

Milan T. Stevančević

*Beogradska škola heliocentrične
elektromagnetne seizmologije*
Belgrade School of Heliocentric Electromagnetic Seismology

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Heliocentrična elektromagnetna seizmologija predstavlja nov naučni pristup zasnovan na prirodnoj elektromagnetnoj sili i energijama koje dolaze sa Sunca. Zemljotres je najsavršenija prirodna pojava koja pokazuje svu veličanstvenost Prirode.

Heliocentrična seizmička istraživanja započeta su 1977. godine posle bukureštanskog zemljotresa od 7,2 stepena.



Milan T. Stevančević (2006. godina)

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Predgovor

Prirodne katastrofe na Zemlji oduvek su ulivale strah kod ljudi širom sveta. Nije ni čudo, pamti se, a i zapisano je mnoštvo katastrofa koje su uzrokovale ogroman broj stradalih, na hiljade, desetine hiljada, ponekad i stotine hiljada ljudi. Tu su tropski cikloni i tornada, orkanski vetrovi, ekstremne količine padavina, snežne oluje, poplave, odroni, pa zatim zemljotresi i vulkani. Aktivnostima vulkana prethode znaci, ukoliko se ozbiljno shvate, daju dovoljno vremena da se stanovnici sklone na dovoljno daleko bezbedno mesto. Kod meteoroloških ekstremnih pojava, razvojem satelitske i radarske tehnike i sistema upozorenja, mogu da se ublaže posledice i stradanje ljudi. Predznaci zemljotresa su još uvek tajnoviti, udar nastaje naglo, traje kratko, a posledice se vide istog trenutka, razaranje i smrt.

Milan Stevančević, autor ove knjige, je elektroinženjer sa odličnim znanjem elektromagnetizma i matematike koje je stekao na elektrotehničkom fakultetu u Beogradu.

U višedecenijskoj praksi bavio se telekomunikacijama a to ga je neumoljivo povezal sa zakonima prostiranja energije na Zemlji, pre svega u atmosferi. Uočio je da zavise od vremenskih prilika i neprilika. Idući za tragom tih uzročno-posledičnih događaja uputio se ka Suncu, odakle na planetu Zemlju stiže energija za pokretanje meteoroloških procesa. Javnosti je predstavio nova saznanja o značaju elektromagnetne sile kao nematerijalne i naelektrisanih čestica Sunčevog vetra kao materijalne komponente u stvaranju oblaka, kiše, vetra i sistema vrtložnih kretanja u atmosferi Zemlje.

U stručnim meteorološkim krugovima njegove teorijske postavke heliocentričnog tumačenja nisu obručke prihvaćene, čak suprotno, više je bilo kritičkih tonova, ili jednostavno rečeno, nerazumevanja i neshvatanje suštine. A njegove teorijske postavke su zasnovane na univerzalnim zakonima kosmosa: elektromagnetna i gravitaciona sila su pokretačke sile svih procesa uz pretvaranje njihove energije u druge vidove.

Vremenom, pored atmosferskih procesa, primenio je univerzalne zakone prirode na druge procese na Zemlji, pre svega na zemljotrese. Uočio je povezanost pobuđenosti električnog i magnetnog polja Zemlje u vreme dolaska i kretanja naelektrisanih čestica Sunčevog vetra (mlazna struja u meteorologiji) i područja sa pojavom zemljotresa.

Matematičkim aparatom, uz primenu zakona prenosa energije, objasnio je uzroke i nastanak zemljotresa. U stručnim krugovima seizmološke nauke naišao je na izraženo neslaganje.

Za većinu istraživača prirodnih pojava, ove hipoteze su još uvek van domašaja njihove moći rasuđivanja a pored toga nemaju ni hrabrosti da unutar ustaljenog i tromog sistema znanja i opšteprihvaćenog mišljenja iskorače ka novim idejama. Ideje, stavove i hipoteze nemilosrdno kritikuju a da se nisu upustili u ozbiljna istraživanja u toj oblasti (neargumentovano rasuđivanje). Poznati nemački filozof Artur Šopenhauer (1788-1860), pre nepuna dva veka, napisao je u svom delu *Eristička dijalektika*: „Opšteprihvaćenost nekog mišljenja nije, ozbiljno uzev, nikakav dokaz, pa čak ni dokaz o verovatnoći njegove ispravnosti. Oni koji to tvrde moraju da pretpostave da vremenska udaljenost oduzima opšteprihvaćenosti njenu dokaznu moć, jer bi inače svi morali da se sete svojih starih zabluda, koje su izvesno vreme važile kao istinite, npr. Ptolomejev sistem.

Ono što se zove opšteprihvaćeno mišljenje, otvoreno uzev, mišljenje je dve ili tri osobe, koje su ga prve smislile ili izložile, tvrdile da je ono istinito, i kojima se dobronamerno poverovalo da su ga temeljito proverile.

Zavedeni predrasudom o njihovoj priznatoj stručnosti, prvo ga je prihvatilo nekoliko drugih osoba. Njima su, opet, poverovali mnogi drugi, kojima je tromost mišljenja nalagala da odmah poveruju, a ne da mukotrпно proveravaju. Tako je iz dana u dan rastao broj takvih, na mišljenju tromih i lakovernih pristalica. Kada je opšteprihvaćeno mišljenje zadobilo dobar deo glasova, njegove pristalice su objašnjavale da je to postignuto time što njegove činjenice odgovaraju pravom stanju stvari.

Oni preostali sada su bili primorani da dopuste da važi ono što je opštevažee, da im ne bi prikačili da su neposlušni, jer se bune protiv opšteprihvaćenog mišljenja, i da su sveznalice koje žele da budu pametnije od ostalog sveta. Sada je prihvatanje postalo obaveza. Manjina sposobna da rasuđuje mora da ćuti, a oni kojima je dopušteno da govore potpuno su nesposobni da oforme sopstveno mišljenje i sopstveni sud. Oni su puki odjek tuđeg mišljenja, ali su utoliko žešći i netrpeljiviji branioci tog mišljenja. Jer, kod onog ko drugačije misli, oni ne mrze toliko tuđe mišljenje za koje se onaj opredelio, nego smelost da sam prosuđuje, što sami nikad ne pokušavaju i čega su prećutno svesni. Ukratko, samo mali broj ume da misli, ali svako želi da ima mišljenje. Šta njima onda drugo preostaje nego da, umesto da ga sami oforme, uzmu već oformljeno od drugih.“

Od Galileja i Kopernika naučno tumačenje prirodnih pojava na Zemlji počinje da uzima u obzir saznanja o vanzemaljskom svetu.

Astronomija je prva iskoračila u tom smeru, na to se nadovezuju meteorologija sa klimatologijom, koje se još nisu izdvojile kao posebne naučne discipline, i koje se polako okreću Suncu i utvrđuju povezanost njegove promenljive aktivnosti sa klimom na Zemlji (mala ledena doba).

Zatim sledi astronomska teorija klime Milutina Milankovića (Kanon osunčavanja), a poslednjih nekoliko decenija istraživanje povezanosti klime i vremena sa vanzemaljskim energijama, pre svega sa Sunca, u punom je zamahu. Deo meteorološke nauke još uvek se drži zemaljskih uzroka, a seizmologija još uvek čvrsto stoji na ovozemaljskim energijama, mada postoje prvi znaci koji ukazuju na promene.

Autor ove knjige je još pre nekoliko decenija ukazao da je električna komponenta energije sa Sunca uzročnik meteoroloških pojava, a magnetna komponenta zemljotresa. U ranijim tekstovima obelodanio je teorijsku osnovu, a u ovoj knjizi detaljno je prikazao i objasnio mehanizam nastanka zemljotresa kao posledice aktivnosti Sunca nazvavši je heliocentrična elektromagnetna seizmologija.

Veliki napredak u oblasti elektronskih tehnologija i kosmičkih istraživanja intenzivirao je razvoj mnogih naučnih oblasti. Nova saznanja neminovno otvaraju nova pitanja ali i preispitivanja postojećih teorijskih postavki. Iznošenje novih ideja različitim pristupima, uz korišćenje najnovije merne satelitske tehnologije, daju osnovu za stvaranje novih naučnih pristupa u mnogim naukama uključujući i seizmologiju.

Pored novih tehnologija, za razvoj određene naučne oblasti bitna je i stvaralačka ideja koja nastaje u čoveku, koji poznaje problematiku u okviru koje ne postoji jedinstveno mišljenje ili se rađa sumnja u postojeću teoriju. Istoričari nauke su utvrdili da su do fundamentalnih otkrića u većini slučajeva došli veoma mladi ljudi ili oni koji su bili novi u istraživačkoj oblasti i stvaraoci koji su pre svega drugačije videli svet i istraživački problem. U nauci snaga argumenata vremenom ruši autoritete.

Polazna hipoteza Milana Stevančevića u razmatranju zemljotresa jeste da magnetne linije interplanetarnog magnetnog polja predstavljaju kosmički dalekovod za prenos energija sa Sunca, koji se u atmosferi Zemlje uočava kao mlazna struja (Jet stream), i da su sve prirodne pojave, i u atmosferi i unutrašnjosti Zemlje, posledica dejstva osnovnih makroskopskih sila, elektromagnetne i gravitacione sile.

Autor definiše prirodne procese na Zemlji, koje odvojeno proučavaju meteorologija, seizmologija i vulkanologija kao povezan lanac događanja koji započinje na Suncu i zatim se prostire interplanetarnim prostorom, atmosferom i unutrašnjošću Zemlje.

Autor prati tok energije sa Sunca i detaljno prati njeno kretanje kroz atmosferu i objašnjava kako dolazi do magnećenja materije, objašnjava krivu magnećenja, remanentnu indukciju, koercitivnu silu i ciklus histerezisa.

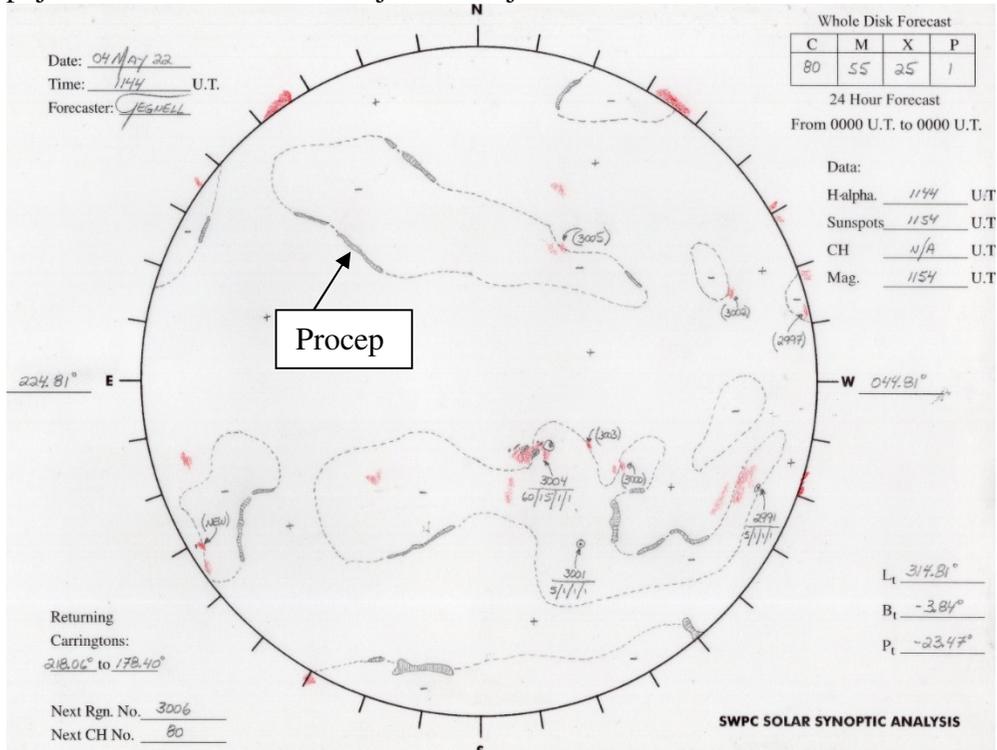
Zatim detaljno objašnjava tok zemljotresa. Sve procese i tumačenja podržava matematičkim aparatom i tako daje potpuno naučno objašnjenje zemljotresa. Veći deo teksta čine teorijska objašnjenja, a na kraju su dati primeri koje je autor analizirao. Na osnovu analize autor zaključuje da se prvi predznaci zemljotresa nalaze na Suncu kada se u geoefektivnoj poziciji nađu aktivni regioni i koronalne rupe. Promenljiva aktivnost Sunca predstavlja osnovu za buduću prognozu zemljotresa.

Teorijske postavke Milana Stevančevića u ovoj naučnoj oblasti predstavljaju potpunu novinu u tumačenju zemljotresa i na neki način kopernikovski preokret. Autor je čvrsto ubeđen da će njegove naučne postavke vremenom biti prihvaćene u naučnim krugovima.

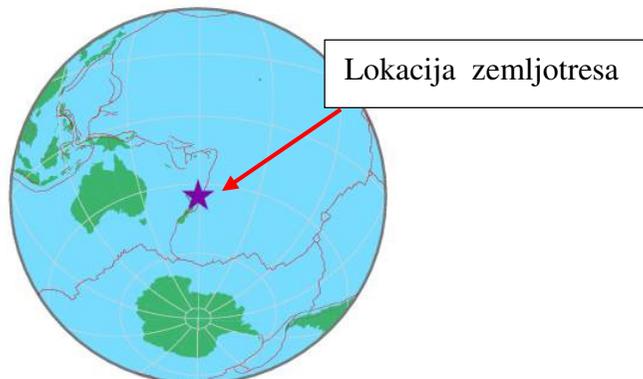
Knjiga predstavlja dragoceno štivo za stručnjake tog profila, nezavisno da li će se složiti ili ne sa autorovim stavovima, a i za ostale čitaoce koji su zainteresovani za tumačenje prirodnih procesa na Zemlji.

Nedeljko Todorović, dipl. meteorolog

Sve aktivnosti na Suncu počinju od procepa između dva magnetna polja različite polarizacije. Magnetna polja su izvor energije svih prirodnih pojava u atmosferi i unutrašnjosti Zemlje.



Seizmička kretanja na Zemlji javljaju na procepima između dve tektonske ploče koje indukcijom čestica Sunčevog vetra namagnetiše Sunce. Indukcija je osnovni prirodni proces za nastanak zemljotresa



Tektonske ploče na Zemlji

Zahvalnica



Izražavamo veliku zahvalnost Nacionalnoj srbskoj svemirskoj agenciji i gospodinu Nebojši Zdravkoviću na nesebičnoj pomoći kako bi ova knjiga bila objavljena.

1.1.1. Introduction

It is known that the Earth is located in the magnetic field of the Sun and is connected by magnetic lines with the Sun. The lines of the Earth's magnetic field and the lines of the Sun's magnetic field connect through the Planetary Magnetic Gate and thus form one unbreakable Sun-Earth system. If the magnetic line of the interplanetary magnetic field is a cosmic transmission line for the transfer of energy from the Sun, then the energies that create earthquakes are also transmitted through the cosmic transmission line. Nothing happens by itself and all natural phenomena are created in the atmosphere and interior of the Earth by one and the same force, electromagnetic, from one and the same source, the Sun. When an electric current is passed through a conductor located in a magnetic field, a mechanical force called electromagnetic force acts on it. Electromagnetic force is created by the interaction of electric current and magnetic field.

This finding clearly indicates that natural phenomena on Earth cannot be considered in a geocentric approach, regardless of what is happening in the Sun and interplanetary space. Newton's first law of motion is: every body remains in a state of rest or regular motion until it is acted upon by an external force. There are many scientific disagreements in the current geocentric seismology. None of the recognized mechanisms that explain the nature of earthquakes can satisfy the condition for the appearance of an electromagnetic wave. The existence of an electromagnetic wave requires the existence of an electric current, which in turn requires the existence of a force, which can break the structure of an atom when two tectonic plates collide. As such a force does not exist on the planet Earth, it calls into question the entire valid theoretical setting of the earthquake.

If it is known that an earthquake can be measured at great distances from the hypocenter and that no physical force has the ability to act at a distance, then the theoretical basis of an earthquake should be sought in natural macroscopic forces that have the ability to act at a distance. In order to explain this natural phenomenon, modern materialist physics introduces the concept of the physical field, through which the forces of interaction are transmitted. However, the introduction of the concept of material physical field is not in accordance with intangible natural forces, so the identification of material physical field with intangible natural field has no scientific basis. Simply put, modern science has no explanation for the ability of natural forces to act at a distance. Earthquakes are natural phenomena whose theoretical basis is not sufficiently understood and explained. In order to understand the new foundations of earthquakes, it is necessary to explore some other scientific approaches.

2.1.1. Uvod

Poznato je da se Zemlja nalazi u magnetnom polju Sunca i da je povezana magnetnim linijama sa Suncem. Linije magnetnog polja Zemlje i linije magnetnog polja Sunca spajaju se kroz **Planetarna magnetna vrata** i tako čine jedan ne raskidivi sistem Sunce-Zemlja. Ako magnetna linija interplanetarnog magnetnog polja predstavlja kosmički dalekovod za prenos energija sa Sunca, onda se i energije koje stvaraju zemljotrese prenose kosmičkim dalekovodom. Ništa se ne događa samo od sebe a sve prirodne pojave stvara u atmosferi i unutrašnjosti Zemlje jedna ista sila, elektromagnetna, iz jednog istog izvora, Sunca. Kada se kroz provodnik koji se nalazi u magnetnom polju propusti električna struja na njega deluje mehanička sila koju nazivamo elektromagnetskom silom. Elektromagnetska sila nastaje uzajamnim dejstvom električne struje i magnetskog polja.

Ovo saznanje jasno ukazuje da se prirodne pojave na Zemlji ne mogu razmatrati geocentričnim pristupom nezavisno od dešavanja na Suncu i interplanetarnom prostoru. Prvi Njutnov zakon kretanja glasi: svako telo ostaje u stanju mirovanja ili pravolinijskog kretanja sve dok na njega ne dejstvuje spoljna sila. Postoje mnoge naučne nesaglasnosti u važećoj geocentričnoj seizmologiji.

Nijedan od priznatih mehanizama sa kojim se objašnjava priroda zemljotresa, ne može da zadovolji uslov za pojavu elektromagnetnog talasa. Postojanje elektromagnetnog talasa zahteva postojanje električne struje, što opet zahteva postojanje sile, koja može da razbije strukturu atoma prilikom sudara dve tektonske ploče. Kako takva sila na planeti Zemlji ne postoji, to dovodi u sumnju celokupnu važeću teorijsku postavku zemljotresa.

Ako se zna da se zemljotres može izmeriti na velikim rastojanjima od hipocentra i da nijedna fizička sila nema sposobnost delovanja na daljinu, onda teorijske osnove zemljotresa treba tražiti u prirodnim makroskopskim silama koje imaju sposobnost delovanja na daljinu. Da bi se objasnio ovaj prirodni fenomen, savremena materijalistička fizika uvodi pojam fizičkog polja, čijim se posredstvom prenose sile međusobnog dejstva.

Međutim, uvođenje pojma materijalnog fizičkog polja nije u saglasnosti sa nematerijalnim prirodnim silama pa poistovećivanje materijalnog fizičkog polja sa nematerijalnim prirodnim poljem nema naučnu osnovu. Jednostavno rečeno, savremena nauka nema objašnjenje za sposobnost delovanja prirodnih sila na daljinu. Zemljotresi spadaju u prirodne pojave čija teorijska osnova nije dovoljno sagledana i objašnjena. U cilju sagledavanja novih osnova zemljotresa neophodno je istražiti neke druge naučne pristupe.

2.2.1. Electromagnetic model

The electromagnetic model of earthquakes is a new scientific approach that includes events on the Sun, interplanetary space, the atmosphere and the Earth's interior. The basis of the new approach are the laws of nature given in mathematical form based on natural forces. If there is no singularity in nature, then all natural phenomena have a common basis, which clearly indicates that earthquakes cannot be observed separately from other natural sciences. Based on the current level of knowledge about the occurrence of earthquakes, research should be multidisciplinary and include more scientific disciplines.

The theoretical foundations of heliocentric electromagnetic seismology include electromagnetics, meteorology, physics, chemistry, geography, geology, astronomy, and seismology.

On the other hand, electromagnetic and gravitational forces are the basic natural macroscopic forces of all meteorological, seismological and volcanic phenomena on Earth. These are the only two intangible natural forces that enable mathematical and theoretical scientific understanding of all natural phenomena.

It is known that changing magnetic fields cause changing electric fields and vice versa. Electric fields in the atmosphere and magnetic fields in the Earth's interior are inseparable. Based on the wave impedance $Z = \sqrt{\mu / \epsilon}$, we can claim that meteorological phenomena that occur in the atmosphere are the conversion of the dominant electrical component and earthquakes and volcanoes are the conversion of the dominant magnetic component of the same interplanetary electromagnetic field. Thus we know that lightning is an electrical discharge in the atmosphere and an earthquake is a magnetic discharge inside the Earth.

2.2.2. Relationship between meteorology and seismology

Consider the atmosphere and interior of the Earth as a stationary quasi-stationary system to which energy is brought from the Sun, through the Sun's field \mathbf{K}_s , localized in certain domains within the system, ie in the Earth's atmosphere and interior. If we take into account that in addition to the Sun's field, the field also acts on moving loads

$$\mathbf{K} = - d\mathbf{A} / dt - \text{grad } \phi \dots \dots \dots (2.1.)$$

- where \mathbf{K} comes from the currents and loads in the observed system, then the density of electricity in areas where the field of the Sun acts is

$$\mathbf{J} = \sigma (\mathbf{K}_s + \mathbf{K}) \dots \dots \dots (2.2.)$$

2.2.1. Elektromagnetni model

Elektromagnetni model zemljotresa predstavlja nov naučni pristup koji obuhvata dešavanja na Suncu, interplanetarnom prostoru, atmosferi i u unutrašnjosti Zemlje. Osnova novog pristupa su zakoni prirode dati u matematičkom obliku koji se baziraju na prirodnim silama. Ako u prirodi ne postoji singularitet onda sve prirodne pojave imaju zajedničku osnovu što jasno ukazuje da se zemljotresi ne mogu posmatrati odvojeno od drugih prirodnih nauka. Na osnovu sadašnjeg nivoa saznanja o nastanku zemljotresa istraživanja treba da budu multidisciplinarna i da obuhvataju više naučnih disciplina. Teorijske osnove heliocentrične elektromagnetne seizmologije obuhvataju elektromagnetiku, meteorologiju, fiziku, hemiju, geografiju, geologiju, astronomiju i seizmologiju.

S druge strane, elektromagnetna i gravitaciona sila su osnovne prirodne makroskopske sile svih meteoroloških, seizmoloških i vulkanoloških pojava na Zemlji. To su jedine dve nematerijalne prirodne sile koje omogućavaju matematičko i teorijsko naučno sagledavanje svih prirodnih pojava.

Poznato je da promenljiva magnetska polja izazivaju promenljiva električna polja i obratno. Električna polja u atmosferi i magnetna polja u unutrašnjosti Zemlje su nerazdruživi.

Na osnovu talasne impedanse $Z = \sqrt{\mu/\epsilon}$, možemo da tvrdimo da su meteorološke pojave koje se dešavaju u atmosferi, konverzija dominantne električne komponente a zemljotresi i vulkani konverzija dominantne magnetne komponente jednog istog interplanetarnog elektromagnetnog polja. Tako znamo da je munja električno pražnjenje u atmosferi a zemljotres magnetno pražnjenje u unutrašnjosti Zemlje.

2.2.2. Povezanost meteorologije i seizmologije

Posmatrajmo atmosferu i unutrašnjost Zemlje kao jedan nepokretan kvazistacionarni sistem kome se energija dovodi sa Sunca, posredstvom polja Sunca \mathbf{K}_s , lokalizovanog u određenim domenima unutar sistema, odnosno u atmosferi i unutrašnjosti Zemlje. Ako se uzme u obzir da na pokretna opterećenja, pored polja Sunca \mathbf{K}_s dejstvuje i polje

$$\mathbf{K} = -d\mathbf{A} / dt - \text{grad } \phi \dots \dots \dots (2.1.)$$

-gde polje \mathbf{K} potiče od struja i opterećenja u posmatranom sistemu, onda je gustina električne struje u sredinama gde dejstvuje polje Sunca jednaka

$$\mathbf{J} = \sigma (\mathbf{K}_s + \mathbf{K}) \dots \dots \dots (2.2.)$$

If equation

$$\mathbf{J} = \sigma (\mathbf{K}_s - (d\mathbf{A} / dt) - \text{grad } \varphi) \dots \dots \dots (2.3.)$$

is multiplied scalar with \mathbf{J} / σ and integrated by volume \mathbf{V} , which the observed system occupies, then the equation of energy balance system is obtained, that is Earth.

$$\int \mathbf{K}_s \mathbf{J} dV = \int (\mathbf{J}^2 / \sigma) dV + \int \text{grad } \varphi \mathbf{J} dV + \int (d\mathbf{A} / dt) \mathbf{J} dV \dots \dots (2.4.)$$

The equation 2.4. is a **Law of nature** that defines all natural phenomena in the atmosphere and Earth's interior.

Term $\int \mathbf{K}_s \mathbf{J} dV$ on the left side of the equation represents the force which is transferred to Earth through electric field of the Sun.

All members on the right side of the equation shows how the power is distributed within the system considered, and the Earth.

The first term of the right side $\int (\mathbf{J}^2 / \sigma) dV$ represents the power losses Joule's or force which is partly converted into heat.

The second term of the equation $\int \text{grad } \varphi \mathbf{J} dV$ represents the power absorbed by the electric field in the atmosphere.

The third term $\int (d\mathbf{A} / dt) \mathbf{J} dV$ represents the power absorbed by the magnetic fields in Earth's interior, through the components of the electric field - $d\mathbf{A} / dt$.

The second member describes the effect of meteorological phenomena in the atmosphere and the third power of seismic phenomena in the Earth's interior.

For the study of seismology is very important because it represents the third member of the force absorbed by the magnetic field \mathbf{P}_m during its establishment.

If it is known that the $\mathbf{J} = \text{rot } \mathbf{H}$ then the intensity of the magnetic field

$$\mathbf{P}_m = \int (d\mathbf{A} / dt) \mathbf{J} dV = \int (d\mathbf{A} / dt) \text{rot } \mathbf{H} dV \dots \dots \dots (2.5.)$$

If

$$\text{div} [(d\mathbf{A} / dt) \times \mathbf{H}] = \mathbf{H} \text{rot} (d\mathbf{A} / dt) - (d\mathbf{A} / dt) \text{rot } \mathbf{H}$$

Ako jednačinu

$$\mathbf{J} = \sigma (\mathbf{K}_s - (d\mathbf{A} / dt) - \text{grad } \varphi) \dots \dots \dots (2.3.)$$

pomnožimo skalarno sa \mathbf{J} / σ i izvršimo integraljenje po zapremini V , koju zauzima posmatrani sistem, onda se dobija jednačina energetskog bilansa sistema, odnosno Zemlje.

$$\int \mathbf{K}_s \mathbf{J} dV = \int (\mathbf{J}^2 / \sigma) dV + \int \text{grad } \varphi \mathbf{J} dV + \int (d\mathbf{A} / dt) \mathbf{J} dV \dots \dots (2.4.)$$

Jednačina 2.4. predstavlja **Zakon prirode** koji definiše sve prirodne pojave u atmosferi i unutrašnjosti Zemlje.

Član $\int \mathbf{K}_s \mathbf{J} dV$ na levoj strani jednačine, predstavlja snagu koja se posredstvo električnog polja Sunca dovodi Zemlji.

Svi članovi na desnoj strani jednačine pokazuju kako se ta snaga raspodeljuje unutar posmatranog sistema, odnosno Zemlje.

Prvi član na desnoj strani jednačine $\int (\mathbf{J}^2 / \sigma) dV$ predstavlja snagu Džulovih gubitaka, odnosno snagu koja se jednim delom pretvara u toplotu.

Drugi član jednačine $\int \text{grad } \varphi \mathbf{J} dV$ predstavlja snagu koju apsorbuje električno polje u atmosferi.

Treći član $\int (d\mathbf{A} / dt) \mathbf{J} dV$ predstavlja snagu koju apsorbuje magnetsko polje u unutrašnjosti Zemlje, posredstvom komponente električnog polja - $d\mathbf{A} / dt$

Drugi član opisuje snagu meteoroloških pojava u atmosferi a treći snagu seizmičkih pojava u unutrašnjosti Zemlje.

Za istraživanje seizmologije od izuzetne važnosti je treći član jer predstavlja snagu koju apsorbuje magnetsko polje \mathbf{P}_m za vreme svog uspostavljanja.

Ako se zna da je $\mathbf{J} = \text{rot } \mathbf{H}$ onda je snaga magnetskog polja

$$\mathbf{P}_m = \int (d\mathbf{A} / dt) \mathbf{J} dV = \int (d\mathbf{A} / dt) \text{rot } \mathbf{H} dV \dots \dots \dots (2.5.)$$

Ako je $\text{div} [(d\mathbf{A} / dt) \times \mathbf{H}] = \mathbf{H} \text{rot} (d\mathbf{A} / dt) - (d\mathbf{A} / dt) \text{rot } \mathbf{H}$

Equation 2.5 can be transformed into a form

$$P_m = \int [\mathbf{H} \text{ rot } (d\mathbf{A} / dt)] dV - \int \text{div} [(d\mathbf{A} / dt) \times \mathbf{H}] dV \dots\dots(2.6.)$$

Based on the theorem Gauss-Ostrogratski volume integral can be transformed into surface

$$\int_v \text{div} [(d\mathbf{A} / dt) \times \mathbf{H}] dV = \oint_s \text{div} [(d\mathbf{A} / dt) \times \mathbf{H}] dS \dots\dots\dots(2.7.)$$

If a closed surface S increases to infinity, the intensity of the magnetic field H at points of the surface decreases with 1/r² and has a character of the field current contour at large distances. Also, the intensity of the magnetic vector potential decreases with 1/r² and the integral 2.7 tends to zero.

If $\text{rot } (d\mathbf{A} / dt) = \text{rot } \mathbf{A} = d\mathbf{B} / dt$

then it comes that the force that is consumed during the establishment of a magnetic field is equal

$$P_m = \int [\mathbf{H} d\mathbf{B} / dt] dV \dots\dots\dots(2.8.)$$

If the equation 2.8 is multiplied by dt, energy is obtained which is absorbed by the magnetic field in the Earth's interior under the magnetic induction increase for d**B**.

$$dW_m = \int_v \mathbf{H} d\mathbf{B} dV \dots\dots\dots(2.9.)$$

The total energy is consumed to establish a magnetic field is

$$W_m = \int_v dV \int_{B_0}^{B_m} \mathbf{H} d\mathbf{B} \dots\dots\dots(2.10.)$$

- where **B**₀ is the value of magnetic induction before the onset of induction of electric currents in the Earth's interior, provided that the interior of the Earth has not been previously magnetized.

- **B**_m is the maximum induction in the Earth under the influence of the interplanetary magnetic field.

Jednačina (2.5.) može se transformisati u oblik

$$\mathbf{P}_m = \int_V [\mathbf{H} \operatorname{rot} (d\mathbf{A} / dt)] dV - \int \operatorname{div} [(d\mathbf{A} / dt) \times \mathbf{H}] dV \dots (2.6.)$$

Na osnovu teoreme Gaus-Ostrogratski zapreminski integral može se transformisati u površinski

$$\int_V \operatorname{div} [(d\mathbf{A} / dt) \times \mathbf{H}] dV = \oint_S \operatorname{div} [(d\mathbf{A} / dt) \times \mathbf{H}] dS \dots (2.7.)$$

Ako zatvorena površina S raste u beskonačnost, jačina magnetskog polja \mathbf{H} u tačkama ove površine opada sa $1/r^3$ i ima karakter polja strujne konture na velikim rastojanjima. Takođe, jačina magnetskog vektora potencijala opada sa $1/r^2$ pa integral (2.7.) teži nuli.

Ako je

$\operatorname{rot} (d\mathbf{A} / dt) = \operatorname{rot} \mathbf{A} = d\mathbf{B} / dt$ onda se dobija da je snaga koja se utroši za vreme uspostavljanja magnetskog polja jednaka

$$\mathbf{P}_m = \int_V [\mathbf{H} d\mathbf{B} / dt] dV \dots (2.8.)$$

Kada jednačinu (2.8.) pomnožimo sa dt dobija se energija koju magnetsko polje apsorbira u unutrašnjosti Zemlje pri povećanju magnetske indukcije za $d\mathbf{B}$.

$$dW_m = \int_V \mathbf{H} d\mathbf{B} dV \dots (2.9.)$$

Ukupna energija koja se utroši za uspostavljanje magnetskog polja je

\mathbf{B}_m

$$W_m = \int_V dV \int_{B_0} \mathbf{H} d\mathbf{B} \dots (2.10.)$$

- gde je \mathbf{B}_0 vrednost magnetske indukcije pre početka pojave indukcionih električnih struja u unutrašnjosti Zemlje, pod uslovom da unutrašnjost Zemlje nije ranije magnetisana.

- \mathbf{B}_m predstavlja maksimalnu indukciju u unutrašnjosti Zemlje pod dejstvom interplanetarnog magnetnog polja.

Meteorology, seismology and volcanology make one natural science and man created three sciences out of one in his ignorance of the laws of nature. These three natural sciences define unbreakable chain of natural processes on the Sun, interplanetary space, the atmosphere and Earth's interior. Therefore natural science should be studied as a whole and not individually. The first systematic study of earthquakes in Serbia started on 10 November 1898th within the Belgrade Meteorological Observatory. Then they began the first geomagnetic measurements. Nowadays in Japan seismology is a part of meteorology. Separation of Meteorology and Seismology in Serbia has no scientific justification. Seismology became only silent an observer.

Based on the results of meteorology research, as the queen of all natural sciences, it is the basis of seismology and volcanology. In order to investigate the theoretical foundations of seismic phenomena, it is necessary to introduce a new scientific discipline within the Nature Sciences, which is Heliocentric electromagnetic seismology.

This is the beginning of the birth of a new scientific discipline in our country, Serbie, that allows fundamental studies of seismic phenomena as part of the total cosmic processes with the heliocentric approach. Events in Earth's interior should be explored indirectly using the laws in mathematical form, which are based on natural forces. From the standpoint of science is not important what is recognized in the world, but whether the science is based on natural or imaginary forces. It is known that natural science based on natural forces and any diversion of natural science to the fictitious forces or subjective descriptions of individuals among the alternative or theology. As a final result of the subjective interpretation of the description, there is a **dogma** that can not be proven neither theoretically nor experimentally. In natural sciences, the **Law of nature** is obtained as the research result, which has the mathematical and experimental repeatability.

Today's research on natural phenomena, based on subjective descriptions or fictional forces, such as tectonic forces in seismology, cannot be considered scientific, since fictional forces are within the realm of alternative sciences, so science based on fictional forces is alternative.

Logic as an instrument of valid thinking, mathematical logic, and laws based on natural forces are the basis of the Science of Nature.

Na osnovu jednačine 2.4. dolazimo do saznanja da su meteorologija, seizmologija i vulkanologija jedna *Nauka o Prirodi* a čovek je u svom ne poznavanju **Zakona prirode** od jedne stvorio tri nauke. Ove tri prirodne nauke definišu neraskidivi lanac prirodnih procesa na Suncu, interplanetarnom prostoru, atmosferi i unutrašnjosti Zemlje. Zato *Nauku o Prirodi* treba izučavati u celini a ne pojedinačno. Prva sistematska proučavanja zemljotresa u Srbiji započela su 10. novembra 1898. godine u okviru Beogradske meteorološke opservatorije. Tada su započela i prva zemnomagnetna merenja. U Japanu je seizmologija u okviru meteorologije a razdvajanje meteorologije i seizmologije u Srbiji nema naučno opravdanje pa je seizmologija postala samo nemi posmatrač. Na osnovu rezultata istraživanja meteorologija, kao kraljica svih prirodnih nauka, predstavlja osnovu seizmologije i vulkanologije. U cilju istraživanja teorijskih osnova seizmičkih pojava, potrebno je uvesti novu naučnu disciplinu

Heliocentričnu elektromagnetnu seizmologiju.

To je početak rađanja jedne nove naučne discipline u našoj zemlji, Srbiji, koja omogućava fundamentalna istraživanja seizmičkih pojava kao delu ukupnih kosmičkih procesa sa heliocentričnim pristupom. Dešavanja u unutrašnjosti Zemlje treba istraživati indirektno koristeći zakone u matematičkoj formi koji su zasnovani na prirodnim silama. Sa stanovišta nauke nije bitno šta je priznato u svetu, već da li nauka počiva na prirodnim ili izmišljenim silama.

Poznato je da prirodne nauke počivaju na prirodnim silama a svako skretanje prirodne nauke prema izmišljenim silama ili subjektivnim opisima pojedinaca spada u alternativu ili teologiju.

Kao krajni rezultat subjektivnog tumačenja opisa javlja se **dogma** koja se ne može dokazati ni teorijski ni eksperimentalno. U prirodnim naukama kao rezultat istraživanja dobija se Zakon prirode koji ima matematičku i eksperimentalnu ponovljivost.

Današnja istraživanja prirodnih pojava, na osnovu subjektivnih opisa ili izmišljenih sila, kao što su tektonske sile u seizmologiji, ne mogu se smatrati naučnim jer izmišljene sile spadaju u domen alternativnih nauka pa je i nauka koja se bazira na izmišljenim silama alternativna.

Logika kao instrument valjanog mišljenja, matematička logika i zakoni koji su zasnovani na prirodnim silama predstavljaju osnovu *Nauke o prirodi*.

2.3.1. Magnetization of matter

It is known that all substances are subject to magnetization and that their presence contributes to the change of the magnetic field. When a medium is introduced into a foreign magnetic field, magnetization occurs. Thus, some substances have the ability to quickly reach the degree of saturation, and in others it happens slowly. When the foreign magnetic field is removed, the magnetization, in principle, disappears. However, in environments whose chemical composition contains iron, nickel, cobalt or some ferromagnetic alloys, the magnetization is maintained even after the cessation of the foreign magnetic field. The magnetization of matter is conditioned by the existence of magnetic moments in atoms, whose elementary carriers are electrons and protons, ie the nuclei of atoms.

If it is assumed that the circulation of an electron around the nucleus of an atom is in the shape of a circle, then the trajectory of the electron can be viewed as a single current contour that can be represented by a magnetic moment.

$$m = IS$$

- This moment is called the orbital magnetic moment of the electron.

Suppose an interplanetary magnetic field is a foreign field that magnetizes an environment. Before the beginning of magnetization, the magnetic moments of the observed medium are oriented in all directions.

When magnetization begins, under the action of electromagnetic forces, elementary current contours tend to be positioned so that their micro fields are positioned in the direction and direction with the foreign excited interplanetary magnetic field. The higher the number of oriented current circuits, the higher the degree of magnetization of the medium. When we talk about the degree of magnetization of a medium, instead of electric currents, we describe the magnetization by magnetic moments, which has great similarities as when the current contour is defined by the magnetic moment.

After a long action of the interplanetary field, all current contours are completely oriented, and then we say that magnetic saturation has occurred.

2.3.1. Magnetisanje materije

Poznato je da su sve materije podložne magnetisanju i da svojim prisustvom doprinose promeni magnetskog polja. Kada se neka sredina unese u strano magnetno polje tada dolazi do magnetisanja. Tako neke materije imaju sposobnost brzog dostizanja stepena zasićenosti a kod nekih drugih to se događa sporo. Kada se ukloni strano magnetno polje namagnećenost, u principu nestaje. Međutim, u sredinama čiji hemijski sastav sadrži gvožđe, nikel, kobalt ili neke feromagnetske legure, namagnećenost se zadržava i posle prestanka dejstva stranog magnetnog polja. Magnetisanje materije uslovljeno je postojanjem magnetskih momenata u atomima, čiji su elementarni nosioci elektroni i protoni, odnosno jezgra atoma.

Ako se pretpostavi da je kruženje elektrona oko jezgra atoma u obliku kruga, onda se trajektorija elektrona može posmatrati kao jedna strujna kontura koja se može predstaviti magnetskim momentom.

$$\mathbf{m} = I\mathbf{S}$$

- Ovaj moment naziva se orbitalni magnetski moment elektrona.

Pretpostavimo da je interplanetarno magnetno polje, strano polje, koje vrši magnećenje neke sredine. Pre početka magnetisanja, magnetski momenti posmatrane sredine orijentisani su u svim pravcima.

Kada započne magnetisanje, pod dejstvom elektromagnetskih sila, elementarne strujne konture imaju tendenciju da se postave tako da se njihova mikro polja postave u pravcu i smeru sa stranim pobudnim interplanetarnim magnetnim poljem. Što je broj orijentisanih strujnih kontura veći to je stepen magnetisanja sredine veći. Kada se govori o stepenu magnetisanja neke sredine, umesto električnih struja, namagnećenost opisujemo putem magnetskih momenata, što ima velike sličnosti kao kada se strujna kontura definiše magnetskim momentom.

Posle dužeg dejstva interplanetarnog polja dolazi do potpune orijentacije svih strujnih kontura i tada kažemo da je došlo do magnetnog zasićenja.

Macroscopic size, that characterizes the magnetization state of an environment, is defined by the magnetic moment density vector

$$\mathbf{M} = \Sigma \mathbf{m} / \Delta V \dots\dots\dots(3.1.1.)$$

- where $\Sigma \mathbf{m}$ is the vector sum of magnetic moments of ampere's currents in the element of volume ΔV .

This means that the element of magnetized environment, where the density of magnetic moment is M , has a magnetic moment

$$d\mathbf{m} = \mathbf{M}dV \dots\dots\dots(3.1.2.)$$

For all types of chemical elements, except the ferromagnetic ones, the density of the magnetic moment is linearly proportional to the intensity of the magnetic field H

$$\mathbf{M} = \chi \mathbf{H} \dots\dots\dots(3.1.3.)$$

- where χ is unnamed number and it is called the susceptibility of the matter.

Based on the relation (1.3.9. Doc. 1. Theoretical bases of the movement of solar wind particles in interplanetary space) we know that the coupling of forces in interplanetary space tends to reverse the current contour of free electric loads so that the vector of its magnetic moment m coincides in the direction and the direction with the magnetic induction vector B .

On the other hand, in the environment where magnetization takes place, magnetic moments are oriented towards the direction of the interplanetary magnetic field, which indicates that the same process occurs in interplanetary space and the Earth's interior.

This is another proof that there is no singularity in nature, and the only difference is that there are convective electric currents in interplanetary space and conductive electric currents in the interior of the Earth. From the point of view of electromagnetics, there is no difference between convective and conductive electric currents.

Everything indicates that there are real conditions for the interplanetary magnetic field to magnetize an environment in the Earth's interior. This could be concluded by comparing diagram 1.8. and diagram 1.9. from the document Doc. 1. Theoretical bases of solar wind particle motion in interplanetary space.

Makroskopska veličina kojom se karakteriše stanje namagnećenosti neke sredine definiše vektor gustine magnetskog momenta

$$\mathbf{M} = \Sigma \mathbf{m} / \Delta V \dots\dots\dots(3.1.1.)$$

-gde je $\Sigma \mathbf{m}$ vektorski zbir magnetskih momenata Amperovih struja u elementu zapremine ΔV .

To znači da element namagnećene sredine, gde je gustina magnetskog momenta \mathbf{M} , ima magnetski moment

$$d\mathbf{m} = \mathbf{M}dV \dots\dots\dots(3.1.2.)$$

Za sve vrste hemijskih elemenata, sem feromagnetskih, gustina magnetskog momenta linearno je srazmerna jačini magnetnog polja H

$$\mathbf{M} = \chi \mathbf{H} \dots\dots\dots(3.1.3.)$$

- gde je χ neimenovani broj i naziva se susceptibilnost materije.

Na osnovu relacije (1.3.9. *Doc. 1. Teorijske osnove kretanja čestica Sunčevog vetra u interplanetarnom prostoru*) znamo da spreg sila u interplanetarnom prostoru ima tendenciju da okrene strujnu konturu slobodnih električnih opterećenja tako da se vektor njenog magnetskog momenta \mathbf{m} poklopi po pravcu i smeru sa vektorom magnetske indukcije \mathbf{B} .

Sa druge strane, u sredini kod koje se vrši magnećenje, magnetski momenti orijentišu se prema pravcu i smeru interplanetarnog magnetnog polja što ukazuje da se isti proces događa i u interplanetarnom prostoru i u unutrašnjosti Zemlje.

To je još jedan od dokaza da u prirodi ne postoji singularitet a jedina razlika je što u interplanetarnom prostoru postoje konvekcione a u unutrašnjosti Zemlje kondukcione električne struje. Sa stanovišta elektromagnetike razlika između konvekcioni i kondukcioni električnih struja ne postoji.

Sve ukazuje da postoje realni uslovi da interplanetarno magnetno polje vrši magnećenje neke sredine u unutrašnjosti Zemlje. To se moglo zaključiti upoređenjem dijagrama 1.8. i dijagrama 1.9. iz dokumenta *Doc. 1. Teorijske osnove kretanja čestica Sunčevog vetra u interplanetarnom prostoru*.

2.3.2. Magnetization curves

Suppose it is an interplanetary magnetic field, a foreign field that acts on some environment in the Earth's interior. As the strength of the interplanetary magnetic field H increases, from point O to point A , the density of the magnetic moment in the observed medium will begin to increase. The curve from point O to A is called the Original Magnetization Curve..

Magnetization Curve.

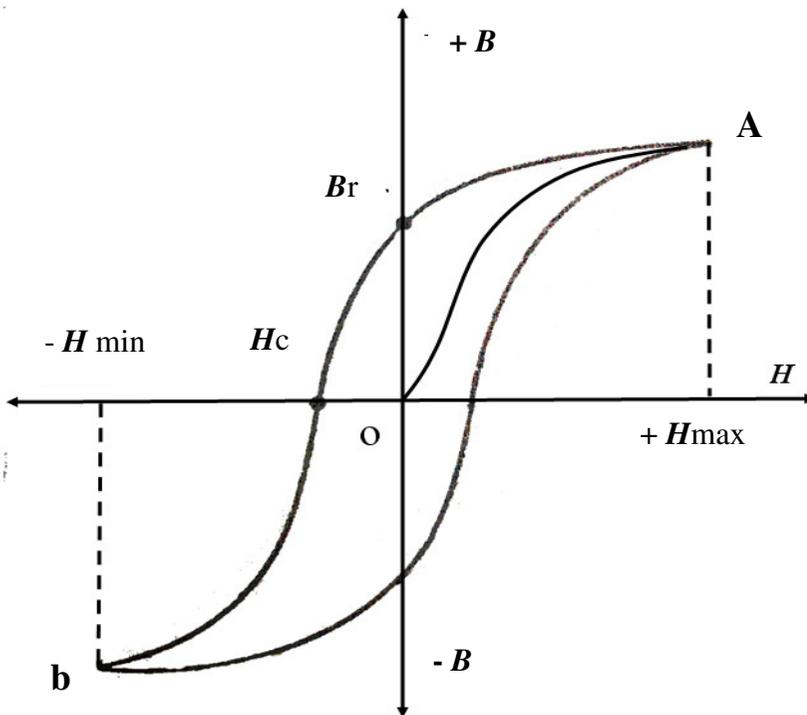


Fig 2.1.

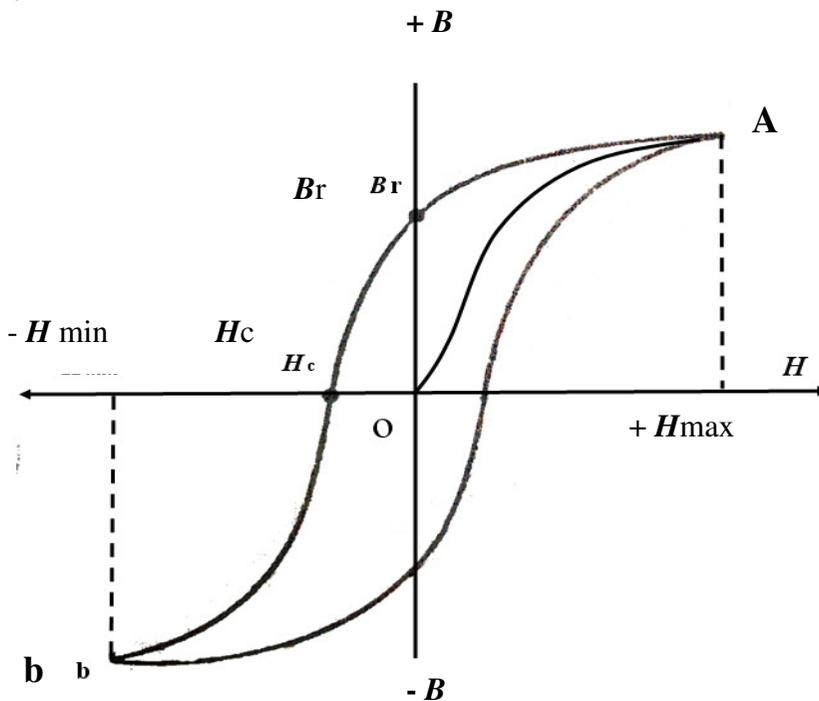
It comes to saturation in the point a , and the interplanetary magnetic field reaches a maximum value H_{max} .

This means that all magnetic moments, located in environment of the magnetization, are oriented in the direction of the external interplanetary magnetic field. Any further increase in the interplanetary magnetic field has no influence on the increase in the magnetization of environment.

2.3.2. Krive magnećenja

Pretpostavimo da je interplanetarno magnetno polje, strano polje koje deluje na neku sredinu u unutrašnjosti Zemlje. Sa povećanjem jačine interplanetarnog magnetnog polja H , od tačke O do tačke A , gustina magnetskog momenta u posmatranoj sredini počće da raste. Kriva od tačke O do A naziva se **Prvobitna kriva magnećenja**.

Kriva magnećenja



Prikaz 2.1.

U tački A dolazi do zasićenja a interplanetarno magnetno polje dostiže maksimalnu vrednost H_{max} .

To znači da su svi magnetski momenti, koji se nalaze u sredini koja se magnetiše, orijentisani u pravcu i smeru spoljašnjeg interplanetarnog magnetnog polja. Svako dalje povećanje jačine interplanetarnog magnetnog polja nema uticaja na povećanje magnećenja sredine.

When the intensity of the interplanetary magnetic field is reduced, the magnetic induction B from point A to B_r will also decrease. When the intensity of the interplanetary magnetic field is equal to zero, the magnetic induction does not disappear, but retains a value called the remanent induction which is marked with B_r .

The appearance of remanent induction B_r following the reduction of the interplanetary magnetic field is explained by the magnetic dipoles that are not returning all to the position of non-magnetization.

Under the change in the direction of the interplanetary magnetic field H , the magnetic induction B will decrease, and to a certain point it will be equal to zero. This point is marked with H_c , and is called the **coercive field or coercive force**.

The product of remanent induction B_r and the coercive field H_c describes the magnetic properties of the site that is magnetized.

When the intensity of the interplanetary magnetic field reaches the value $-H_{min}$, the maximum negative value of magnetic induction is obtained. If the intensity of the interplanetary magnetic field changes again from $-H_{max}$ to $+H_{max}$ and again to $-H_{max}$, the hysteresis cycle for the observed environment is obtained.

Size of the hysteresis cycle depends on the intensity of the interplanetary magnetic field.

Kada se smanji jačina interplanetarnog magnetnog polja smanjiće se i magnetna indukcija \mathbf{B} od tačke \mathbf{A} do \mathbf{Br} . Kada jačina interplanetarnog magnetnog polja bude jednaka nuli, magnetna indukcija ne isčezava već zadržava neku vrednost koja se zove **Remanentna indukcija** i obeležava se sa \mathbf{Br} .

Pojava remanentne indukcije \mathbf{Br} posle smanjenja interplanetarnog magnetnog polja objašnjava se tako što se svi magnetni dipoli ne vraćaju u položaj nemagnećenja.

Pri promeni smera interplanetarnog magnetnog polja \mathbf{H} smanjiće se magnetska indukcija \mathbf{B} , i u određenom trenutku ona će biti jednaka nuli. Ova tačka obeležava se sa \mathbf{Hc} , i naziva se **koercitivno polje** ili **koercitivna sila**.

Proizvod remanentne indukcije \mathbf{Br} i koercitivnog polja \mathbf{Hc} opisuje magnetne osobine lokacije koja se magnetiše.

Kada jačina interplanetarnog magnetnog polja dostigne vrednost $-\mathbf{Hmin}$ u tački \mathbf{b} dobija se maksimalna negativna vrednost magnetske indukcije. Ako se jačina interplanetarnog magnetnog polja ponovo menja od $-\mathbf{Hmax}$ do $+\mathbf{Hmax}$ i ponovo do $-\mathbf{Hmax}$ dobija se ciklus histerezisa za posmatranu sredinu.

Veličina ciklusa histerezisa zavisi od jačine interplanetarnog magnetnog polja i magnetskih karakteristika sredine koja se magnetiše.

2.3.3. Magnetization Energy

Energy density per unit volume, which is consumed during the process of magnetization of an environment is

$$dW_m / dV = \int H dB$$

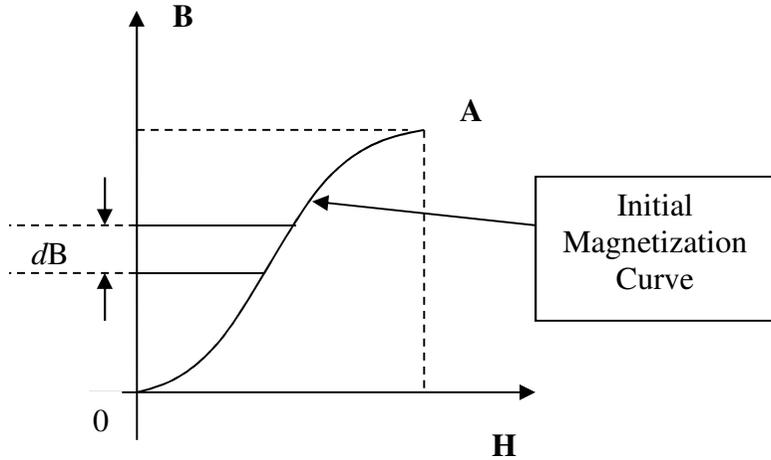


Fig. 2.2.

If we assume that the magnetization is performed at the original magnetization curve and if there is a linear dependence $\mathbf{B} = \mu \mathbf{H}$ between the magnetic induction and the intensity of the interplanetary magnetic field, then we get that

$$dW_m / dV = \mu \int_0^H H dH = (\mu / 2) H^2 \dots \dots \dots (3.6.1.)$$

$$dW_m / dV = \frac{1}{2} \mathbf{BH}$$

The total energy which is consumed during the magnetization of an environment is

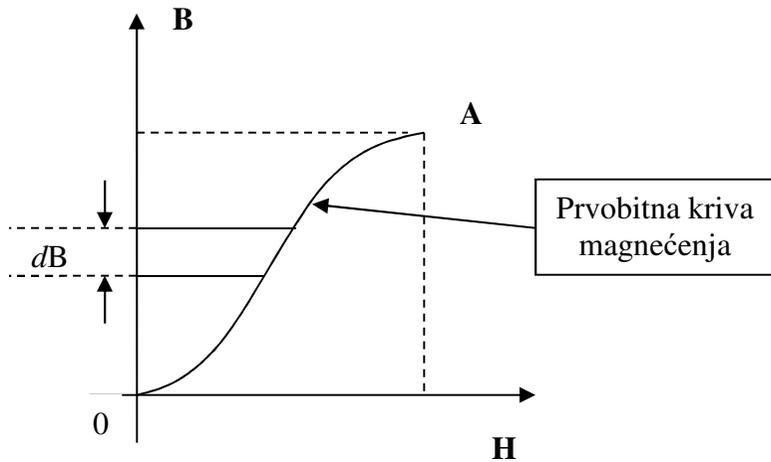
$$W_m = \frac{1}{2} \int_v \mathbf{BH} dV \dots \dots \dots (3.6.2.)$$

In the general case when the intensity of the interplanetary magnetic field reduces, it comes to degradation of the system so that a part of energy consumed can be returned because the energy is ‘accumulated’ in the magnetic field.

2.3.3. Energija magnećenja

Gustina energije po jedinici zapremine, koja se utroši za vreme procesa magnećenja neke sredine iznosi

$$dW_m / dV = \int H dB$$



Prikaz 2.2.

Ako pretpostavimo da se magnećenje vrši po prvobitnoj krivoj magnećenja i ako između magnetske indukcije i jačine interplanetarnog magnetnog polja postoji linearna zavisnost $B = \mu H$ dobija se da je

$$dW_m / dV = \mu \int_0^H H dH = (\mu / 2) H^2 \dots \dots \dots (3.6.1.)$$

$$dW_m / dV = 1/2 BH$$

Ukupna energija koja se utroši za vreme magnećenja sredine je

$$W_m = 1/2 \int_v BH dV \dots \dots \dots (3.6.2.)$$

U opštem slučaju kada se smanji jačina interplanetarnog magnetnog polja, dolazi do razgradnje sistema pa se jedan deo utrošene energije može vratiti jer je energija "akumulirana" u magnetnom polju.

2.3.4. Energy Losses During Magnetization

During Magnetization of an environment it comes to energy losses due to irreversible processes. The energy consumed for changing the magnetic field in an environment is equal to $\int \mathbf{H} d\mathbf{B}$ (Fig. 2.2). When \mathbf{H} and $d\mathbf{B}$ are of the same sign, the energy density of $\mathbf{H}d\mathbf{B}$ is positive, that is, environment that is magnetized absorbs the energy of the interplanetary magnetic field.

In the case of different sign of \mathbf{H} and $d\mathbf{B}$, environment that is magnetized releases energy. The total energy absorbed by an environment during magnetization is equal to

$$dW_m / dV = \oint \mathbf{H} d\mathbf{B}$$

Power of losses due to hysteresis is directly proportional to the number of cycles of the magnetization per unit time. This means that at the increase in the intensity of the magnetic field, an environment that is magnetized receives more energy than the energy returned to the source by environment.

2.3.5. The temperature of the Earthquake focus

The first term $\int (\mathbf{J} / \sigma) dV$ on the right side of the equation 2.4 defines the power that is converted into heat, which is manifested in the increase of temperature of the earthquake focus. The increasing in temperature of the earthquake focus occurs in two steps. The first temperature increase occurs due to change in the magnetic state of the earthquake focus, and the second one during the induction earthquake, that is, effects of the energy accumulated in the magnetic field in the gap or fault.

Because of the small magnetic dipole efficiency, it comes to large losses in the earthquake focus and a sudden rise in temperature, that is, to the heated magma. The high temperature of magma in the earthquake focus is the constant companion of magnetization and magnetization reduction.

Definitions:

- Gap is the zone of fractures between two tectonic plates
- Fault is the zone of fractures between two blocks of rock within the tectonic plates.

Defining the gaps and faults, it was necessary because their electromagnetic properties are different. The magnetic capacity of the gap is far greater than of the magnetic capacity fault.

2.3.4. Gubici energije pri magnećenju

Prilikom magnećenja neke sredine u unutrašnjosti Zemlje dolazi do gubitaka energije zbog nepovratnih procesa. Energija koja se utroši za promenu magnetnog polja sredine jednaka je HdB (Prikaz 2.2.)

Kada su H i dB istog znaka, gustina energije HdB je pozitivna, odnosno sredina koja se magnetiše apsorbuje energiju interplanetarnog magnetnog polja. U slučaju da su H i dB različitog znaka, sredina koja je namagnetisana oslobađa energiju.

Ukupna energija koju neka sredina apsorbuje prilikom magnećenja jednaka je

$$dW_m/dV = \oint HdB$$

Snaga gubitaka usled histerezisa direktno je proporcionalna broju ciklusa magnećenja u jedinici vremena. To znači da je prilikom povećanja intenziteta magnetnog polja, sredina koja se magnetiše prima veću energiju, nego što je energija koju sredina vraća izvoru.

2.3.5. Temperatura hipocentra

Prvi član $\int (\mathbf{J} / \sigma) dV$ na desnoj strani jednačine 2.4. određuje snagu koja se pretvara u toplotu što se manifestuje u povećanju temperature hipocentra. Povećanje temperature hipocentra događa se iz dva koraka. Prvo povećanje temperature dolazi usled promene magnetskog stanja hipocentra a drugo, prilikom indukcionog zemljotresa, odnosno dejstva energije koja je akumulirana u magnetnom polju procepa ili raseda.

Zbog malog korisnog dejstva magnetnog dipola u hipocentru dolazi do velikih gubitaka i naglog porasta temperature, odnosno do usijanja magme. Visoka temperatura magme u hipocentru je stalni pratilac magnećenja i razmagnećivanja.

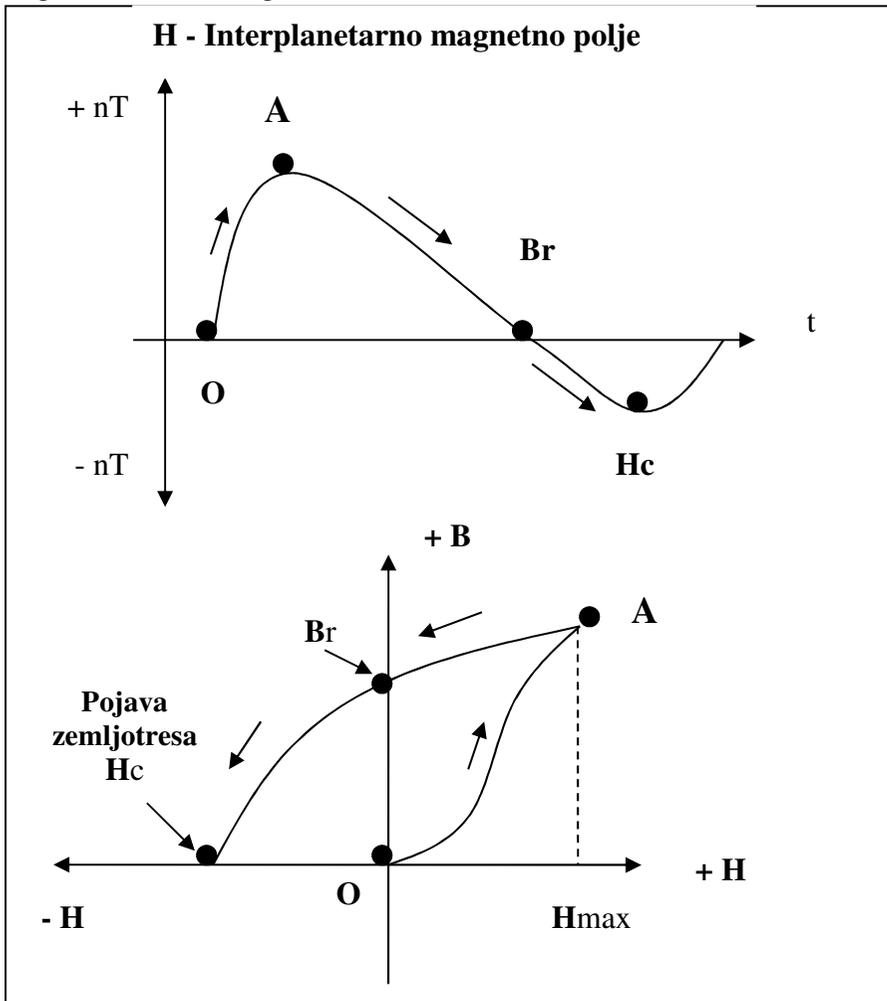
Definicije:

- procep je zona između dve tektonske ploče;
- rased je zona preloma između dva bloka stena unutar tektonskih ploča.

Definisanje procepa i raseda bilo je neophodno jer su im elektromagnetne osobine koje određuju snagu zemljotresa različite. Magnetni kapacitet procepa daleko je veći od magnetnog kapaciteta raseda.

2.3.6. Comparative diagrams of the interplanetary magnetic field strength and magnetic induction.

Let us assume that one of the components of the interplanetary magnetic field that is perpendicular to the line acts upon the gap between two tectonic plates and the magnetization of an environment is carried out at the original curve of magnetization.

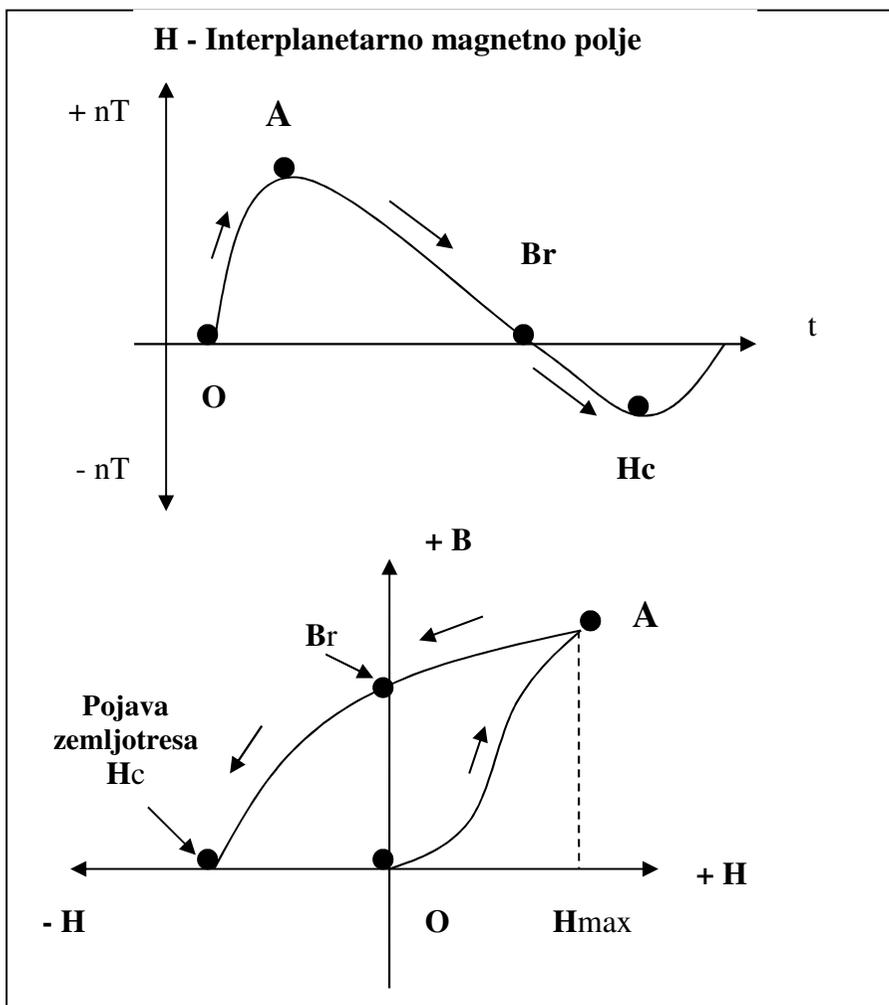


Prikaz 2. 3.

With the increase of the interplanetary magnetic field increases the magnetic induction from point O to A .

2.3.6. Upporedni dijagrami jačine interplanetarnog magnetnog polja i magnetske indukcije.

Pretpostavimo da na procep između dve tektonske ploče deluje jedna od komponenti interplanetarnog magnetnog polja koja je normalna na liniju procepa.



Prikaz 2. 3.

Sa povećanjem intenziteta interplanetarnog magnetnog polja povećava se magnetna indukcija od tačke O do A .

After reaching the maximum value of the interplanetary magnetic field H_{max} , there is a maximum of magnetization of an environment in a point. When the interplanetary magnetic field begins to decrease, the magnetic induction from \mathbf{a} to \mathbf{Br} will also be decreasing. When the intensity of the interplanetary magnetic field is equal to zero, the magnetic induction has \mathbf{Br} value. For an earthquake to occur, it is necessary that the interplanetary magnetic field changes direction and the magnetic induction \mathbf{Br} is equal to zero, that is, the positive value of $+\mathbf{Br}$ should change direction into $-\mathbf{Br}$. The curve from \mathbf{Br} to \mathbf{Hc} is called the curve of magnetization reduction. The value of the interplanetary magnetic field at a point \mathbf{Hc} is called coercive field or coercive force.

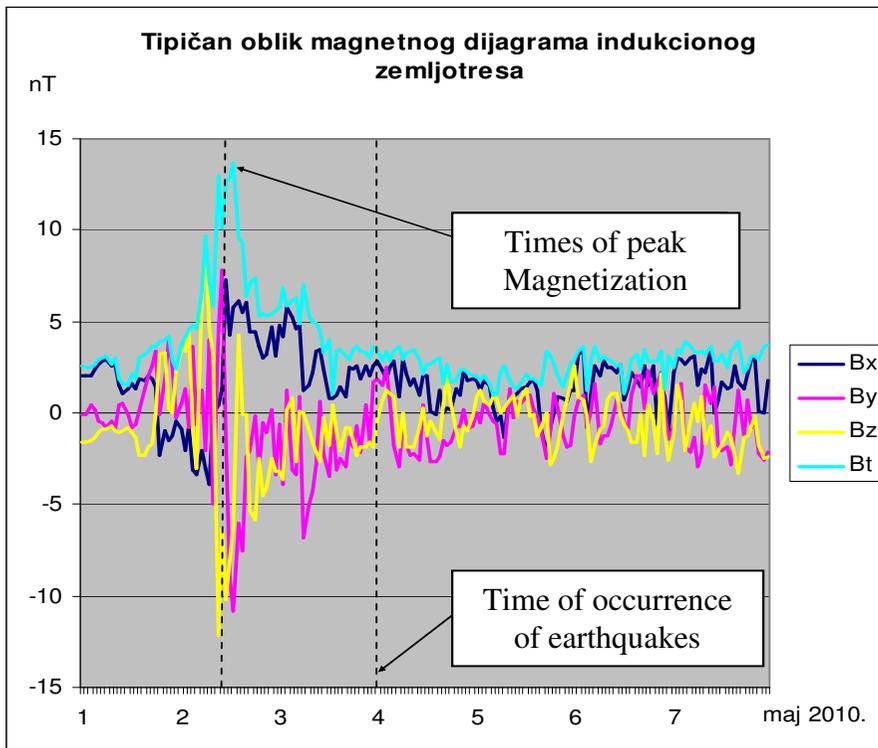
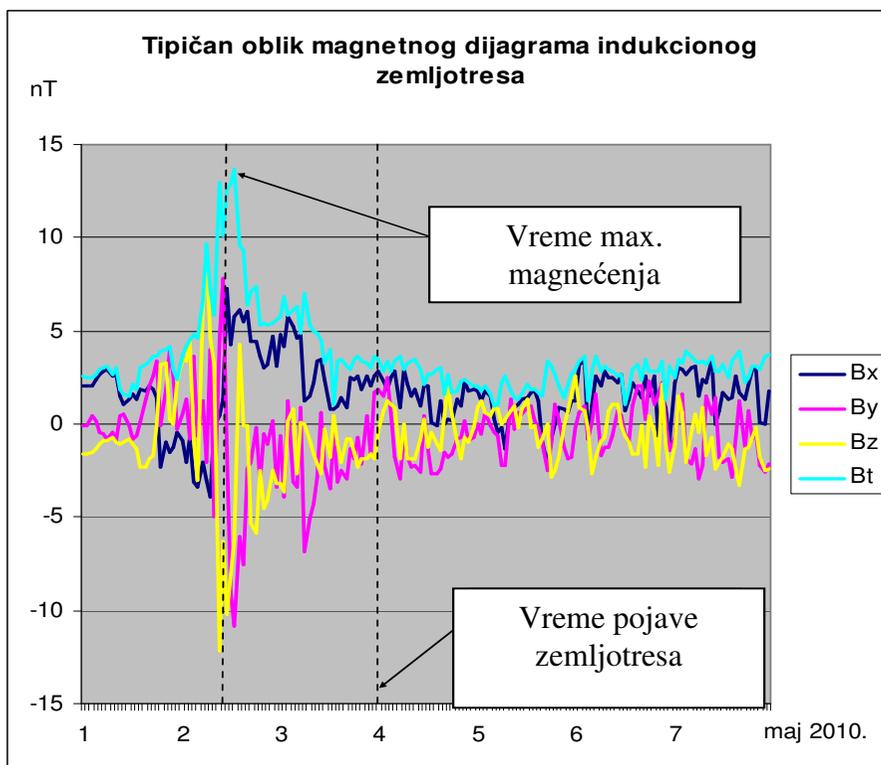


Diagram 2.1.

X and Y component of the interplanetary magnetic field changes direction and make the reduction Magnetization environment leading to the occurrence of earthquakes. This means that one and the same interplanetary magnetic field performs magnetization and the reduction of magnetization of the observed environment.

Posle dostizanja maksimalne vrednosti interplanetarnog magnetnog polja H_{max} , javlja se maksimalno magnećenje sredine u tački **A**. Kada interplanetarno magnetno polje počne da se smanjuje, smanjivaće se i magnetna indukcija od **A** do **Br**. Kada jačina interplanetarnog magnetnog polja bude jednaka nuli, magnetna indukcija ima vrednost **Br**. Da bi se javio zemljotres potrebno je da interplanetarno magnetno polje promeni smer a magnetna indukcija **Br** bude jednaka nuli, odnosno da od pozitivne vrednosti $+Br$ promeni smer na $-Br$.

Kriva od **Br** do **Hc** naziva se **Kriva razmagnećivanja**. Vrednost interplanetarnog magnetnog polja u tački **Hc** naziva se Koercitivno polje ili Koercitivna sila.



Dijagram 2.1.

X i Y komponente interplanetarnog magnetnog polja menjaju smer i vrše razmagnećivanje sredine što dovodi do pojave zemljotresa.

To znači da jedno isto interplanetarno magnetno polje vrši magnećenje i razmagnećivanje posmatrane sredine.

However, it occurs in nature that one interplanetary magnetic field performs the magnetization of an environment, and the reduction of magnetization, that is, bringing the value of induction B to zero level is carried out by other interplanetary magnetic field or telluric electric current. This mostly occurs with strong earthquakes.

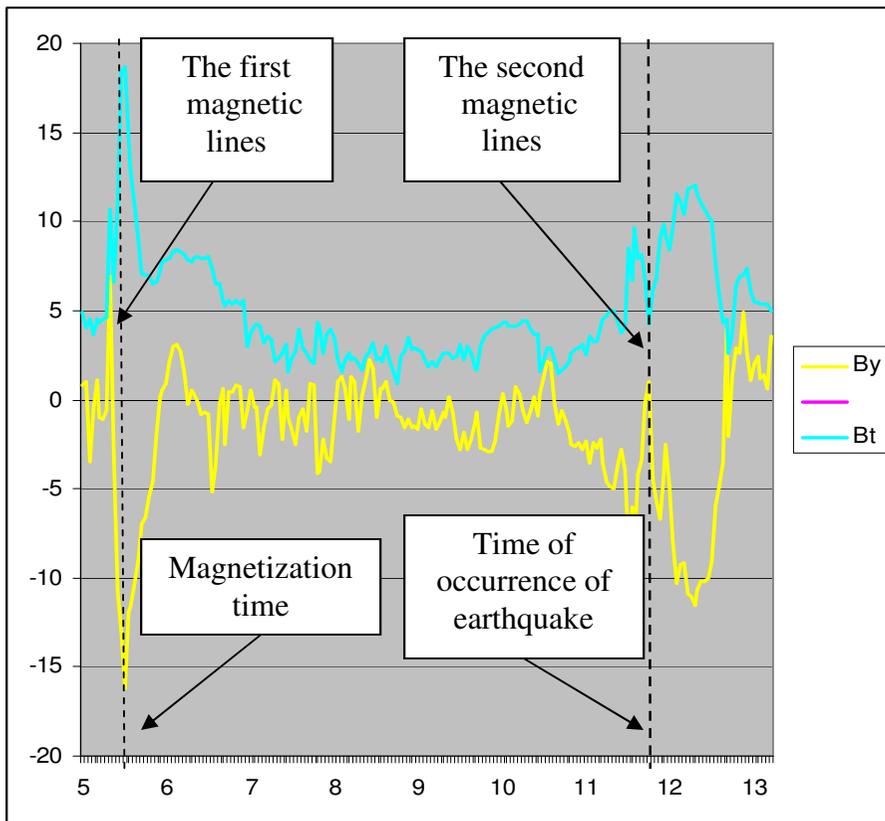
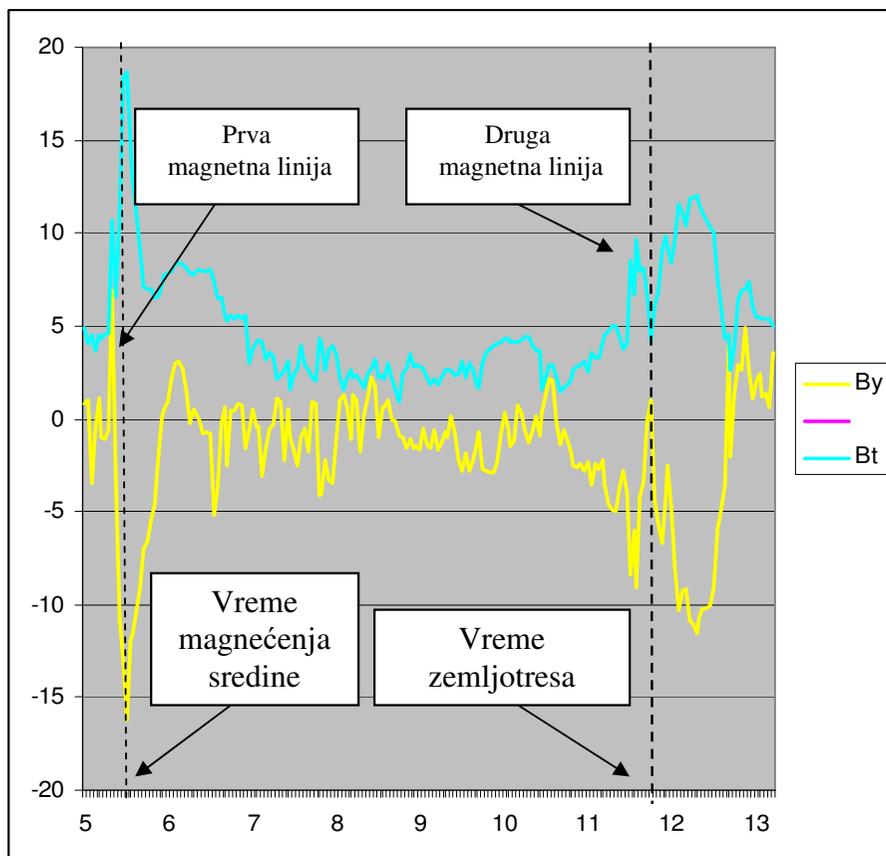


Diagram 2. 2.

Period of 6 days between the time of maximum magnetization and the time of occurrence of earthquake indicates that the tectonic plates behave as the magnetic battery plates with few losses. This means that the remanent induction B_r retained great value and strong foreign magnetic field would be necessary to bring it into the zero level.

Međutim, u prirodi se događa da jedno interplanetarno magnetno polje vrši magnećenje sredine a da se razmagnećivanje, odnosno dovođenje vrednosti indukcije B na nulti nivo vrši drugim interplanetarnim magnetskim poljem ili telurskom električnom strujom. Ovo se najčešće događa kod snažnih zemljotresa.



Dijagram 2. 2.

Period od 6 dana između vremena maksimalnog magnećenja i vremena pojave zemljotresa ukazuje da se tektonske ploče ponašaju kao ploče magnetnog akumulatora sa malim gubicima.

To znači da je remanentna indukcija B_r zadržala veliku vrednost pa je za njeno dovođenje na nulti nivo potrebno snažno strano magnetno polje.

2.3.7. Earthquake Intensity

The magnetic field energy of an environment is equal to the work that the current source spend on establishing the magnetic field. However, when there is no strong magnetic field to make the reduction of magnetization of an environment, remanent induction B_r is gradually reduced because of energy losses due to hysteresis or losses due to eddy currents.

After a certain time when the value of the remanent induction B_r is so low, then the weak interplanetary magnetic field can cause the reduction of magnetization of an environment which causes low coercive force, that is, weak earthquake.

In the special case, the reduction of magnetization over some time may occur gradually naturally due to losses and then there is no occurrence of earthquake.

Regardless of the degree of magnetization of an environment, a trigger impulse is necessary for an earthquake to occur, the task of which is to bring the remanent induction to zero, that is the point of coercive field.

All these indicate that each site has specific magnetic characteristics that determine the intensity of earthquake.

The ratio of magnetic induction and intensity of the interplanetary magnetic field defines the permeability of an environment

$$\mu = \mathbf{B} / \mathbf{H} \dots\dots\dots (3.9.1.)$$

Sites that have a high remanent induction B_r and large coercive field make powerful earthquakes.

As the product of B and the absolute value $|H|$ is greater, for the given environment, so the earthquake is more powerful.

Therefore, the product $(B_r | H_c |)$, where H_c is the absolute value, can be called a factor of the earthquake intensity.

For an earthquake to occur, it is necessary that three conditions are fulfilled: strong interplanetary magnetic field, fault or gap and trigger impulse.

In nature, there is a trinity at all natural phenomena.

2.3.7. Snaga zemljotresa

Energija magnetnog polja sredine jednaka je radu koji strujni izvor utroši na uspostavljanje magnetnog polja.

Međutim, kada nema snažnog magnetnog polja da izvrši razmagnećivanje sredine, remanentna indukcija B_r postepeno se smanjuje zbog gubitaka energije usled histerezisa ili gubitaka usled vrtložnih struja.

Posle određenog vremena kada se vrednost remanentne indukcije B_r toliko smanji, onda slabo interplanetarno magnetno polje može da izazove razmagnećenje sredine što uzrokuje pojavu slabe koercitivne sile, odnosno slabe elektromagnetske sile što za posledicu ima slab zemljotres.

U posebnom slučaju razmagnećivanje sredine posle nekog vremena može doći postepeno prirodnim putem usled gubitaka i tada nema pojave zemljotresa.

Bez obzira koliki je stepen namagnećenosti neke sredine, da bi se javio zemljotres potreban je trigger impuls koji ima zadatak da izvrši dovođenje remanentne indukcije na nulu, odnosno na tačku koercitivnog polja.

Trigger impuls se registruje na seizmogramu kao primarni talas zemljotresa.

Sve to ukazuje da svaka lokacija ima određene magnetske karakteristike koje određuju snagu zemljotresa.

Odnos magnetske indukcije i jačine interplanetarnog magnetskog polja definiše permeabilnost sredine

$$\mu = \mathbf{B} / \mathbf{H} \dots\dots\dots (3.9.1.)$$

Lokacije koje imaju veliku remanentnu indukciju B_r i veliko koercitivno polje stvaraju snažne zemljotrese.

Što je proizvod \mathbf{B} i apsolutne vrednosti $|\mathbf{H}|$ veći, za posmatranu sredinu, to je zemljotres snažniji.

Zato se proizvod $(\mathbf{B}r|\mathbf{H}c|)$, gde je $\mathbf{H}c$ apsolutna vrednost, može nazvati **Faktorom snage zemljotresa.**

Da bi se javio zemljotres potrebno da se ispune tri uslova, snažno interplanetarno magnetno polje, rased ili procep i trigger impuls, odnosno okidni impuls. U prirodi postoji trojstvo kod svih prirodnih pojava.

2.3.8. Calming earthquake

In operative seismology, process after the first shock is called the calming of earth. However, in the literature can be found that the value of remanent induction \mathbf{Br} and strength coercitive field depends on the hysteresis curve. If the product $(\mathbf{Br} | \mathbf{Hc})$ Power Factor of the earthquake, then any reduction in strength of the interplanetary magnetic field creates a special cycle hysteresis. With decreasing strength of the interplanetary magnetic field will decrease the value of the product $(\mathbf{Br} | \mathbf{Hc})$ and will decrease the intensity of earthquakes. Reducing the volume interplanatarnog magnetic field, indicated as **a**, **b** and **c**, create different hysteresis cycles.

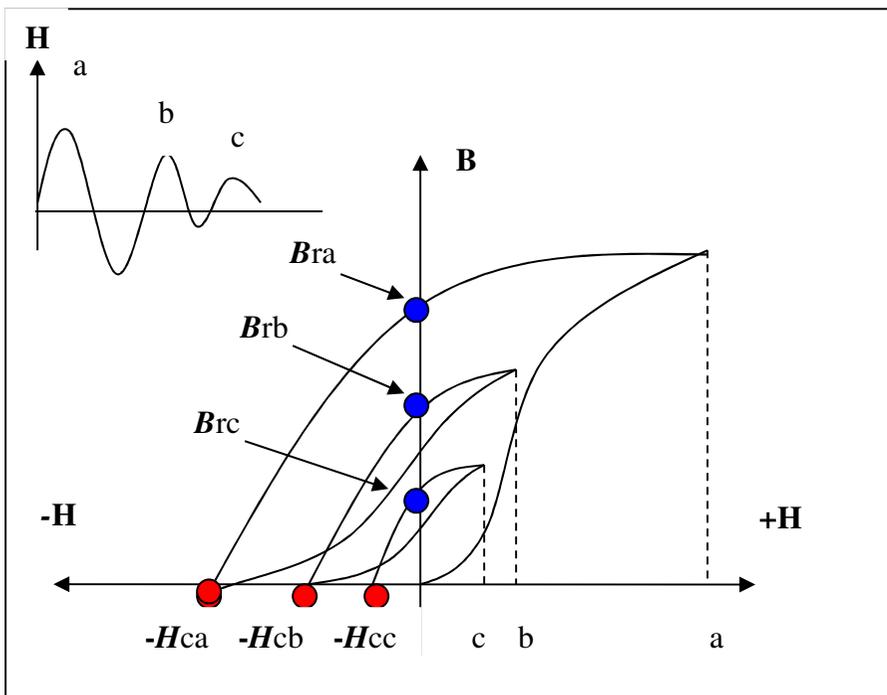
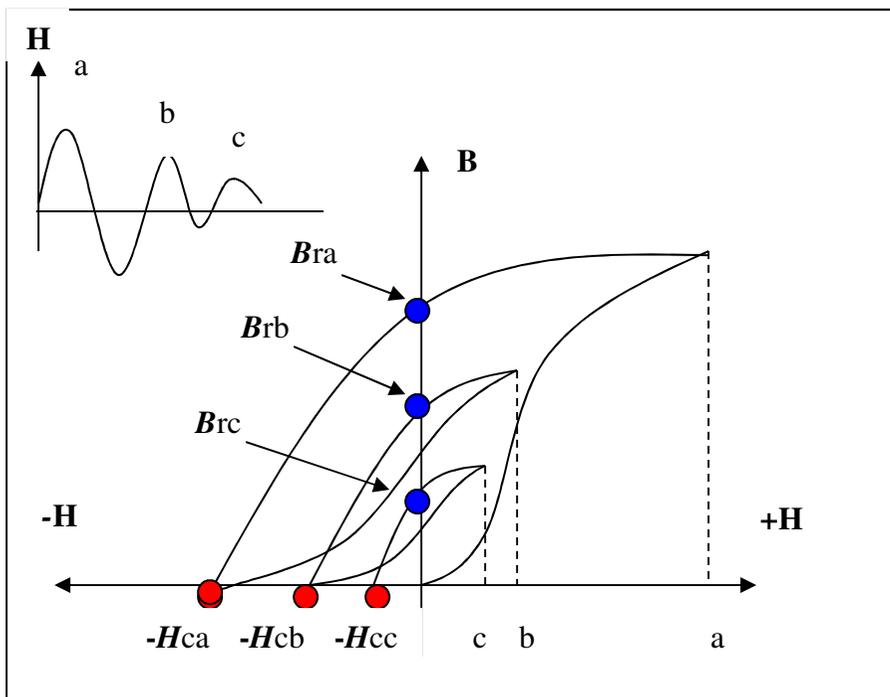


Fig. 2. 4.

The strongest earthquake in the first case (**a**) the product $(\mathbf{Br}_a | \mathbf{Hca})$ and weakest in case (**c**) when the product $(\mathbf{Br}_c | \mathbf{Hcc})$ the smallest. Therefore, the causes of the reduction of intensity of subsequent shocks should be sought in variations of the hysteresis cycles and reduction of the intensity of the interplanetary magnetic field.

2.3.8. Smirivanje zemljotresa

U važećoj seizmologiji proces posle prvog udara naziva se smirivanje tla. Međutim, u stručnoj literaturi može se naći da vrednost remanentne indukcije B_r i jačina koercitivnog polja zavisi od krive histereziisa. Ako je proizvod ($B_r|H_c|$) faktor snage zemljotresa onda svako smanjenje jačine interplanetarnog magnetnog polja stvara poseban ciklus histereziisa. Sa smanjenjem jačine interplanetarnog magnetnog polja smanjivaće se vrednost proizvoda ($B_r|H_c|$) pa će se smanjivati i jačina zemljotresa. Smanjenje jačine interplanetarnog magnetnog polja, označene kao a, b i c stvaraju različite cikluse histereziisa.



Prikaz 2. 4.

Najjači zemljotres je u prvom slučaju (a) kod proizvoda ($B_{ra}|H_{ca}$) a najslabiji u slučaju (c) kada je proizvod ($B_{rc}|H_{cc}|$) najmanji. Zato uzroke za smanjivanje snage naknadnih udara treba tražiti u varijacijama ciklusa histereziisa i smanjenju jačine interplanetarnog magnetnog polja.

Any reduction of the hysteresis curve reduces the value of the product ($\mathbf{Br} \mid \mathbf{Hc} \mid$), actually the force of earthquakes.

Thus, re-strikes are not dependent on settling of earth, but on reducing the value of the product ($\mathbf{Br} \mid \mathbf{Hc} \mid$).

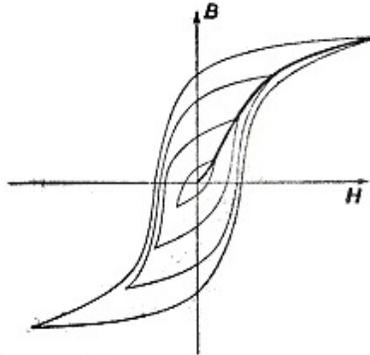


Diagram 2.3

Each strike of an earthquake uses accumulated energy in a magnetic field. When the accumulated magnetic energy of an environment returns to the state before magnetization, earthquake strikes cease.

However, re-hit earthquake may occur as a result of subsequent with new energies.

(Haiti earthquakes)

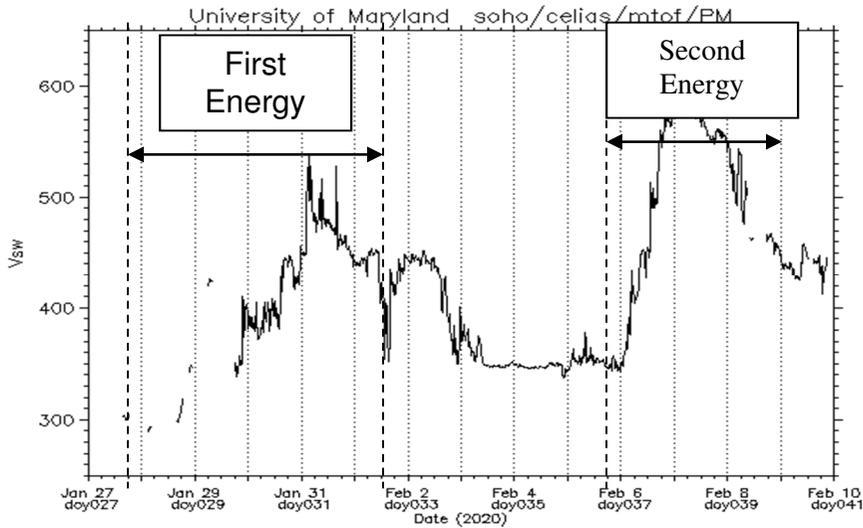
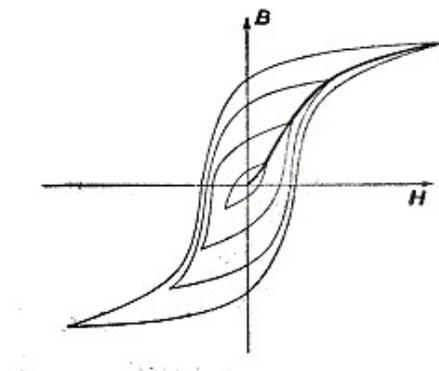


Diagram 2.4

Svako smanjivanje krive histerezisa smanjuje vrednost proizvoda ($\mathbf{Br|Hc}$), odnosno snagu zemljotresa.

Tako ponovni udari ne zavise od **smirivanja tla** već od smanjivanja vrednosti proizvoda ($\mathbf{Br|Hc}$).

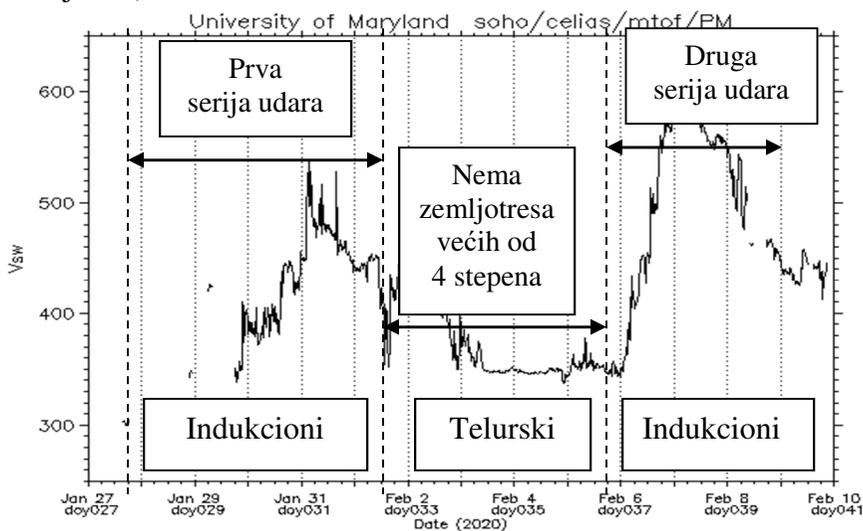


Dijagram 2.3

Svaki udar zemljotresa troši akumuliranu energiju u magnetnom polju. Kada se akumulirana magnetna energija sredine vrati na stanje pre magnećenja, udari zemljotresa prestaju.

Međutim, ponovni udari zemljotresa mogu se javiti kao posledica naknadnog magnećenja novim energijama.

(Haiti zemljotres)



Dijagram 2.4

2.3.9. Reverse Time

Under reversible over time means the time which elapses from the moment of maximum Magnetization and coercive force H_c appearance or occurrence of earthquakes.

Reverse time is a function of several parameters, indicating that each site at the maximum level of Magnetization has reversible time. At different locations Magnetization curve is different so it is reversible time differently.

Krive magnetisanja različitih sredina

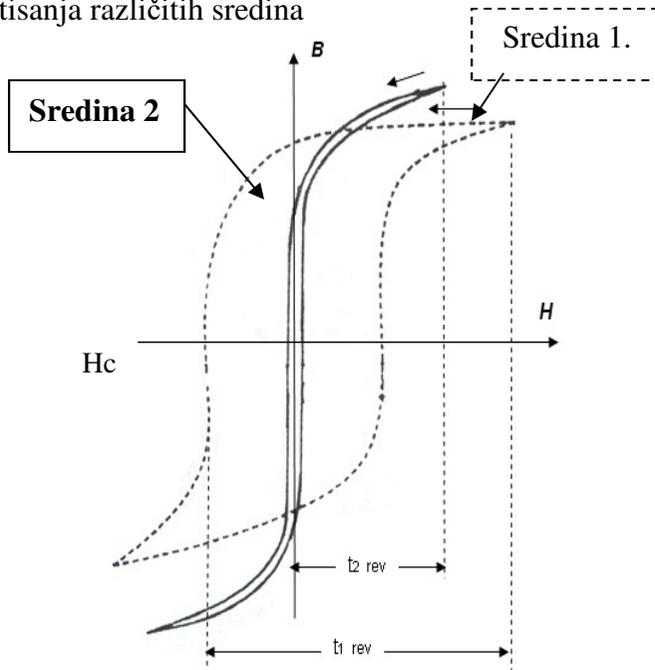


Fig. 2.5.

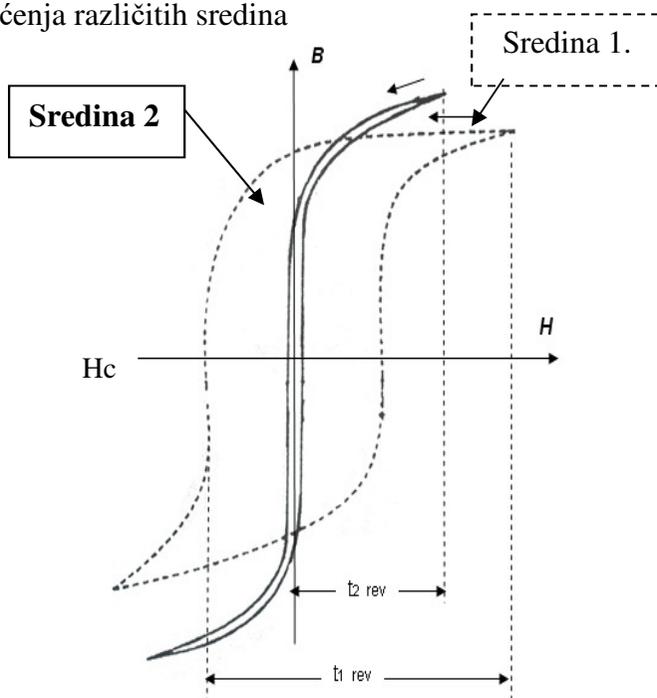
Each location has its own time of magnetization and time of magnetization reduction, that is, the time for which the accumulated energy localized in a magnetic field is returned. One comes to knowledge that the magnetic characteristics of the observed location determine the time when an earthquake will occur and by which intensity. Regardless of the intensity of a foreign field, that is, the interplanetary magnetic field, if the magnetization of an environment is weak, the earthquake will be weak.

2.3.9. Reverzibilno vreme

Pod reverzibilnim vremenom podrazumeva se vremenski period koji protekne od trenutka maksimalnog magnećenja do pojave **koercitivne sile H_c** , odnosno pojave elektromagnetske sile koja izaziva zemljotres.

Reverzibilno vreme je funkcija više parametara što ukazuje da svaka lokacija pri maksimalnom stepenu magnećenja ima svoje reverzibilno vreme. Kod različitih lokacija kriva magnećenja je različita pa je reverzibilno vreme različito.

Krive magnećenja različitih sredina



Prikaz 2.5.

Svaka lokacija ima svoje vreme magnećenja i vreme razmagnećivanja, odnosno vreme za koje se vraća akumulirana energija koja je lokalizovana u magnetnom polju. Tako se dolazi do saznanja da magnetske karakteristike posmatrane lokacije određuju vreme kada će se javiti zemljotres i kojom snagom. Bez obzira kolika je snaga stranog polja, odnosno interplanetarnog magnetskog polja, ako je magnećenje sredine slabo, zemljotres će biti slab.

2.4.1. Magnetic flux

Magnetic flux and flux vector magnetic induction, is one of the most important parameters of magnetic fields in research seismic movement. Flux density of magnetic induction \mathbf{B} through a surface S , which relies on the contour C is defined by the surface integral.

$$\Phi = \int_S \mathbf{B} \cdot d\mathbf{S} = \int_S \mathbf{B} \cdot \mathbf{n} \, dS \cos(\mathbf{B}, \mathbf{n})$$

- where $d\mathbf{S}$ is a vector whose intensity is equal to the elementary surface dS , and has a direction and the direction \mathbf{n} normal to the surface. The positive direction of normal is defined as a rule, the right coil in relation to the arbitrary chosen positive direction of going along the contour.

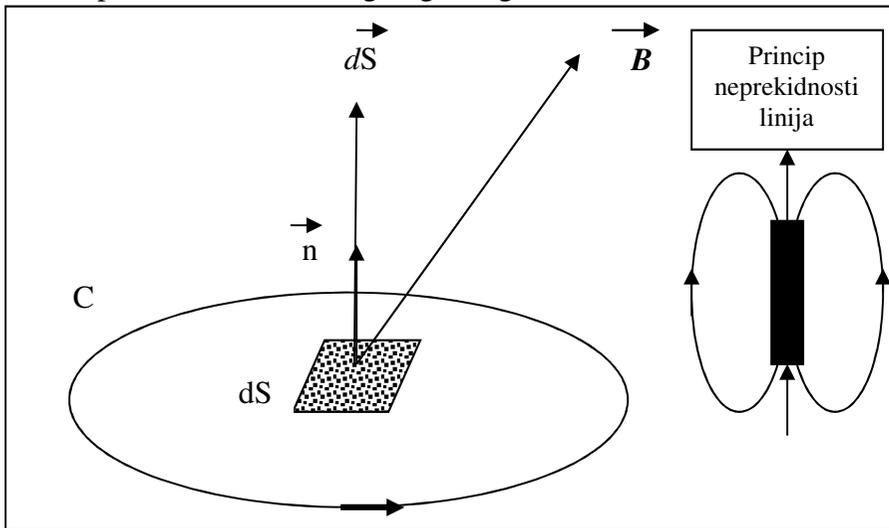


Fig. 2.6.

Flux density \mathbf{B} is subject to the law of conservation of flux, so output flux vector \mathbf{B} through no matter which surface is equal to zero

$$\oint \mathbf{B} \cdot d\mathbf{S} = 0$$

This law describes the continuity of lines of magnetic induction vector as the lines close to him. The principle of continuity and flux conservation law applies to all areas.

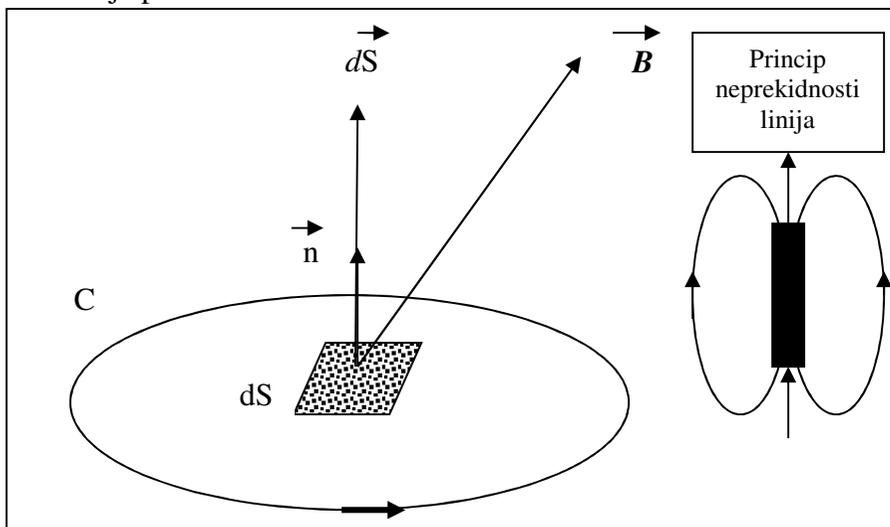
In seismology maximum value is determined by the flux component of the interplanetary magnetic field that is perpendicular to the line between two tectonic plates and faults.

2.4.1. Magnetni fluks

Magnetni fluks, odnosno fluks vektora magnetske indukcije, je jedan od najvažnijih parametara magnetnog polja kod istraživanja seizmičkih kretanja. Fluks vektora magnetske indukcije \mathbf{B} kroz neku površinu S , koja se oslanja na konturu C definiše se površinskim integralom.

$$\Phi = \int_S \mathbf{B} \cdot d\mathbf{S} = \int_S \mathbf{B} \cdot \mathbf{n} \, dS \cos(\mathbf{B}, \mathbf{n})$$

- gde je $d\mathbf{S}$ vektor čiji je intenzitet jednak elementarnoj površini dS , a ima pravac i smer normale \mathbf{n} na tu površinu. Pozitivan smer normale određuje se po pravilu desne zavojnice u odnosu na proizvoljno izabrani pozitivan smer obilaženja po konturi.



Prikaz 2.6.

Fluks vektora \mathbf{B} podleže zakonu o konzervaciji fluksa pa izlazni fluks vektora \mathbf{B} kroz ma koju površinu jednak je nuli

$$\oint \mathbf{B} \cdot d\mathbf{S} = 0$$

Ovaj zakon opisuje neprekidnost linija vektora magnetske indukcije jer se linija zatvaraju same u sebe. Princip neprekidnosti, odnosno zakona o konzervaciji fluksa važi za sve sredine.

U seizmologiji maksimalna vrednost fluksa određena je komponentom interplanetarnog magnetnog polja koja je upravna na liniju između dve tektonske ploče ili raseda.

2.4.2. Magnetic circuit

To earthquake occurred on a site needs to occur in the interior of the Earth induced by electric current. The electrical current creates a magnetic field and magnetic field magnetization is observed locations. This means that the Earth's interior is current contour through which flows induced by electric current that includes an environment. To assist in the magnetization we need a magnetic circuit. Under the magnetic circuit we mean a collection of bodies and environments, which form a tube which closes the magnetic flux. The cross-section tubes and magnetic permeability of the body and environment, which affects tube, may be changing but the elementary flux in each section of the tube is the same.

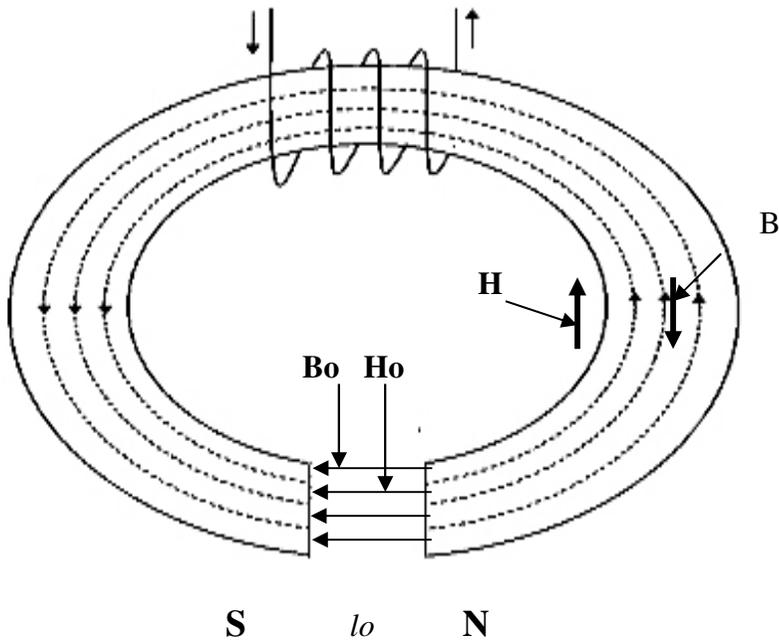


Fig. 2.7.

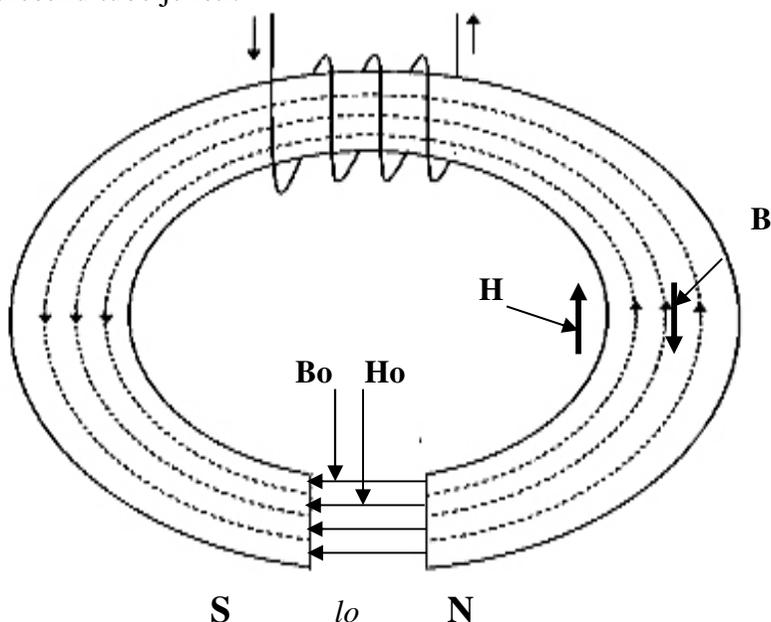
Suppose that the observed location, where there is magnetization, located between two tectonic plates between which there is a gap. Let kondukcionala induced electric current forms a magnetic circuit in the form of the torus. Provided that the flux leakage is neglected in the gap then

$$\Phi = BS = B_0 S_0 \dots \dots \dots (3.8.1.)$$

This means that lines of magnetic induction pass through the gap without interruption.

2.4.2. Magnetsko kolo

Da bi se javio zemljotres na nekoj lokaciji potrebno da se u unutrašnjosti Zemlje javi indukovana električna struja. Električna struja stvara magnetno polje a magnetno polje vrši magnećenje posmatrane lokacije. To znači da u unutrašnjosti Zemlje postoji strujna kontura kroz koju teče indukovana električna struja koja obuhvata neku sredinu. Da bi se izvršilo magnećenje potrebno je da postoji magnetsko kolo. Pod magnetskim kolom podrazumevamo skup tela i sredina, koji obrazuju tubu u kojoj se zatvara **magnetski fluks**. Poprečni presek tube i magnetska permeabilnost tela i sredina, koje zahvata tuba, mogu biti promenljivi ali elementarni fluks u svakom preseku tube je isti.



Prikaz 2.7.

Pretpostavimo da se posmatrana lokacija, na kojoj dolazi do magnećenja, nalazi između dve tektonske ploče između kojih postoji procep. Neka indukovana konduciona električna struja obrazuje magnetsko kolo u vidu torusa. Pod uslovom da je zanemareno rasipanje fluksa u procepu onda je

$$\Phi = BS = B_0 S_0 \dots \dots \dots (3.8.1.)$$

To znači da linije magnetske indukcije prolaze kroz procep bez prekidanja.

When the application of Ampere's law on the circular contour, which coincides with the axis of the magnetic circuit and assuming no losses due to eddy currents then

$$\oint \mathbf{H} dl = Hl + H_0 l_0 = 0 \dots \dots \dots (3.8.2.)$$

$$H = - (l_0 / l) H_0$$

In accordance with realcijom (3.8.1)

$$B_0 = \mu_0 H_0 = (S / S_0) B \text{ pa je}$$

$$H = - (l_0 S / l S_0) B / \mu_0 \dots \dots \dots (3.8.3.)$$

The minus sign indicates that the field strength H and magnetic induction B in an environment magnetiše have opposite directions. The gap field strength H and magnetic flux density B have the same directions.

Gap weak magnetic field in the tectonic plates and the stronger field in the gap or the space between two tectonic plates and faults.

This natural phenomenon is a consequence of the appearance of magnetic masses on both sides of plate boundaries or faults. Field vector H in a magnetic circuit with a gap between two tectonic plates can be considered as a result of superposition of the field that has no source of which comes from the induced electric current and the original field, which originates from the magnetic mass at the poles. This means each tectonic plate is a magnetic pole. The gap between the two tectonic plates a field that has no source of the original magnetic field have the same direction so that the fields add up and give the resulting magnetic field $H_0 = B/\mu_0$. The tectonic plates originally magnetic field has the opposite direction from no source magnetic field and the field subtracted.

The gap between the two tectonic plates makes the distribution of magnetic field in the magnetic circuit uneven.

Analysis of the distribution of the magnetic field and magnetic induction indicates that earthquakes focus can only be caught faults or gap, in accordance with the relation (3.6.1.).

Mathematical relationships show that the faults and gaps behave as magnetic batteries. Maximum capacity of magnetic battery occurs in a subduction zone.

Kada se primeni Amperov zakon na kružnu konturu koja se podudara sa osom magnetskog kola i pod pretpostavkom da nema gubitaka usled vrtložnih struja tada je

$$\oint \mathbf{H}dl = Hl + H_0l_0 = 0 \dots \dots \dots (3.8.2.)$$

$$H = - (l_0 / l) H_0$$

U skladu sa relacijom (3.8.1)

$$B_0 = \mu_0 H_0 = (S / S_0) B \text{ pa je}$$

$$H = - (l_0 S / l S_0) B / \mu_0 \dots \dots \dots (3.8.3.)$$

Znak minus pokazuje da jačina polja H i magnetska indukcija B u sredini koja se magnetiše imaju suprotne smerove. U procepu jačina polja H i magnetska indukcija B imaju iste smerove.

Procep slabi magnetno polje u tektonskim pločama a jača polje u procepu, odnosno u prostoru između dve tektonske ploče ili raseda.

Ovaj prirodni fenomen je posledica pojave magnetskih masa sa obe strane tektonskih ploča ili raseda. Polje vektora H u magnetskom kolu sa procepom između dve tektonske ploče može se smatrati kao rezultat superpozicije bezizvornog polja koji potiče od indukovane električne struje i izvornog polja koje potiče od magnetskih masa na polovima. To znači svaka tektonska ploča predstavlja jedan magnetski pol. U procepu, između dve tektonske ploče bezizvorno i izvorno magnetno polje imaju isti smer pa se polja sabiraju i daju rezultujuće magnetno polje $H_0 = B/\mu_0$. U tektonskim pločama izvorno magnetsko polje ima suprotan smer od bezizvornog magnetskog polja pa se polja oduzimaju.

Procep između dve tektonske ploče čini raspodelu magnetnog polja u magnetskom kolu neravnomernom.

Analiza raspodele magnetskog polja i magnetske indukcije ukazuje, da hipocentar zemljotresa može biti samo u procepu ili rasedu, i u skladu sa relacijom (3.6.1.).

Matematičke relacije pokazuju da se rasedi i procepi ponašaju kao **Magnetni akumulatori**. Najveći kapacitet magnetnih akumulatora javlja se u zoni subdukcije.

2.5.1. Ways of Magnetization

Each occurrence of induction of electric currents inside the Earth causes Magnetization environment. In most cases Magnetization is performed telluric electric currents. However, the strong Magnetization environment at the local level is done with Current Field. (Jet Stream). If the Current Field above the gap or fault leads to uneven distribution of magnetic fields in the Earth's interior and then reported conditions for the occurrence of earthquakes induction.

Magnetization tectonic plate Current Field in the northern hemisphere

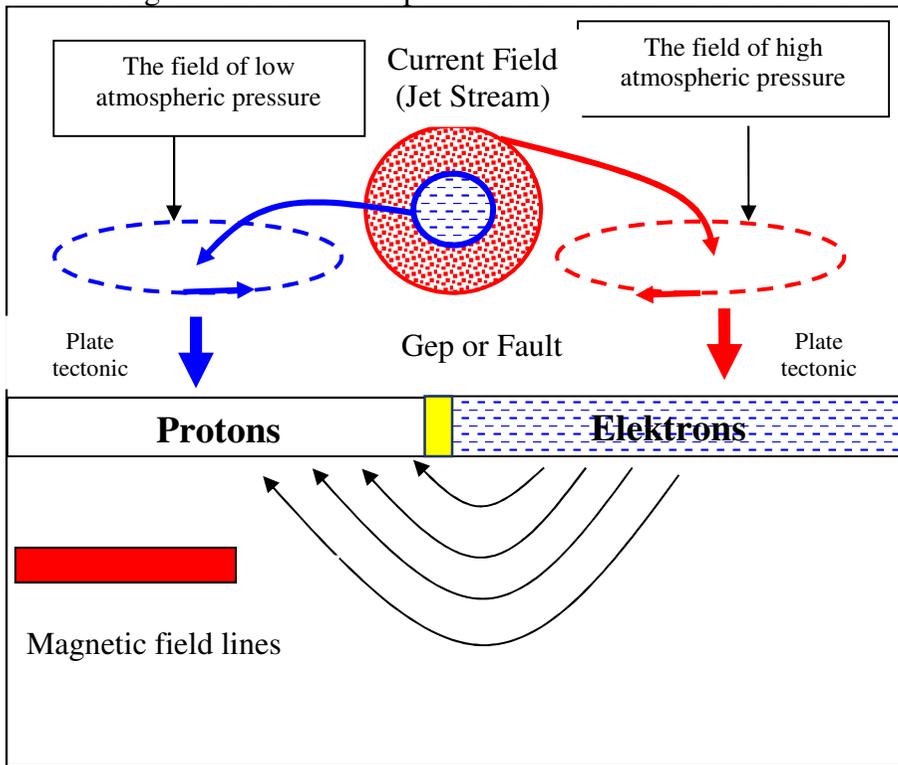


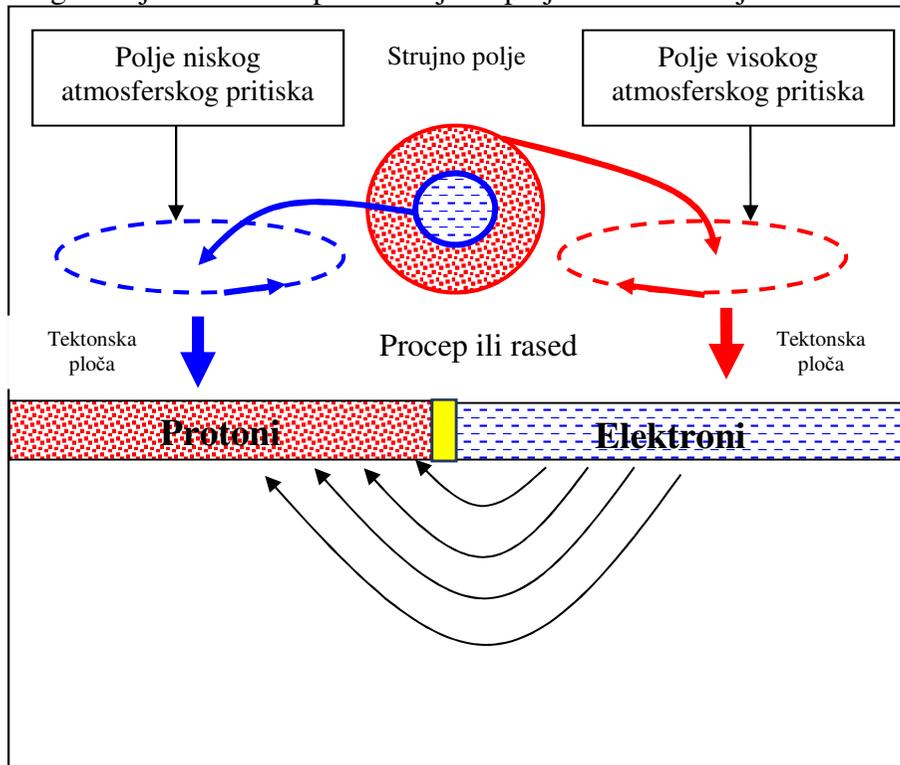
Fig. 2. 8.

Magnetization is carried out through joint efforts of electrons and protons. Magnetic lines generated by magnetic fields penetrate the magma and make Magnetization magma. To avoid the silent electric discharge, the existence of the gap between two tectonic plates. The gap acts as an electrical insulator between two tectonic plates.

2.5.1. Načini magnećenja

Svaka pojava indukcije električnih struja u unutrašnjost Zemlje izaziva magnećenje sredina. U većini slučajeva magnećenje se vrši telurskim električnim strujama. Međutim, snažna magnećenja sredina na lokalnom nivou vrši se Strujnim poljima. (Jet Stream) U slučaju da se strujno polje nalazi iznad procepa ili raseda dolazi do neravnomerne raspodele magnetnog polja u unutrašnjosti Zemlje i tada se javljaju uslovi za pojavu indukcionih zemljotresa.

Magnećenje tektonskih ploča strujnim poljem na severnoj hemisferi



Prikaz 2. 8.

Magnećenje se vrši zajedničkim delovanjem elektrona i protona. Magnetne linije tako stvorenog magnetnog polja prodiru u magmu i vrše **magnećenje magme**. Da ne bi došlo do tihog električnog pražnjenja neophodno je postojanje procepa između dve tektonske ploče. Procep ima ulogu električnog izolatora između dve tektonske ploče.

It is known that variable electric fields induce a variable magnetic field. If it is known that the electric and magnetic field, two aspects of a single electromagnetic field, then the electric field in the atmosphere and magnetic field inside the Earth's natural phenomena are inseparable. Electric and magnetic fields are always at an angle of 90 degrees.

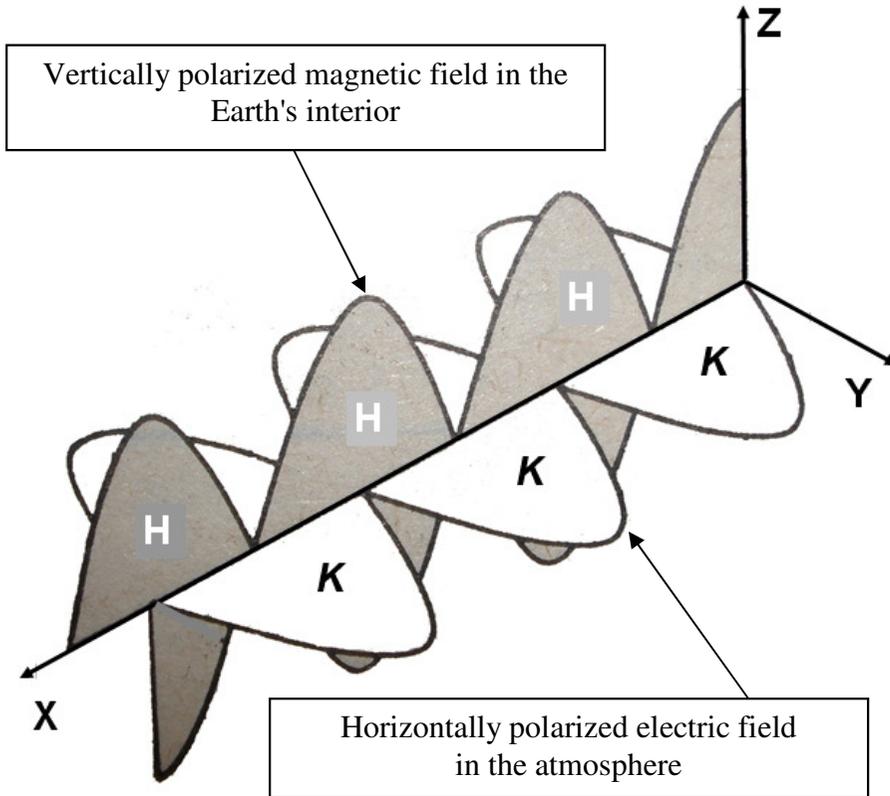
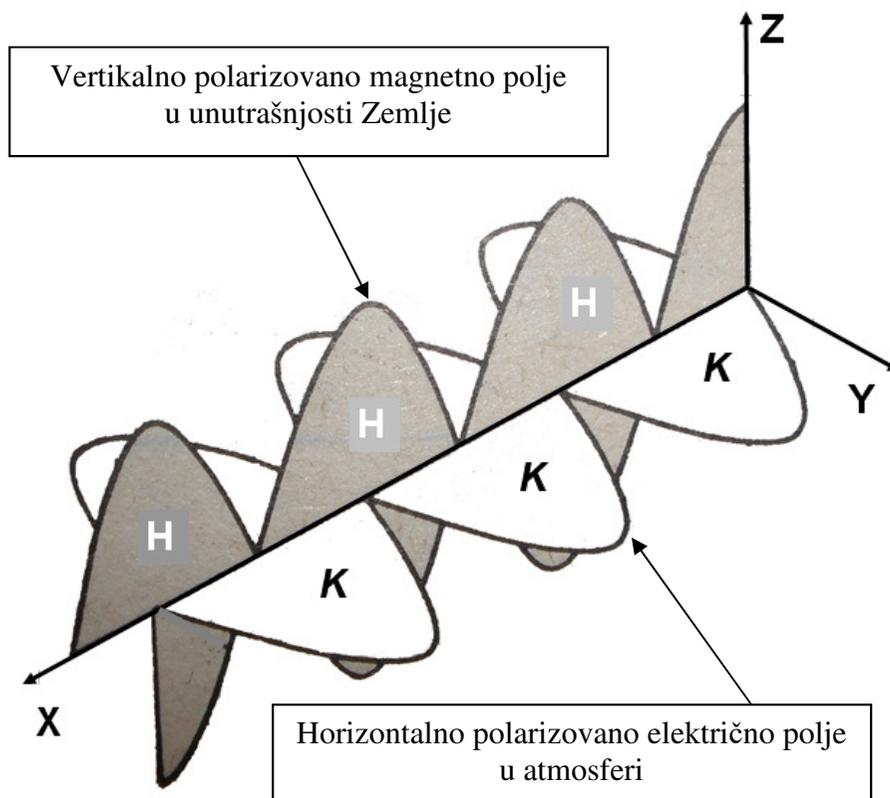


Fig. 2.9.

With horizontal polarization of complementary electric fields in the atmosphere, the complementary magnetic fields with vertical polarization occur in the Earth's interior.

This type of magnetization in the atmosphere is recognized as the form of complementary fields of atmospheric pressure. (2009. *Volume II, Belgrade School of Meteorology*)

Poznato je da promenljiva električna polja izazivaju promenljiva magnetna polja. Ako se zna da su električno i magnetno polje dva vida jednog jedinstvenog elektromagnetnog polja, onda su električno polje u atmosferi i magnetno polje u unutrašnjosti Zemlje nerazdružive prirodne pojave. Električno i magnetno polje nalaze uvek pod uglom od 90 stepeni.



Prikaz 2.9.

Kod horizontalne polarizacije komplementarnih električnih polja u atmosferi, u unutrašnjosti Zemlje javljaju se komplementarna magnetna polja sa vertikalnom polarizacijom.

Ova vrsta magnećenja u atmosferi se prepoznaje u obliku komplementarnih polja atmosferskog pritiska. (2009. *Sveska druga Beogradske škole meteorologije*).

Representation of the connection between electric and magnetic fields

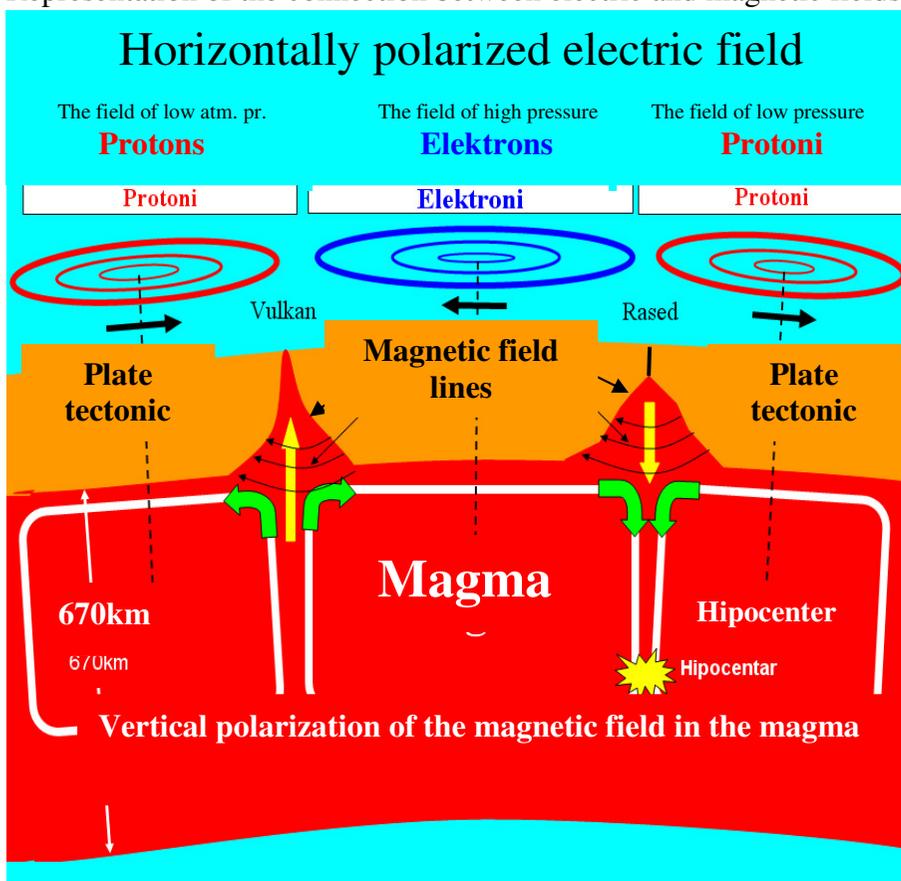


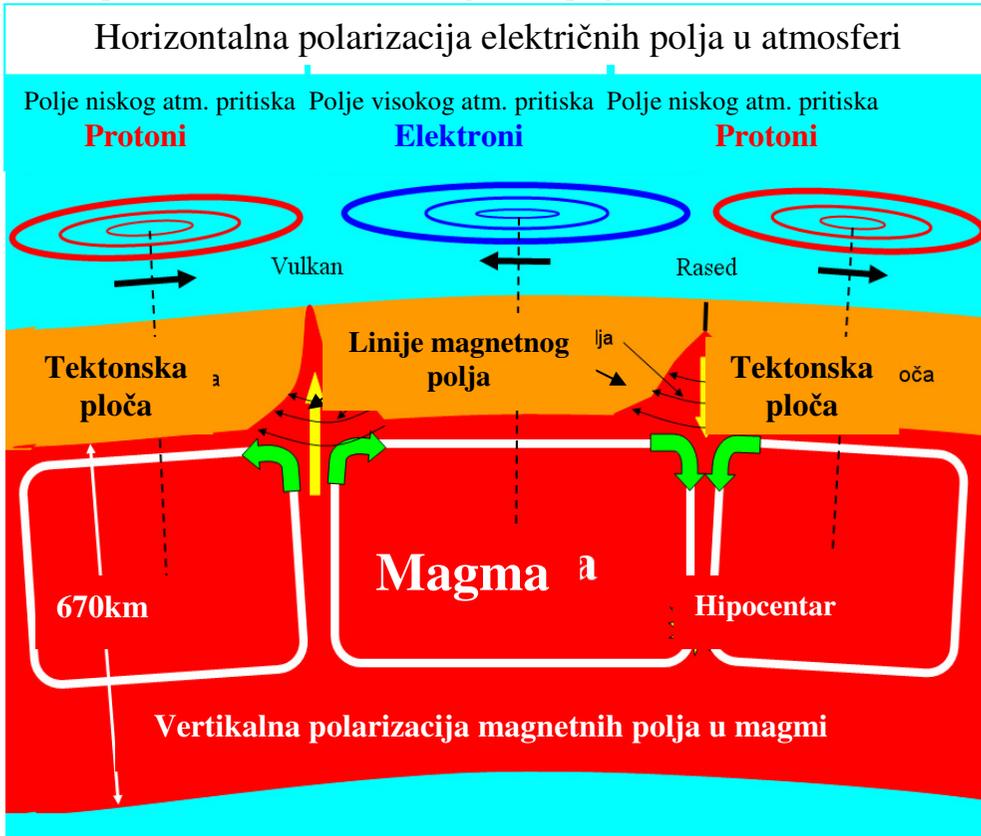
Fig. 2.10.

Under the influence of complementary fields of atmospheric pressure, an electric horizontal meteorological front is being created in the atmosphere. In the interior of the Earth, caused by magnetic complementary fields, a seismic front is created which can be ascending or descending.

At earthquakes that occur at great depths, magnetization is performed in a magnetic field of the gap where convection current of magma goes. After magnetization, vertical descending current of magma carries away the magnetized part of magma at depth where the earthquake occurs. (maximum depth of the earthquake is about 670 kilometers.) The basis of induction of earthquakes is the existence of the Current Field above the location of earthquakes.

At locations where there is vertical upward flow of magma rise to a volcano.

Prikaz povezanosti električnih i magnetnih polja



Prikaz 2.10.

Pod dejstvom komplementarnih polja atmosferskog pritiska u atmosferi se stvara električni horizontalni meteorološki front. U unutrašnjosti Zemlje, pod dejstvom magnetnih komplementarnih polja, stvara se vertikalni seizmički front koji može biti uzlazni ili silazni.

Kod zemljotresa koji se javljaju na velikim dubinama magnećenje se vrši u magnetnom polju procepa gde prolazi konvekciona struja magme. Posle magnećenja, vertikalna silazna struja magme odnosi namagnetisani deo magme u dubinu gde se javlja zemljotres. (Maksimalna dubina zemljotresa je oko 670 kilometara.)

Osnova svih indukcionih zemljotresa je postojanje strujnog polja iznad lokacije zemljotresa.

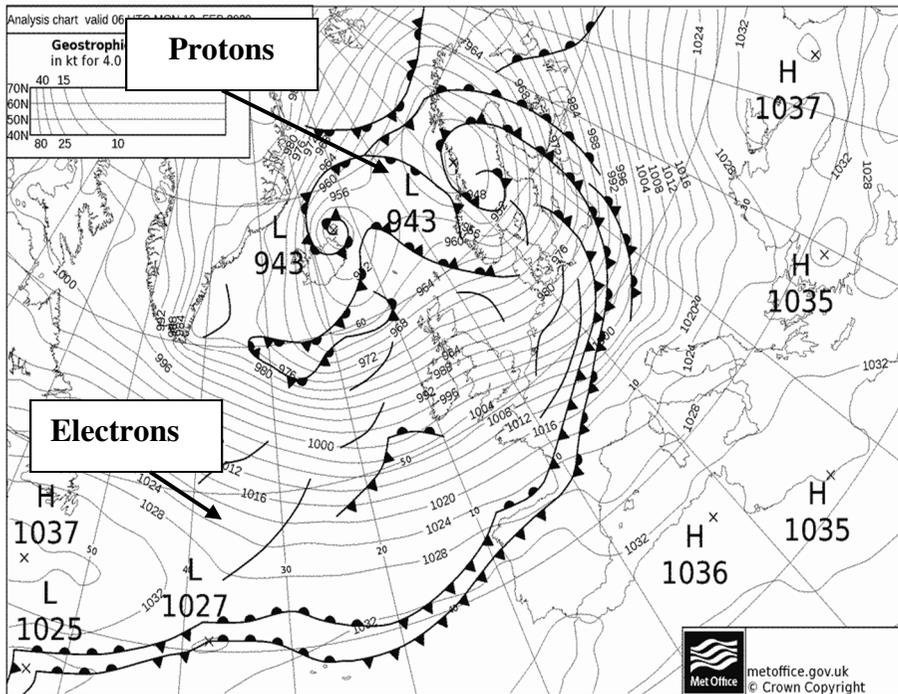
Na lokacijama gde postoji vertikalni uzlazni tok magme dolazi do pojave vulkana.

Electrons extend right from the direction of the radial velocity of the current field and protons to the left. The electrons create the fields of high atmospheric pressure and serenity. The protons create the fields of low atmospheric pressure and clouds and bad weather. When there is fault or a gap between the fields of low and high atmospheric pressure, then occurs magnetization occurs in the Earth's interior.

At magnetization of tectonic plates, one plate receives positive and the other negative convection electric loads and thus the induction electric current is being established.

The gap between the tectonic plates does not allow the electric discharge of tectonic plates and the degree of charge, that is, magnetization depends on the conductance of the gap.

An example of complementary fields of atmospheric pressure

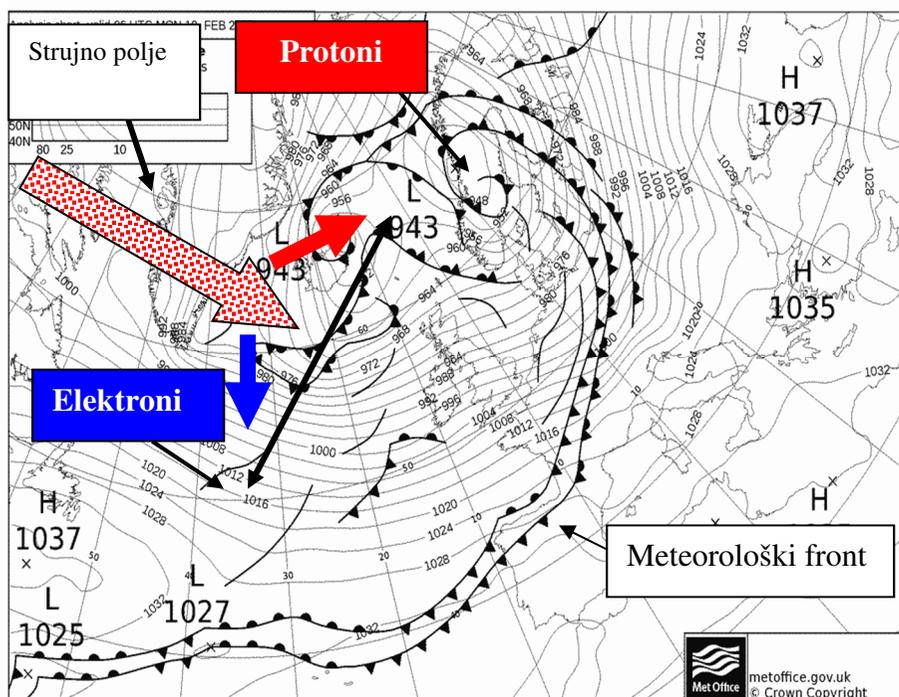


If the Fault or the gap is on the line connecting the centers of complementary fields leads to Magnetization.

Desno od smera radijalne brzine strujnog polja prostiru se elektroni a levo protoni. Elektroni stvaraju polja visokog atmosferskog pritiska i vedrinu. Protoni stvaraju polja niskog atmosferskog pritiska i stvaraju oblačnost i nevreme. Kada se između polja niskog i visokog atmosferskog pritiska nalazi rased i procep tada dolazi do magnećenja unutrašnjosti Zemlje.

Kod magnećenja tektonskih ploča jedna ploča prima pozitivna a druga negativna konvekciona električna opterećenja i na taj način uspostavlja se indukciona električna struja. Procep između tektonskih ploča ne dozvoljava električno pražnjenje tektonskih ploča a od provodnosti procepa zavisi stepen naelektrisanja odnosno magnećenja.

Primer komplementarnih polja atmosferskog pritiska



Karta 2.1.

Ukoliko se na liniji koja spaja centre komplementarnih polja nalazi rased ili procep dolazi do magnetisanja.

2.5.2. Correlation between volcanic eruptions and earthquakes

Studies have shown that the relatively close location, there is a simultaneous occurrence of earthquakes and volcanic eruptions. There is a perception that earthquakes cause volcanic eruption. However, in the heliocentric meteorology eruption and earthquakes in adjacent sites also caused a Current Field. After opening the Current Field created the field of low and high atmospheric pressure. When the line connecting the centers of atmospheric forcing find volcano and faults, there are conditions for the simultaneous occurrence of volcanic eruptions and earthquakes.

Showing simultaneous occurrence of earthquakes and volcanoes

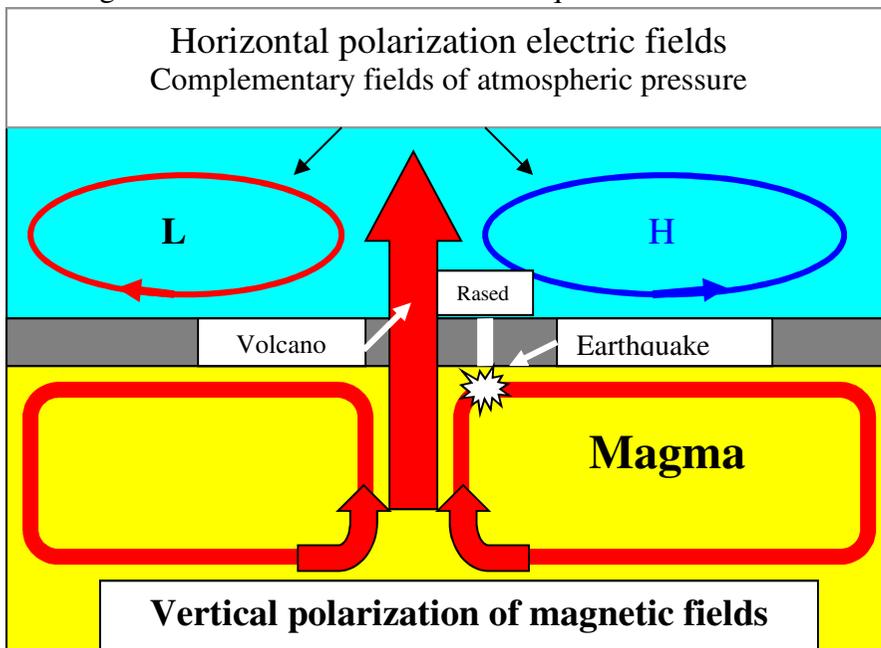


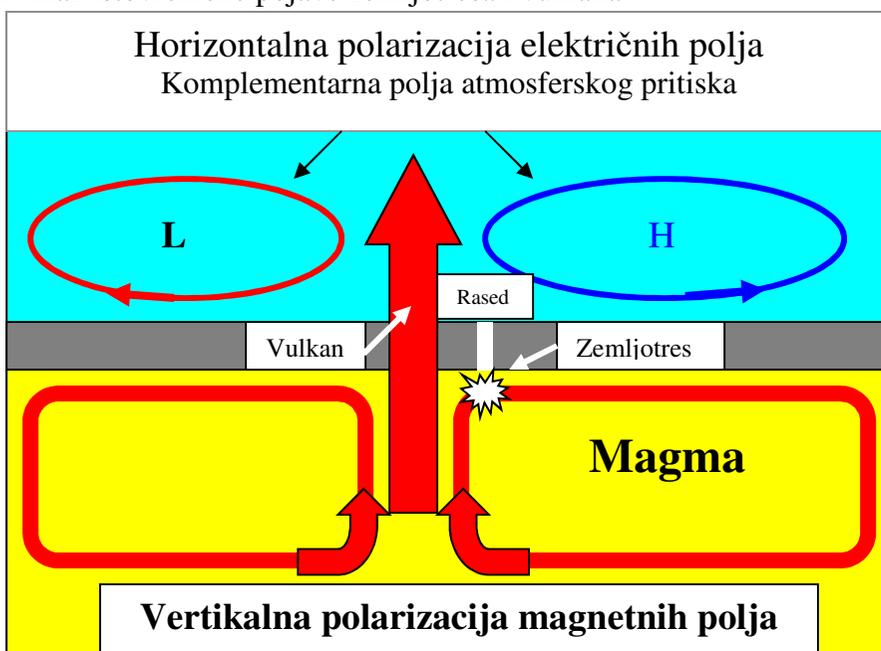
Fig. 1.11

Eruptions and seismic movements of the volcano are the physical nature and occur under the influence of vertical upwelling of magma generated by the vertically polarized complementary magnetic fields. Seismic movements occur only in the vicinity of the volcano, regardless of the power eruptions. However, the seismic motion in the electromagnetic low earthquake and spread over long distances. Based on these findings we can conclude that mutual earthquakes and volcanoes do not exist. On site there is no volcano electromagnetic conditions for the occurrence of earthquake. Physical and electromagnetic motions have different parameters

2.5.2. Povezanost vulkanskih erupcija i zemljotresa

Istraživanja su pokazala da na relativno bliskim lokacijama, dolazi do istovremene pojave zemljotresa i erupcije vulkana. Postoji mišljenje da zemljotresi izazivaju erupciju vulkana. Međutim, u heliocentričnoj meteorologiji erupciju vulkana i zemljotresa na bliskim lokacijama izaziva jedno isto strujno polje. Znamo da se posle otvaranja strujnih polja stvaraju polja niskog i visokog atmosferskog pritiska. Kada se na liniji koja spaja centre atmosferskih polja nađu vulkan i rased postoji mogućnost istovremene pojave erupcije i zemljotresa.

Prikaz istovremene pojave zemljotresa i vulkana



Prikaz 2.11

Erupcija i seizmička kretanja kod vulkana su **fizičke prirode** i javljaju se pod dejstvom vertikalne uzlazne struje magme koju stvaraju vertikalno polarizovana komplementarna magnetna polja. Fizička seizmička kretanja javljaju se samo u okolini vulkana, bez obzira na snagu erupcije. Međutim, seizmička kretanja kod slabog zemljotresa su elektromagnetna i prostiru se na veliku daljinu. Fizička i elektromagnetna kretanja tla imaju različite parametre. Na lokaciji vulkana nema elektromagnetnih uslova za pojavu zemljotresa. Na osnovu ovih saznanja može se zaključiti da međusobni uticaj zemljotresa i vulkana ne postoji.

2.5.2. Figure in the Mirror Principle

There is another way of magnetization in the nature which occurs during the cyclonic activity (bad weather) in the atmosphere by the principle of figure in the mirror.

Representation of proton magnetization of fault by principle of figure in the mirror

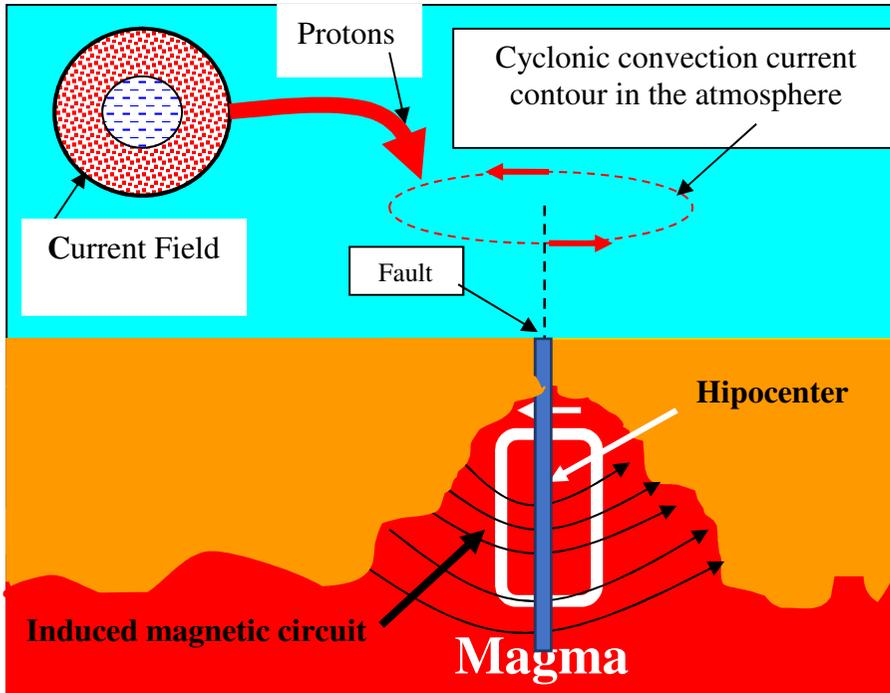


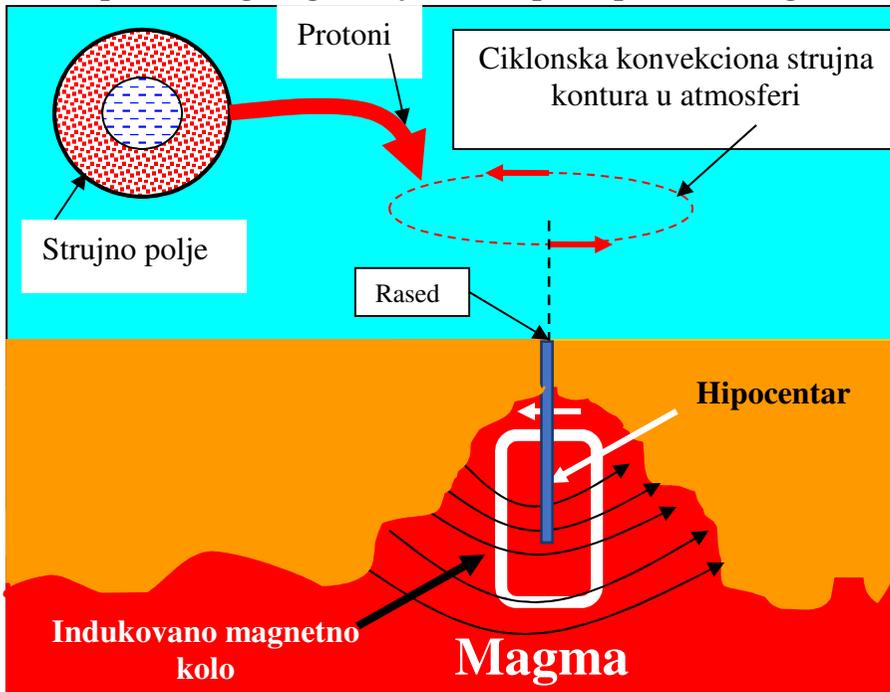
Fig. 2. 12.

The formation of rain drops is an atomic process that occurs in two steps. The first step is the creation of a cloud drop by aggregation of hydrogen and oxygen that are part of the solar wind, that is, the current field. The second step is the creation of raindrop by electron valence. After the opening of the current field, heavy ionized particles of the solar wind "bomb" a cloud with cloud drops and link polarized molecules of cloud drops by electron valence. This means that only by the arrival of the current field, which carries the particles of the solar wind, it comes to the formation of cloud and rain drops. The maximum opening of the current field is during the largest precipitation amount.

2.5.2. Princip lika u ogledalu

U prirodi postoji još jedan način magnećenja koje se javlja za vreme ciklonske aktivnosti (nevremena) u atmosferi, na principu lika u ogledalu.

Prikaz protonskog magnećenja raseda principom lika u ogledalu



Prikaz 2. 12.

Nastajanje kišnih kapi je atomski proces koji se događa iz dva koraka. Prvi korak je stvaranje oblačne kapi sjedinjavanjem vodonika i kiseonika koji se nalaze u sastavu Sunčevog vetra, odnosno u strujnom polju. Drugi korak je stvaranje kišne kapi elektronskom valencijom. Teško jonizovane čestice Sunčevog vetra posle otvaranja strujnog polja “bombarduju” oblak sa oblačnim kapima i elektronskom valencijom vezuju polarizovane molekule oblačnih kapi.

To znači da tek dolaskom strujnog polja, koje nosi čestice Sunčevog vetra, dolazi do stvaranja oblačnih i kišnih kapi. Maksimalno otvaranje strujnog polja je za vreme najveće količine padavina.

Thus, the precipitation amount can be used to determine the date of maximum magnetization. Typical examples of proton earthquakes in Serbia are expressed in terms of precipitation.

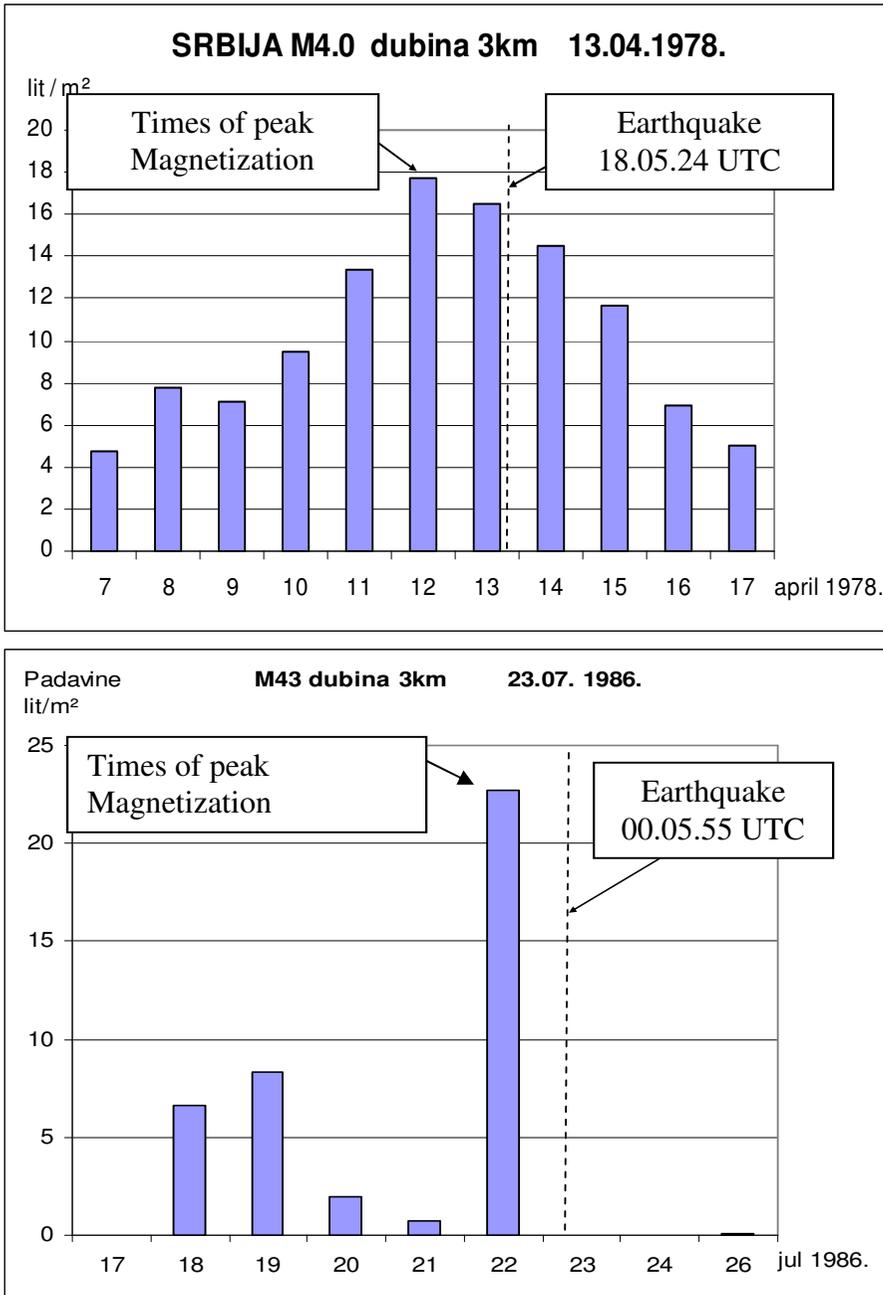
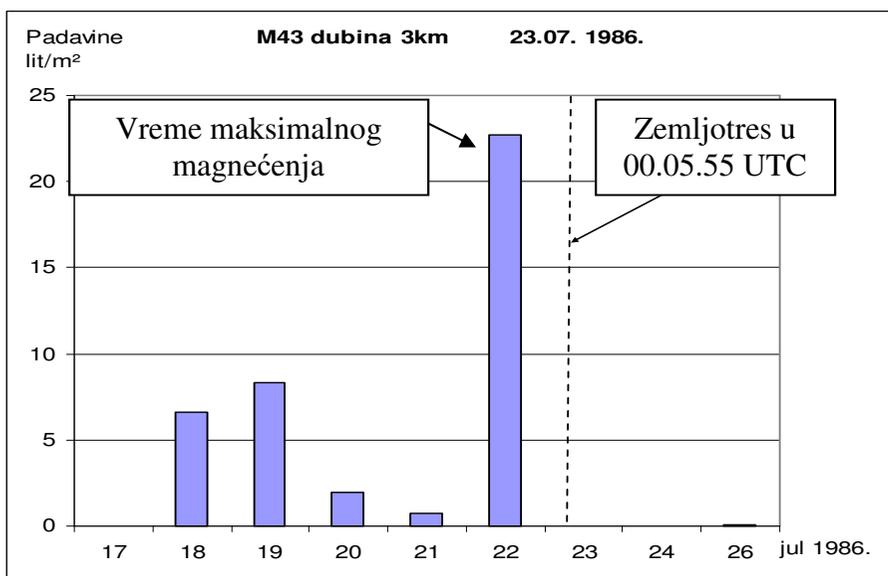
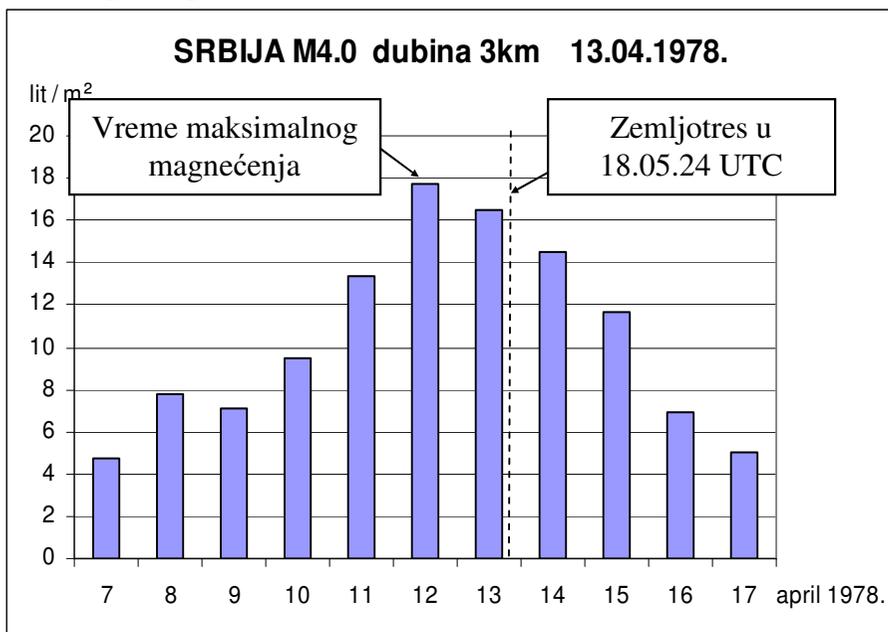


Diagram 2.5.

Tako se količina padavina može koristiti za određivanje datuma maksimalnog magnećenja. Tipični primeri protonskih zemljotresa u Srbiji izraženi preko padavina



Dijagram 2.5.

Strongest earthquake, which was officially registered in Serbia, had a magnitude M6.0 occurred in Kopaonik 18th May 1980 in 20.13.6 UTC.

During the month of May 1980th year over Serbia passed the three Current Fields, which caused great precipitation. The average rainfall in May were about 55 liters. However, in May 1980th year fell 124.6 liters of rain per square meter.

One of the three Current Fields, which came from the direction of southwest (245 degrees) cause the induction earthquake with a seismic focus at a depth of 9 kilometers

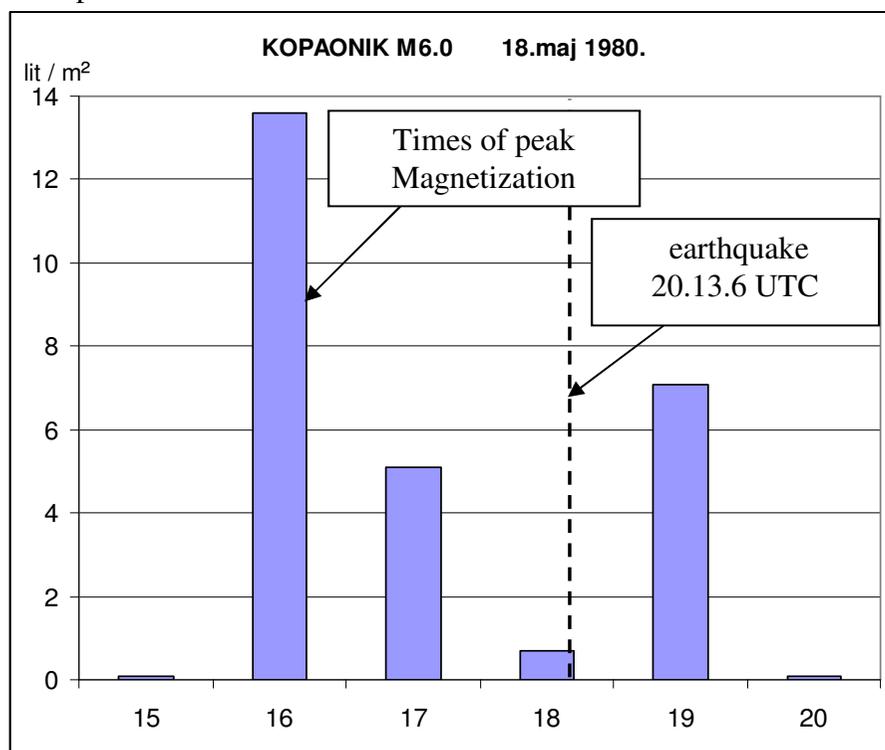


Diagram 2..6

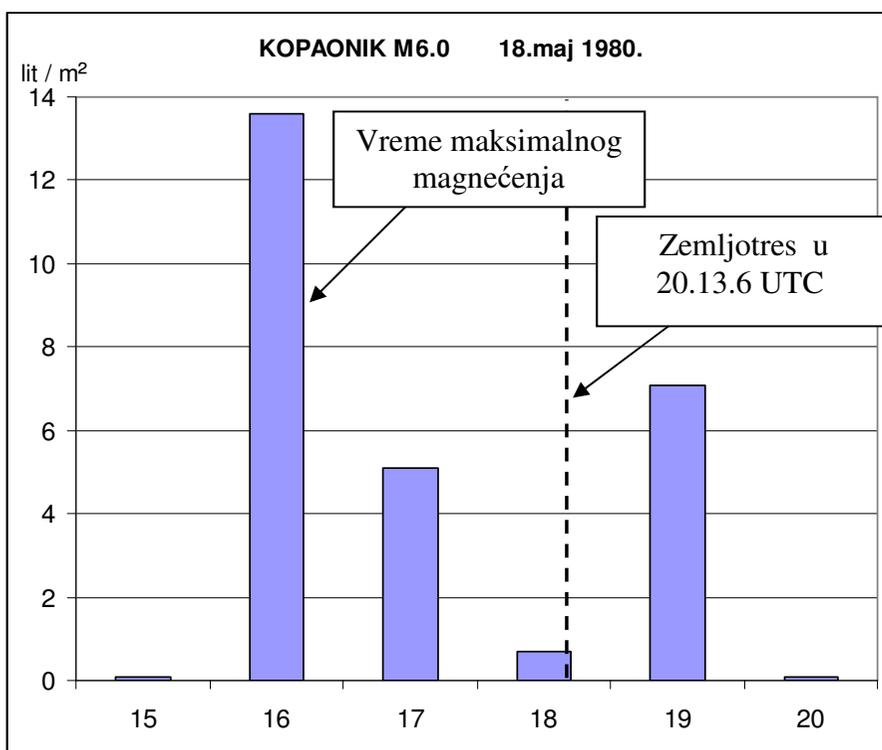
It was noted that in Serbia are powerful earthquakes when the Current Field comes from the southwest. (Kraljevo earthquake on 3 November 2010.)

- Serbia M4.8, depth of 2km, October 1, 1972;
- Serbia M4.1, depth of 3 km on 20 May 1985;

Najjači zemljotres, koji je službeno zabeležen u Srbiji, imao je magnitudu **M6.0** a dogodio se na Kopaoniku 18. maja 1980. godine u 20.13.6 UTC.

U toku maja meseca 1980. godine preko Srbije prešla su tri strujna polja koja su izazvala velike padavine. Prosečne padavine u maju su oko 55 litara. Međutim, u maju 1980. godine palo je 124,6 litara kiše po metru kvadratnom.

Jedno od tri strujna polja koje je došlo iz pravca jugozapada (245 stepeni) izazvalo je indukcioni zemljotres sa hipocentrom na dubini od 9. kilometara.



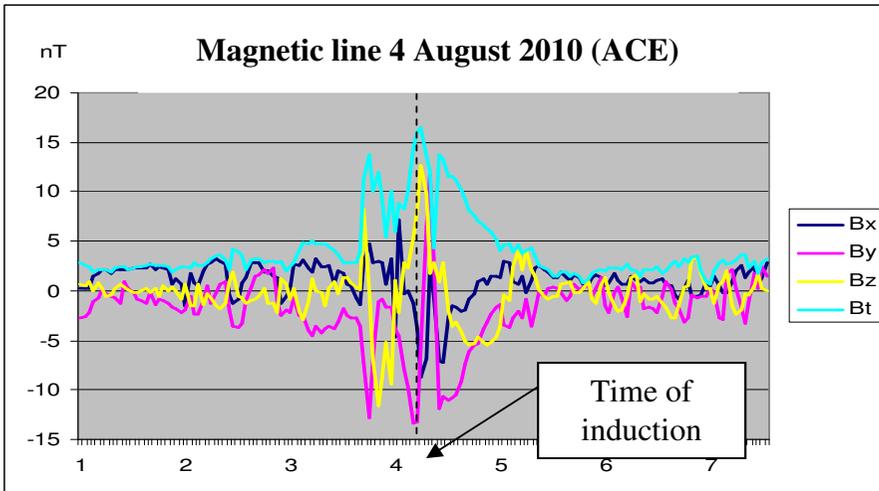
Dijagram 2.6.

Zapaženo je da se u Srbiji javljaju snažni zemljotresi kada strujno polje dolazi iz pravca jugozapada. (Kraljevački zemljotres 3. novembra 2010.)

- **Srbija M4.8**, dubina 2km, 1. oktobra 1972;
- **Srbija M4.1**, dubina 3km 20. maja 1985;

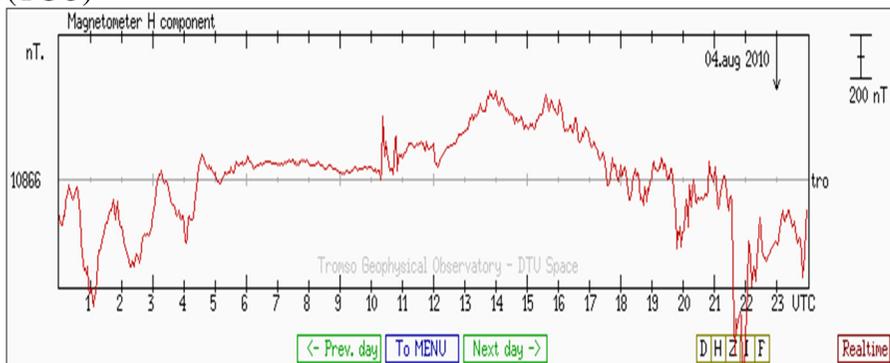
2.6.1. Telluric earthquakes

Free electrical loads that enter the atmosphere through the Planetary Magnetic Door created by the induction in the Earth conducted electrical current, called telluric currents. When the magnetic lines of the interplanetary magnetic field made the free electrical loads with a large electrical charge, then the telluric current strengths and rise to a magnetic storm.



Dijagram 2. 7.

H component of geomagnetic field. Credit: Tromsø Geophysical Observatory (TGO)

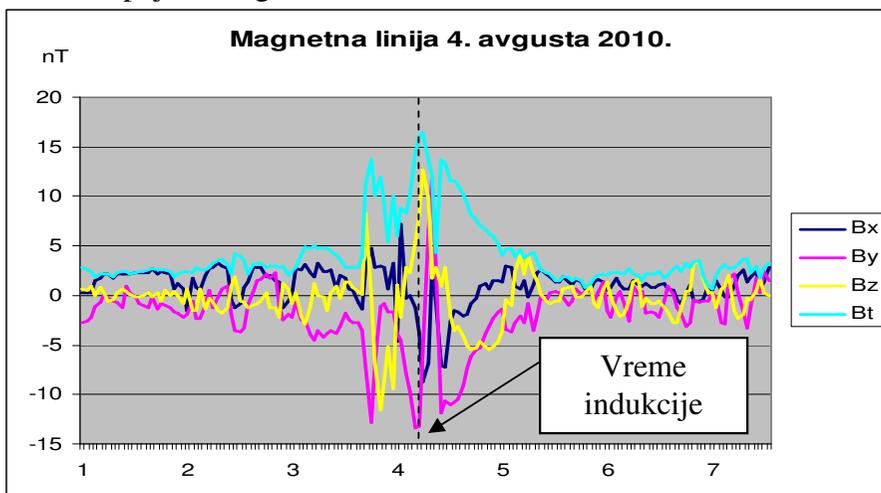


Dijagram 2. 8.

When comparing the diagrams 2.7. and 2.8. obtained knowledge about the correlation of these two time parameters. In this way proves the effect of free electrical load on the occurrence of telluric electric currents.

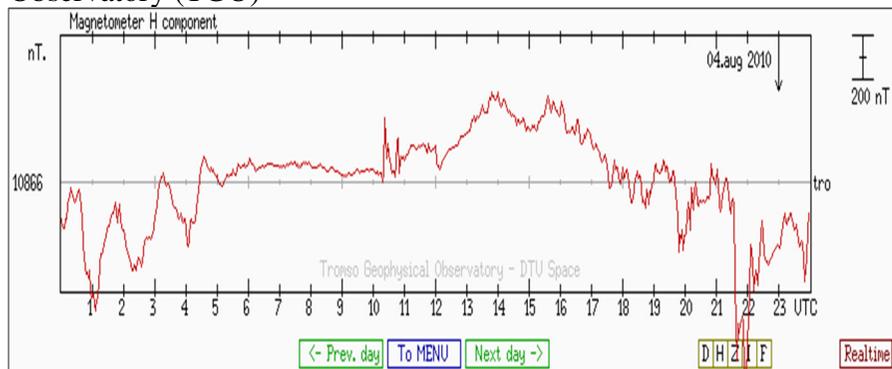
2.6.1. Telurski zemljotresi

Slobodna električna opterećenja koja ulaze u atmosferu kroz Planetarna magnetna vrata stvaraju putem indukcije u unutrašnjosti Zemlje kondukcione električne struje, koje nazivamo telurskim strujama. Kada magnetna linija interplanetarnog magnetnog polja donese slobodna električna opterećenja sa velikim električnim nabojem, tada su telurske struje jake i dolazi do pojave magnetne bure.



Dijagram 2. 7.

H komponenta geomagnetskog polja. Credit: Tromsø Geophysical Observatory (TGO)

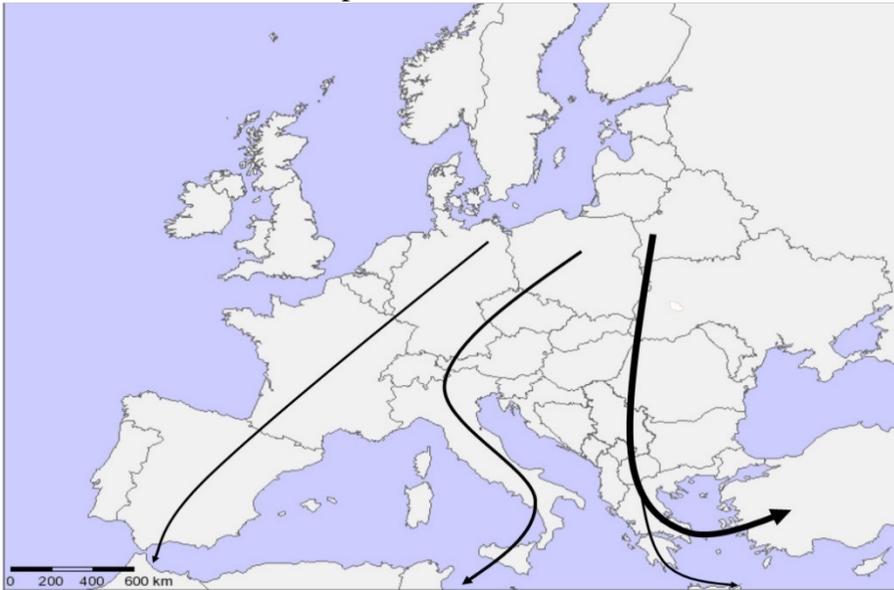


Dijagram 2. 8.

Kada se uporede dijagrami 2.7. i 2.8. dobija se saznanje o korelaciji ova dva vremenska parametra. Na ovaj način dokazuje se dejstvo slobodnih električnih opterećenja na pojavu telurskih električnih struja.

North telluric electric currents flow in the interior of the Earth from north to south pole. The depth of telluric electric current depends on the strength of the interplanetary magnetic field. What is the strength of telluric currents that strengthens the depth of the larger In general, the telluric currents flow at a depth of 1 to 10 kilometers. However, the strong telluric currents can reach depths of up to several hundred kilometers and can then be trigger (trigger) pulse with the induction of earthquakes at great depths. It is a continuous process, which has a global character.

Electric current density per unit volume is small and magnetization poor in Europe, and so the phenomenon of stronger telluric earthquakes is not possible. With a narrowing of the European continent, the density of electric telluric current increases and the magnetization of environments is stronger and occurrence of earthquakes more frequent. They usually occur at locations where the land narrows in the Balkan, the Apennine and Iberian Peninsula. The highest density of telluric currents occurs on the Balkan Peninsula and the Apennine, and the lowest in the Iberian Peninsula. The flow of the main European telluric currents.



Map. 2.2

In Europe there are three flow of telluric currents. Two flow of telluric currents linking Europe and Africa and one from Europe, the Middle East.

Severne telurske električne struje teku u unutrašnjosti Zemlje od severnog do južnog pola. Dubina telurskih električnih struja zavisi od snage interplanetarnog magnetnog polja. Što je snaga telurskih struja jača to je dubina veća. U principu, telurske struje teku na dubini od 1 do 10 kilometara. Međutim, snažne telurske struje mogu da dostignu dubinu do više stotina kilometara i tada mogu biti okidni (triger)impuls kod indukcionih zemljotresa na velikim dubinama. To je stalni proces koji ima globalni karakter.

Gustina električne struje po jedinici zapremine, u Evropi je mala a magnećenje slabo pa pojava jačih telurskih zemljotresa nije moguća. Sa suženjem evropskog kontinenta povećava se gustina električne telurske struje pa je magnećenje sredina jače a pojava zemljotresa češća. Najčešće se javljaju na lokacijama gde se kopno sužava na Balkanskom, Apeninskom i Pirinejskom poluostrvu. Najveća gustina telurskih struja javlja se na Balkanskom poluostrvu a zatim na Apeninskom a najmanja na Pirinejskom poluostrvu.

Tok glavnih evropskih telurskih struja.



Karta 2.2

U Evropi postoje tri toka telurskih struja. Dva toka telurskih struja povezuju Evropu i Afriku a jedan Evropu sa Srednjim istokom.

Telluric earthquakes are considered to be surface earthquakes and they are not a risk factor. In order to come to the appearance of magnetization of an environment, magnetic circuit must be established through the faults or across the gaps.

However, due to the large magnetic resistance of the gap and weak telluric electric current, telluric earthquakes rarely occur in the gap. Telluric currents cannot form a magnetic circuit between two tectonic plates but could be trigger impulse to induction earthquakes. When magnetic flux is not closed, there is no magnetic circuit and so earthquake, too.

Telluric earthquakes in most cases occur at faults where the magnetic resistance is far less. They can be distinguished by the strength and depth. In general, the telluric earthquakes occur up to 10 kilometers deep. However, when the telluric electric currents are trigger impulse for induction earthquake then they reach the depth of 670 km.

The strength of telluric earthquakes varies from continent to continent. In Europe, the maximum magnitude of telluric earthquakes is about 4 degrees. In North America 4.5 and in the Far East in the Northern Hemisphere 5 degrees. The strongest earthquakes are in the southern hemisphere in the Pacific and South America reaching the magnitude to 5.5 degrees. All telluric earthquakes have planetary character.

2.6.2. Induction earthquakes

Induction earthquakes are of local character and they appear by effect of free electric loads that are accumulated in the current field at 250 or 300 millibar surface above the location in which magnetization is performed. Free electric loads, which penetrated through the planetary magnetic door or geomagnetic anomaly, form the current field in the upper layers of the atmosphere. Free electric loads in the current field carry frozen magnetic field of a region from which they have been erupted.

Current Field has a magnetic layer that prevents the leakage of free electrical load at radial velocities greater than 50 knot. However, after reduction of the radial velocity flow field leads to the dissolution of the magnetic layer and the penetration of free electrical load in the free atmosphere. After opening the Current Field can lead to the induction in the Earth's interior. (2009., *Volume 3rd Belgrade School of Meteorology*)

Telurski zemljotresi se smatraju površinskim zemljotresima i nisu faktor rizika. Da bi došlo do pojave magnećenja sredine mora da se uspostavi magnetno kolo preko raseda ili preko procepa.

Međutim, zbog velikog magnetskog otpora procepa i slabe telurske električne struje, telurski zemljotresi retko se javljaju u procepu. Telurske struje ne mogu da formiraju magnetsko kolo u procepu između dve tektonske ploče ali mogu biti trigger impuls indukcionim zemljotresima. Kada magnetni fluks nije zatvoren, nema magnetskog kola pa nema zemljotresa.

Telurski zemljotresi se u većini slučajeva javljaju na rasedima gde je magnetski otpor daleko manji. Prepoznaju se po jačini i dubini. U principu, telurski zemljotresi javljaju se do 10 kilometara dubine. Međutim, kada su telurske električne struje okidni impuls za indukcionim zemljotres tada dostižu dubinu do 670km.

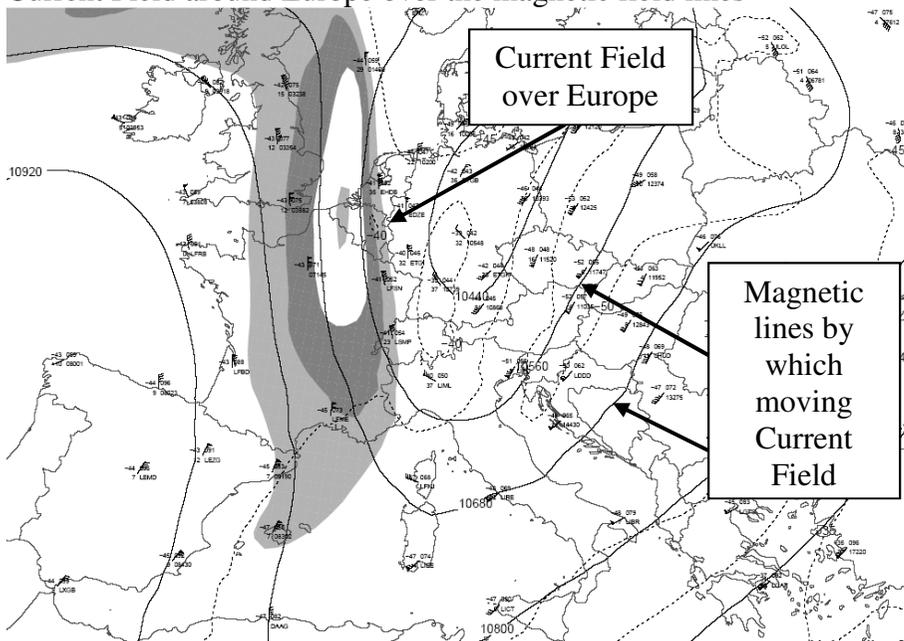
Jačina telurskih zemljotresa razlikuje se od kontinenta do kontinenta. U Evropi maksimalna magnituda telurskih zemljotresa je oko 4 stepena. U Severnoj Americi 4,5 a na Dalekom istoku na severnoj hemisferi 5 stepeni. Najjači telurski zemljotresi na planeti su na južnoj hemisferi na Pacifiku i Južnoj Americi koji dostižu magnitudu do 5,5 stepeni. Svi telurski zemljotresi imaju planetarni karakter.

2.6.2. Indukcioni zemljotresi

Indukcioni zemljotresu su lokalnog karaktera i javljaju se dejstvom slobodnih električnih opterećenja koja su akumulirana u strujnom polju (Jet Stream) na 250 ili 300 milibarskoj površini iznad lokacije kod koje se vrši magnećenje. Slobodna električna opterećenja, koja su prodrila kroz Planetarna magnetna vrata ili geomagnetsku anomaliju, formiraju u gornjim slojevima atmosfere **Strujno polje**. Slobodna električna opterećenja u strujnom polju nose zamrznuto magnetno polje regiona na Suncu iz kojeg su eruptovana.

Strujno polje ima magnetni omotač koji ne dozvoljava rasipanje slobodnih električnih opterećenja pri radijalnim brzinama većim od 50 knota. Međutim, posle smanjenja radijalne brzine strujnog polja dolazi do raspada magnetnog omotača i prodora slobodnih električnih opterećenja u slobodnu atmosferu. Posle otvaranja strujnog polja dolazi do pojave indukcije u unutrašnjosti Zemlje. (2009, Sveska 3. *Beogradska škola meteorologije*)

Induced electrical currents in the Earth's interior creates a magnetic circuit that performs Magnetization environment. In general, if you are going to Magnetization gap or fault can lead to the induction of earthquakes. Current Field around Europe over the magnetic field lines



Map. 2. 3.

Credit : [Larry Oolman](#)

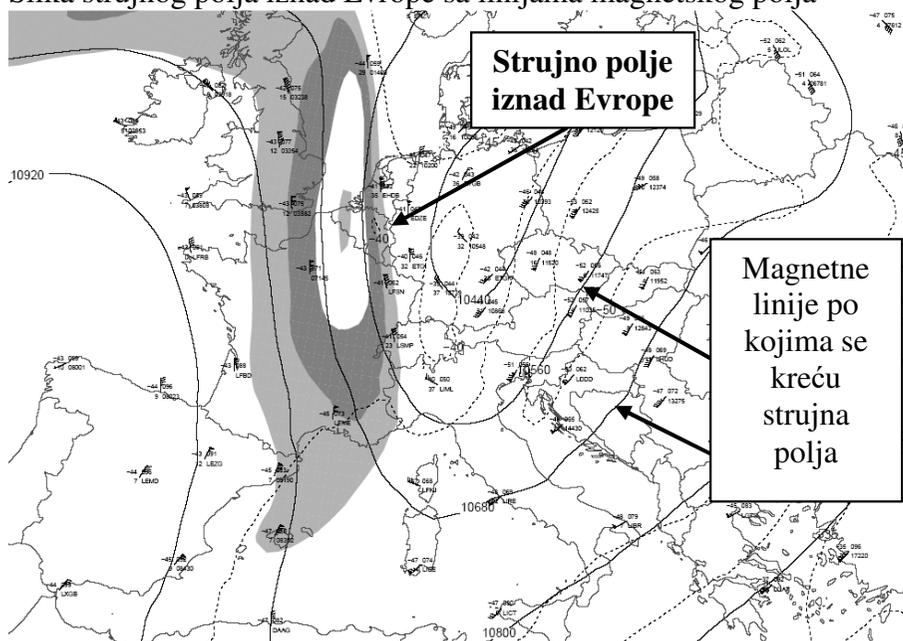
Induction magnitude earthquake reaches a large value and is directly proportional to the electricity Current Field. The strength of induction earthquake faults, is much smaller than the induction of earthquakes on the gap between two tectonic plates. Induction earthquakes occur on faults with magnitudes of 1 to 6 degrees at depths of 2 to 10 kilometers. In exceptional cases can be attained 7 degrees.

Induction earthquakes that occur in the rifts between two tectonic plates can reach the volume up to 9.5 degrees (M9.5 Chile, 22 May 1960.) and have no depth limit. (Spanish earthquake depth 623.4 km 2010).

They originate from the effect of one of the components of the interplanetary magnetic field that is perpendicular to the line between tectonic plates or faults.

Indukovana električna struja u unutrašnjosti Zemlje stvara magnetsko kolo koje vrši magnećenje sredine. U principu, ako se magnećenje događa na procepu ili rasedu dolazi do pojave indukcionih zemljotresa.

Slika strujnog polja iznad Evrope sa linijama magnetskog polja



Karta 2.3

Credit : [Larry Oolman](#)

Magnituda indukcionih zemljotresa dostiže velike vrednosti i direktno je proporcionalna električnoj energiji strujnog polja. Jačina indukcionih zemljotresa na rasedima, znatno je manja od indukcionih zemljotresa na procepima između dve tektonske ploče. Indukcioni zemljotresi na rasedima javljaju se sa magnitudama od 1 do 6 stepeni na dubinama od 2 do 10 kilometara. U izuzetnim slučajevima mogu da dostignu 7 stepeni.

Indukcioni zemljotresi koji se javljaju u procepima između dve tektonske ploče mogu da dostignu jačinu do 9,5 stepeni (Čile M9,5, 22 maja 1960.) i nemaju ograničenje dubine. (Španski zemljotres dubina 623.4 km 2010.)

Nastaju dejstvom jedne od komponenti interplanetarnog magnetnog polja koja je normala na liniju između tektonskih ploča ili raseda.

2.7.1. Earthquakes focus

Every earthquake has two zones, zone induction and propagation. Earthquakes focus and epicenter of the earthquake are still in the induction zone. Soil movement in the epicenter of the primary physical torsional motion with the rapid change in the direction of torsion. In the area of propagation does not change direction and there is a secondary, consequently, wave motions

Showing the distribution of ground motion

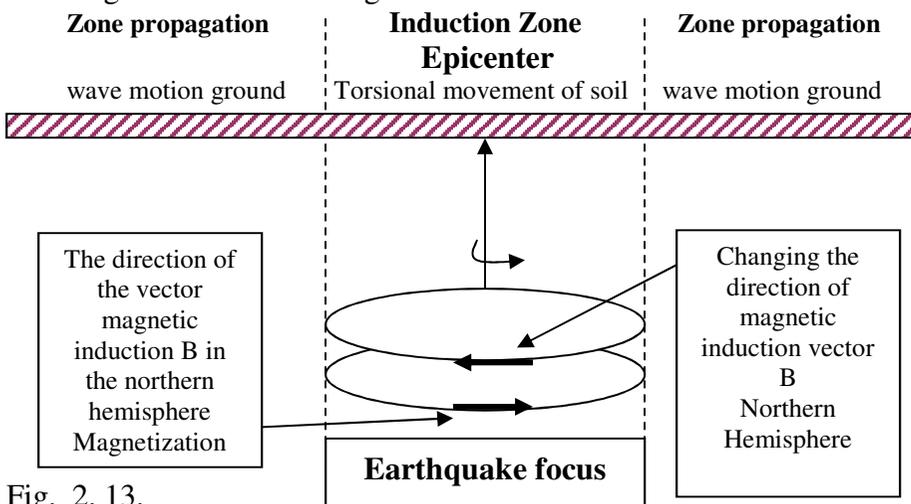


Fig. 2. 13.

During magnetization, direction of magnetic induction in the earthquake focus is in accordance with the vector of the resulting geomagnetic field. In the northern hemisphere, it has the counterclockwise direction, that is, the same direction as the cyclonic activity in the atmosphere in the northern hemisphere. With the phenomenon of coercive force, the direction of the magnetic induction vector is opposite from the direction of the resulting geomagnetic field, and has a clockwise direction, that is, anticyclonic activity.

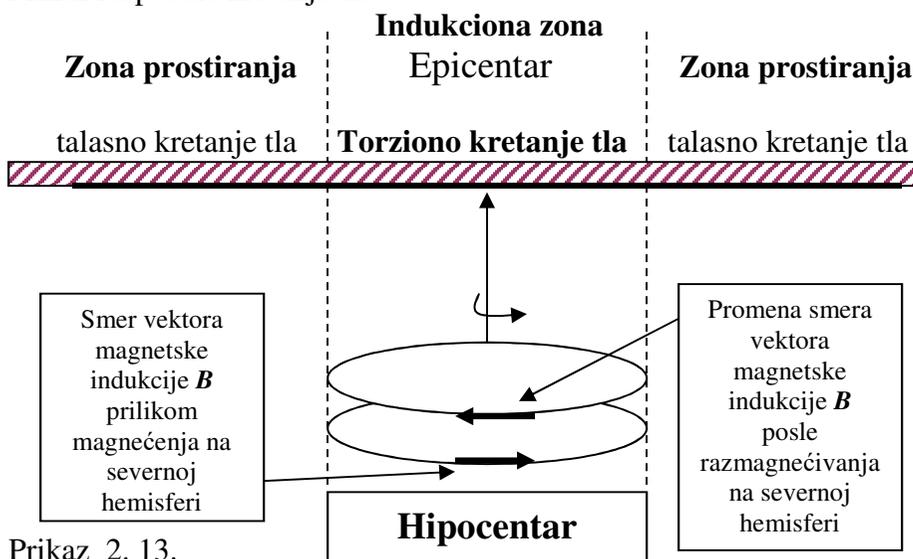
Electromagnetic force that occurs between two magnetic fields of different directions causes sudden torsional motion of all induction zone with rapid change in the direction of torsion.

Torsional motion is transmitted from the earthquake focus to the epicenter, which is best seen on the vertical columns of buildings or chimneys as they twisted in the counterclockwise direction. Due to the torsional motion, cracks on the building walls are vertical, or under some acute angle.

2.7.1. Hipocentar zemljotresa

Svaki zemljotres ima dve zone, indukcionu i zonu prostiranja. Hipocentar i epicentar zemljotresa uvek se nalaze u indukcionalnoj zoni. Kretanje tla u epicentru je primarno fizičko, odnosno torziono kretanje sa brзом promenom smera torzije. U zoni prostiranja nema promene smera kretanja a javlja se sekundarno, posledično, talasno kretanja tla.

Prikaz raspodele kretanja tla



Prikaz 2. 13.

Prilikom magnećenja, smer magnetske indukcije u hipocentru je u skladu sa vektorom rezultujućeg geomagnetskog polja. Na severnoj hemisferi ima **smer suprotan smeru kazaljke na satu**, odnosno ima isti smer kao ciklonska aktivnost u atmosferi na severnoj hemisferi. Kod pojave koercitivne sile, smer vektora magnetske indukcije je suprotan smeru rezultujućeg geomagnetskog polja, i ima **smer kazaljke na satu**, odnosno kao anticiklonska aktivnost.

Elektromagnetska sila koja se javlja između dva magnetska polja različitih smerova izaziva mahovito torziono kretanje cele indukcione zone sa bržom promenom smera torzije.

Torziono kretanje prenosi se od hipocentra na epicentar, što se najbolje vidi na vertikalnim stubovima zgrada ili dimnjacima jer su uvrnuti u smeru suprotnom od kretanja kazaljke na satu. Zbog torzionog kretanja na zidovima zgrada pukotine su vertikalne ili pod nekim kosim uglom.

Earthquake focus behaves as a rotor of natural induction motor with short-circuited rotor, on the principles of which Tesla made his induction motor.

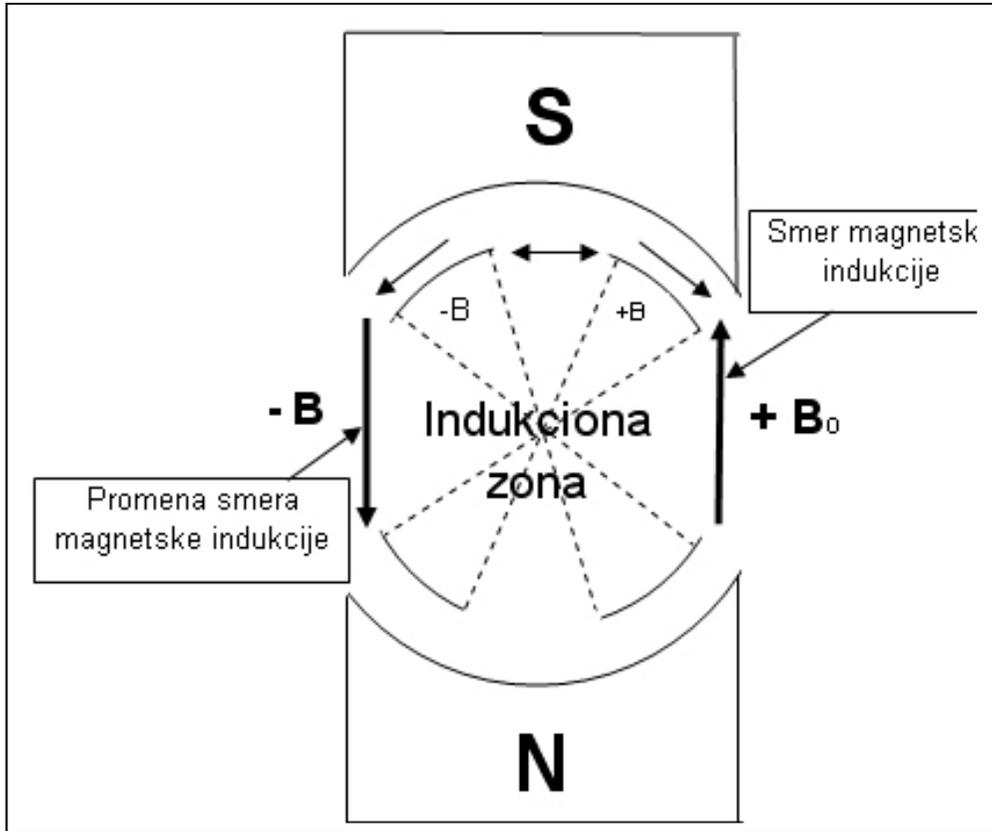
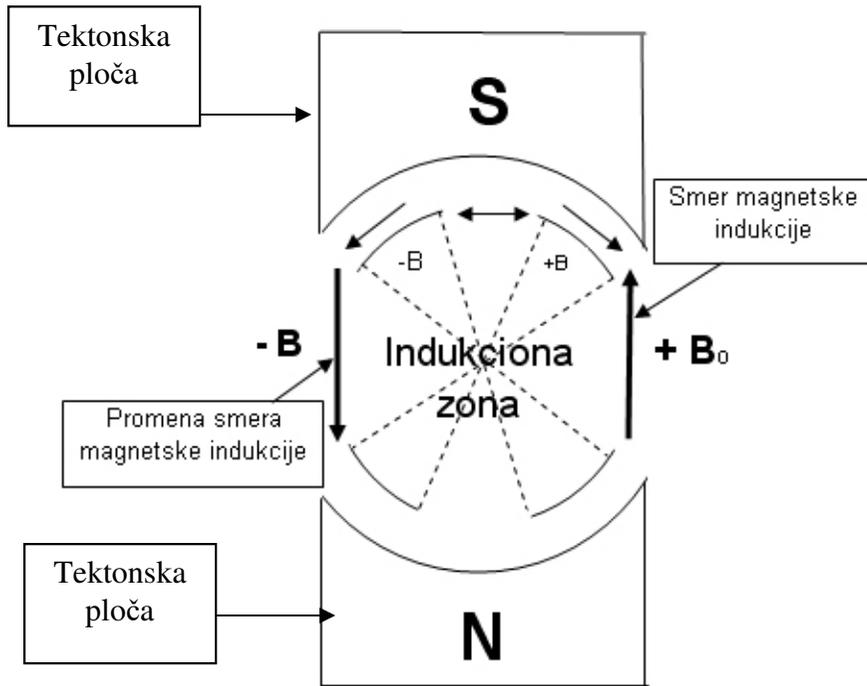


Fig. 2.14.

Change direction component of the interplanetary magnetic field causes the change of direction of magnetic induction B in the gap or fault, which is manifested by the appearance of induced electric currents that cause the physical movement from side to side depending on the direction of magnetic induction. Relation $d\mathbf{F} = I d\mathbf{l} \times \mathbf{B}$ is the law which connects the electrical and mechanical values with magnetic values and represents the basis of all seismic movements. Any change in the direction of the magnetic induction B causes the change of direction of physical movement of the earthquake focus.

Partially circular motion of the earthquake focus is manifested at the epicenter as a torsional movement of the ground.

Hipocentar zemljotresa ponaša se kao rotor **Prirodnog indukcionog motora**, sa kratko spojenim rotorom, sa ograničenim pomerajem, na čijim je principima Tesla izradio svoj indukcionni motor.



Prikaz 2.14.

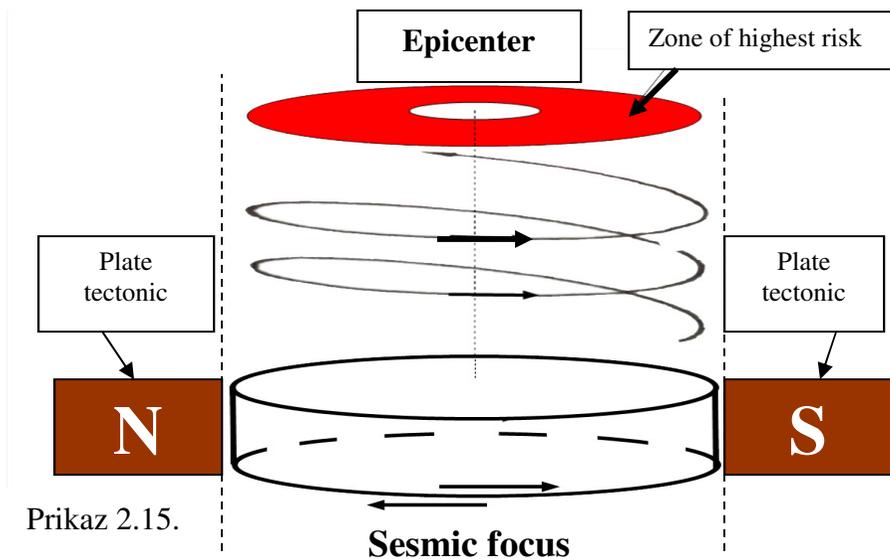
Promena smera komponenti interplanetarnog magnetnog polja izaziva promenu smera magnetske indukcije B u procepu ili rasedu, koja se manifestuje pojavom indukovanih električnih struja koje izazivaju fizičko kretanje **levo-desno** u zavisnosti od smera magnetske indukcije.

Relacija $d\mathbf{F} = I d\mathbf{l} \times \mathbf{B}$ predstavlja zakon kojim se povezuju električne i mehaničke veličine sa magnetskim veličinama i predstavlja osnov svih seizmičkih kretanja. Svaka promena smera magnetske indukcije B izaziva promenu smera fizičkog kretanja hipocentra zemljotresa.

Delimično **kružno kretanje hipocentra** manifestuje se u epicentru kao **torziono kretanje tla**.

Rotation in the earthquake focus is transferred to the ground in the form of a spiral where the pace and direction of a spiral varies depending on the strength and direction of magnetic induction. Risk zone in the epicenter was in the ring because there is no torsion in the very center. This means that every earthquake in the epicenter has the alley of the maximum destructive effect.

Showing induction zone earthquakes



Prikaz 2.15.

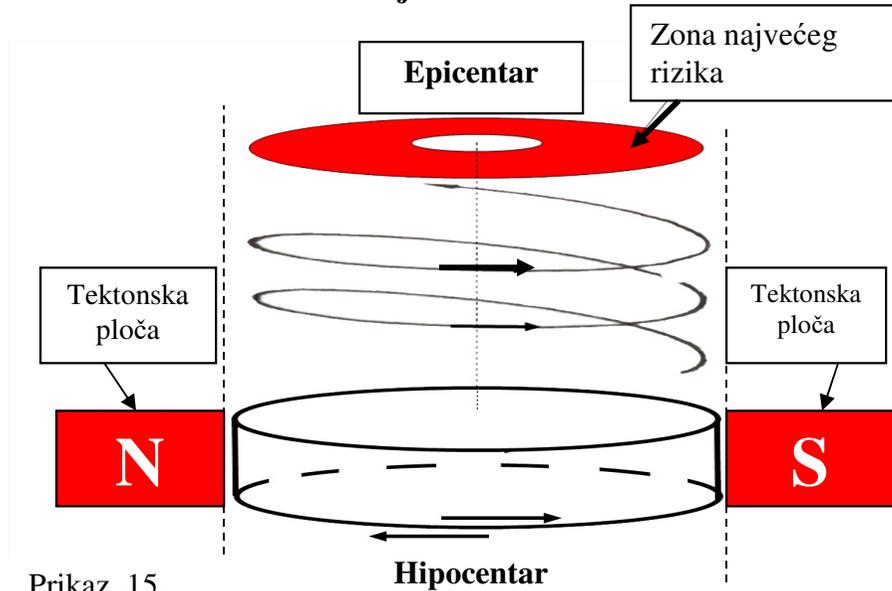
It is known that seismic movements caused by weak earthquake can be measured at distances of several thousand kilometers from the earthquake focus.. On the other hand, the eruption of the volcano releases energy that is 100 times stronger than the power of strong earthquakes and seismic waves created by the eruption of volcanoes extends no further than 20 kilometers from the eruption. The answer is simple:

Propagation of seismic waves is electromagnetic through the magma and volcano is physical through the tectonic plates.

Electromagnetic field, as waves, spread through the magma is very long and far after the cessation of earthquakes. This means a radiated electromagnetic wave is no longer tied to the existence of the earthquake. If so, then the physical movement in the earthquake focus does not create the wave that has the capability of propagation at a distance, which clearly indicates that propagation at distance is created by some other principle.

Rotacija u hipocentru prenosi se prema tlu u obliku spirale gde se korak i smer navojnice menja u zavisnosti od jačine i smera magnetske indukcije. Zona rizika u epicentru je u obliku prstena jer u samom centru nema torzije. To znači da svaki zemljotres u epicentru ima aleju maksimalnog destruktivnog dejstva.

Prikaz indukcione zone zemljotresa



Prikaz .15.

Poznato je da se seizmička kretanja nastala slabim zemljotresom mogu izmeriti na rastojanjima od više hiljada kilometara od hipocentra. S druge strane, erupcija vulkana oslobađa energiju koja je 100 puta jača od energije snažnog zemljotresa a seizmički talas stvoren erupcijom vulkana ne prostire se dalje od 20 kilometara od mesta erupcije. Odgovor je jednostavan:

Prostiranje seizmičkog talasa je elektromagnetno, kroz magmu, a vulkana fizičko kroz tektonske ploče.

Elektromagnetno polje, u vidu talasa, prostire se u jednom smeru kroz magmu vrlo dugo i daleko i posle prestanka zemljotresa. To znači jednom izračeni elektromagnetni talas nije više vezan za postojanje zemljotresa.

Ako je to tako, onda fizičko kretanje u hipocentru ne stvara talas koji ima sposobnost prostiranja na daljinu, što jasno ukazuje da se prostiranje na daljinu stvara nekim drugim principom.

2.8.1. Electric dipole

The main task that arises is to find a source that creates a wave of such a force that can go around the world. Assuming that the source of electromagnetic radiation is electric dipole as the simplest system for creating electromagnetic wave.

To comprehend the basics of electromagnetic propagation at distance, let us set electric dipole in the center of the spherical coordinate system. Electromagnetic field that is close to an electric dipole is called the induction zone, or close area.

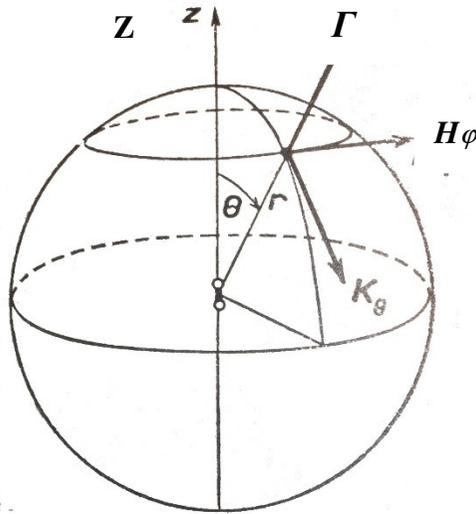


Fig. 2.16.

In the induction zone, the components of electromagnetic field are:

$$H_{\phi} = (I l / 4 \pi r^2) \sin \theta \cos \omega t \dots\dots\dots(2.4.1)$$

$$K_r = (Q l / 4 \pi \epsilon r^3) \cos \theta \sin \omega t \dots\dots\dots(2.4.2.)$$

$$K_{\theta} = (Q l / 4 \pi \epsilon r^3) \sin \theta \sin \omega t \dots\dots\dots(2.4.3.)$$

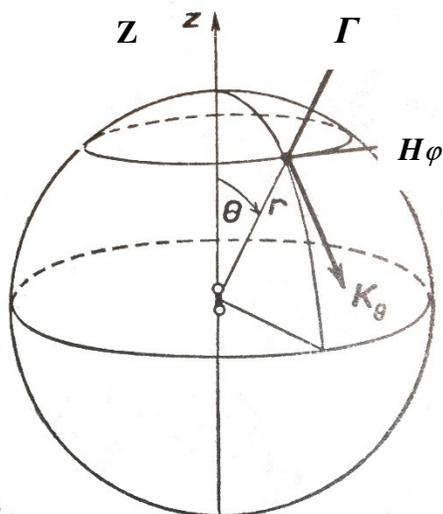
In the induction zone, the dominant component of the magnetic field is $1 / r^2$ and the electric field component is $1 / r^3$.

With the increase in distance from electric dipole there is a transmission into the zone of propagation and so the induction components of the field become weak rapidly.

2.8.1. Električni dipol

Osnovni zadatak koji se postavlja je pronaći izvor koji stvara talas takve snage koji može da obiđe ceo svet. Pretpostavimo da je izvor elektromagnetnog zračenja električni dipol kao najjednostavniji sistem za stvaranje elektromagnetnog talasa.

Da bi sagledali osnove elektromagnetnog prostiranja na daljinu postavimo električni dipol u centar sfernog koordinatnog sistema. Elektromagnetno polje koje je blizu električnog dipola naziva se indukcijom zonom, odnosno bliskom zonom.



Prikaz 2.16.

U indukcijonj zoni, komponente elektromagnetnog polja su:

$$H_{\varphi} = (I l / 4 \pi r^2) \sin \theta \cos \omega t \dots\dots\dots(2.4.1)$$

$$K_r = (Q l / 4 \pi \epsilon r^3) \cos \theta \sin \omega t \dots\dots\dots(2.4.2.)$$

$$K_{\theta} = (Q l / 4 \pi \epsilon r^3) \sin \theta \sin \omega t \dots\dots\dots(2.4.3.)$$

U indukcijonj zoni, kod magnetnog polja dominantna komponenta je $1/r^2$ a kod električnog polja komponenta $1/r^3$.

Sa povećanjem odstojanja od električnog dipola prelazi se u zonu prostiranja pa indukcione komponente polja brzo slabe.

In the zone of propagation, at the time of radiation or after the termination of the dipole radiation, the components of electromagnetic field dominate with $1/r$

$$\mathbf{H}\varphi = (\mathbf{I} / 2 \pi r) \sin\theta \sin(\omega t - \beta r) \dots \dots \dots (2.4.4.)$$

$$\mathbf{K}\theta = -(\sqrt{\mu / \varepsilon}) (\mathbf{I} / 2 \pi r) \sin\theta \sin(\omega t - \beta r) \dots \dots \dots (2.4.5.)$$

On the basis of relations 2.4.4 and 2.4.5, it can be seen that the electromagnetic wave is spherical and spreads with the speed

$$v = 1 / \sqrt{\varepsilon \mu}$$

Electric and magnetic fields are perpendicular to the direction of propagation of electromagnetic wave.

In the zone of induction electric and magnetic fields are mutually phase shifted by $\pi / 2$. In the zone of propagation electric and magnetic fields are in phase and their ratio depends on the environment through which an electromagnetic wave extends $\mathbf{K}/\mathbf{H} = \sqrt{\mu / \varepsilon} \dots \dots \dots (2.4.6.)$

Pointing's vektor

$$\mathbf{\Gamma} = \mathbf{K}\theta \mathbf{H}\varphi \dots \dots \dots (2.4.7.)$$

$$\mathbf{\Gamma} = \sqrt{\mu / \varepsilon} (\mathbf{I}^2 / 4 \lambda^2 r^2) \sin\theta \sin^2(\omega t - \beta r) \dots \dots \dots (2.4.8.)$$

Pointing's vector is directed towards hauls r is always positive, indicating that electromagnetic energy extends radially into the surrounding space. Fig. 2.15.

However, the wave impedance $\mathbf{Zc} = \sqrt{\mu / \varepsilon}$ clearly indicates that electric dipole is not a basis for the creation of dominant electric wave in the Earth's interior. In nature, the amount of energy that is localized in the electric and magnetic field and distributed in equal amounts. Electric field is dominant in the atmosphere, and magnetic field in the Earth's interior. That means that it is necessary to find a system that is capable to create a dominant magnetic wave in the Earth's interior.

In the theory of electromagnetic radiation there is a system that is powered by magnetic energy called a magnetic dipole. The knowledge that the magnetic dipole can be used as a source of radiation was obtained by theoretical conclusion and nature has confirmed its existence and validity of the theoretical conclusion.

U zoni prostiranja, u vreme zračenja ili posle prestanka zračenja dipola, dominiraju komponente elektromagnetnog polja sa $1/r$

$$H_{\varphi} = (I l / 2 \pi r) \sin \theta \sin(\omega t - \beta r) \dots \dots \dots (2.4.4.)$$

$$K_{\theta} = -(\sqrt{\mu / \epsilon}) (I l / 2 \pi r) \sin \theta \sin(\omega t - \beta r) \dots \dots \dots (2.4.5.)$$

Na osnovu relacija (2.4.4.) i (2.4.5.) saznajemo da je elektromagnetni talas sferičan i da se prostire brzinom

$$v = 1 / \sqrt{\epsilon \mu}$$

Električno i magnetno polje su upravni na pravac prostiranja elektromagnetnog talasa.

U zoni indukcije električno i magnetno polje su međusobno fazno pomereni za $\pi/2$. U zoni prostiranja električno i magnetno polje su u fazi pa im odnos zavisi od sredine kroz koju se prostire elektromagnetni talas.

$$K/H = \sqrt{\mu / \epsilon} \dots \dots \dots (2.4.6.)$$

Pointingov vektor

$$\Gamma = K_{\theta} H_{\varphi} \dots \dots \dots (2.4.7.)$$

$$\Gamma = \sqrt{\mu / \epsilon} (I^2 l^2 / 4 \lambda^2 r^2) \sin \theta \sin^2(\omega t - \beta r) \dots \dots \dots (2.4.8.)$$

Pointingov vektor je usmeren u pravcu potega r i uvek je pozitivan, što ukazuje da se elektromagnetska energija prostire radijalno u okolni prostor. Prikaz 2.15.

Razmatranje električnog dipola bilo je potrebno zbog svoje matematičke jednostavnosti a sve u cilju boljeg razumevanja prostiranja na daljinu.

Međutim, talasna impedansa $Z_c = \sqrt{\mu/\epsilon}$ jasno ukazuje da električni dipol nije osnova za stvaranje dominantnog elektromagnetnog talasa u unutrašnjosti Zemlje. U prirodi, količina energije koja je lokalizovana u električnom i magnetnom polju raspodeljena je u podjednakoj količini. U atmosferi je dominantno električno a u unutrašnjosti Zemlje magnetsko polje. To znači da je potrebno pronaći sistem koji ima sposobnost stvaranja dominantnog magnetnog talasa u unutrašnjosti Zemlje.

U teoriji elektromagnetskih zračenja postoji sistem koji se napaja magnetnom energijom a naziva se **Magnetni dipol**.

Saznanje da se magnetni dipol može koristiti kao izvor zračenja dobijeno je teorijskim izvođenjem a priroda je potvrdila njegovo postojanje i validnost teorijskog izvođenja.

2.8.2. Magnetic dipole in hipocentru earthquake

Magnetic dipole is essentially the current contour that has the capability of radiation. In literature magnetic dipole is a little known and there is no data that it has ever been used in practice as a source of electromagnetic radiation. It is a dipole that is created by nature, powered by magnetic energy and, in my opinion, unavailable to a man due to its extremely low efficiency.

If it is assumed that the current contour is in the earthquake focus then, due to change in magnetic field, electric current induces in it which complex amplitude is I .

Magnetic energy that is accumulated in the magnetic field of the gap or fault is power a current contour in the earthquake focus. If there were no current contour there would not be physical movement in the earthquake focus, in accordance with the relation $d\mathbf{F} = I d\mathbf{l} \times \mathbf{B}$. This means that the current contour simultaneously creates physical movement of the earthquake focus and electromagnetic wave.

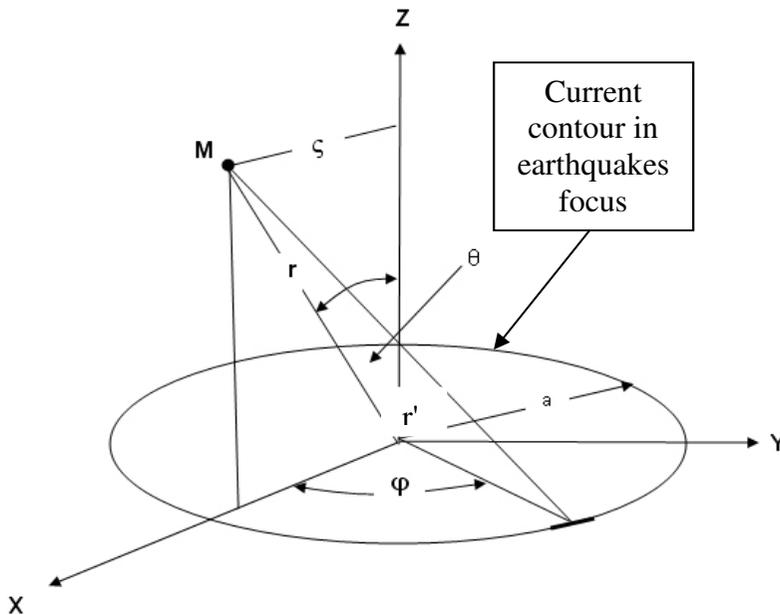


Fig 2.17.

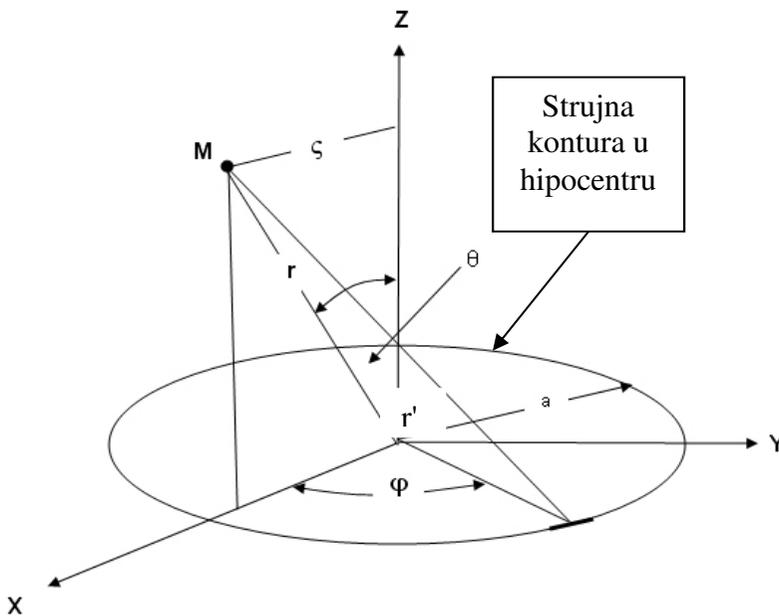
Electromagnetic field, which is radiated by the current contour at point M, due to induced electric currents, can be determined by the magnetic vector potential. Magnetic potential in this case has only $A\phi$ component.

2.8.2. Magnetni dipol u hipocentru zemljotresa

Magnetni dipol je u suštini **strujna kontura** koji ima sposobnost zračenja. U stručnoj literaturi magnetni dipol je malo poznat i nema podataka da je ikad primenjen u praksi kao izvor elektromagnetnog zračenja. To je dipol koji stvara priroda, napaja se **magnetnom energijom** i koji je po mom mišljenju nedostupan čoveku zbog njegovog izuzetno malog korisnog dejstva.

Ako pretpostavimo da se strujna kontura nalazi u hipocentru zemljotresa onda se, zbog promene magnetnog polja, u njoj indukuje električna struja čija je kompleksna amplituda I .

Magnetna energija koja je akumulirana u magnetnom polju procepa ili raseda, napaja strujnu konturu u hipocentru. Kada ne bi bilo strujne konture ne bi bilo fizičkog kretanja u hipocentru, u skladu sa relacijom $d\mathbf{F} = I d\mathbf{l} \times \mathbf{B}$. To znači da strujna kontura istovremeno stvara fizičko kretanje hipocentra i elektromagnetni talas.



Prikaz 2.17.

Elektromagnetno polje, koje zrači strujna kontura u tački M, usled indukovanih električnih struja, može se odrediti pomoću magnetskog vektora potencijala. Magnetski potencijal u ovom slučaju ima samo $A\phi$ komponentu.

If the current contour runs sinusoidal electric current, which is kompleksna amplituda I , then, necessary that the vector potential at point M introduce a factor which characterizes the potential to delay $e^{-j\beta r}$

$$A\varphi = (\mu / 2\pi) a I \int_0^{\pi} e^{-j\beta r} \cos\varphi d\varphi / r'$$

If we calculate r' based on data from Fig. 2.12. and if

$$e^{-j\beta r} \approx e^{-j\beta r} (1 + j\beta a \sin\theta \cos\varphi)$$

we get the approximate shape of the

$$A\varphi = (\mu a^2 / 4r) I (j\beta + 1/r) \sin\theta e^{-j\beta r}$$

The expressions for the components of the fields in the complex form as

$$\mathbf{K}' = -\text{grad } \varphi' - j\omega A' \dots\dots\dots(2.4.8.)$$

$$\mathbf{H}' = (1/\mu) \text{rot} A' \dots\dots\dots(2.4.9.)$$

Electric power and magnetic field contours in seismic focus can be determined via the relation (2.4.8.) and (2.4.9.).

For the electric field we get

$$\mathbf{K}\varphi = -j\omega A\varphi$$

$$\mathbf{K}\varphi = -j\omega (\mu a^2 \pi I / 4\pi) [(j 2\pi / \lambda r) + 1/r^2] \sin\theta e^{-j\beta r}$$

If we assume that $A_r = A_\theta = 0$ we get the electrical components of the magnetic field contours

$$\mathbf{H}_r = j a^2 \beta \pi I / 2\pi [(1/r^2) - j\lambda / 2\pi r^3] \cos\theta e^{-j\beta r} \dots\dots\dots(2.4.10.)$$

$$\mathbf{H}\varphi = j a^2 \beta \pi I / 2\pi [(j 2\pi / \lambda r) + 1/r^2 - (j\lambda / 2\pi r^3)] \sin^2\theta e^{-j\beta r}$$

If the obtained components of the magnetic field of the current contour are compared with the complex components of the electric dipole, they differ only for the constant multiplier. The same is with the components of the electric field.

Ako kroz strujnu konturu teče prostoperiodična električna struja, čija je kompleksna amplituda I , onda je neophodno da se u vektor potencijal u tački M uvede faktor koji karakteriše potencijale u zakašnjenju $e^{-j\beta r}$

$$A\varphi = (\mu / 2\pi) a I \int_0^{\pi} e^{-j\beta r} \cos\varphi d\varphi / r'$$

ako izračunamo r' prema podacima iz Prikaza 2.12. i ako je

$$e^{-j\beta r} \approx e^{-j\beta r} (1 + j\beta a \sin\theta \cos\varphi)$$

dobijamo u aproksimativnom obliku da je

$$A\varphi = (\mu a^2 / 4r) I (j\beta + 1/r) \sin\theta e^{-j\beta r}$$

Izrazi za komponente polja u kompleksnom obliku su

$$\mathbf{K}' = -\text{grad } \varphi' - j\omega A' \dots\dots\dots(2.4.8.)$$

$$\mathbf{H}' = (1/\mu) \text{rot} A' \dots\dots\dots(2.4.9.)$$

Električno i magnetsko polje strujne konture u hipocentru možemo odrediti preko relacija (2.4.8.) i (2.4.9.).

Za električno polje dobijamo da je

$$\mathbf{K}\varphi = -j\omega A\varphi, \text{ odnosno}$$

$$\mathbf{K}\varphi = -j\omega (\mu a^2 \pi I / 4\pi) [(j2\pi/\lambda r) + 1/r^2] \sin\theta e^{-j\beta r}$$

Ako se uzme da je $A_r = A_\theta = 0$ dobijaju se komponente magnetskog polja strujne konture

$$\mathbf{H}_r = j a^2 \beta \pi I / 2\pi [(1/r^2) - j\lambda / 2\pi r^3] \cos\theta e^{-j\beta r} \dots\dots(2.4.10.)$$

$$\mathbf{H}\varphi = j a^2 \beta \pi I / 2\pi [(j2\pi/\lambda r) + 1/r^2 - (j\lambda / 2\pi r^3)] \sin^2\theta e^{-j\beta r}$$

Ako se dobijene komponente magnetskog polja strujne konture uporede sa kompleksnim komponentama električnog dipola one se razlikuju samo za konstantni množitelj. To isto važi i za komponente električnog polja.

This means that the magnetic field of the horizontal current contour, that is, magnetic dipole, is by its structure identical to the electric field of a vertical electric dipole.

Amp magnetic dipole moment in the relations (1.4.10.) is

$$\mathbf{m} = \mathbf{IS} = I a^2 \pi \dots\dots\dots(2.4.15.)$$

However, mathematically speaking, it is more convenient to operate coulomb magnetic moment.

Coulomb magnetic moment is defined as

$$p_m = \mu \mathbf{m} = \mu \mathbf{IS}, \quad \text{on the other hand}$$

$$p_m = Q_m l$$

- where Q_m coulomb variable mass but the distance between them.

$$j \omega a^2 \pi \mu \mathbf{I} = j \omega p_m = j \omega Q_m l$$

- where $\omega j Q_m$ complex amplitude sinusoidal magnetic current I_m between variables of magnetic materials.

Then comes that the components of the electromagnetic field in the induction zone

$$H_\theta = j (\sqrt{\epsilon / \mu}) (I_m l / 2 \lambda r) \sin\theta e^{-\beta r} \dots\dots\dots(2.4.16.)$$

$$K_\varphi = -j (I_m l / 2 \lambda r) \sin\theta e^{-j \beta} \dots\dots\dots(2.4.17.)$$

and the components of electromagnetic field propagation in the zone

$$H_r = 1 / 2\pi (\sqrt{\epsilon / \mu}) (1 / r^2 - j\lambda / r^3) I_m l \cos\theta e^{-j \beta r} \dots\dots\dots(2.4.18.)$$

$$H_\theta = 1 / 4\pi (\sqrt{\epsilon / \mu}) (j 2\pi / \lambda r + 1/r^2 - \lambda / 2\pi r^3) I_m l \sin\theta e^{-j \beta r}$$

$$K_\varphi = -1/4\pi (j 2\pi / \lambda r + 1/r^2) I_m l \sin\theta e^{-j \beta r}$$

Mathematical expressions for the electric and magnetic fields can be written in a form that is completely symmetrical to electric and magnetic fields in electric dipole.

Electromagnetic basis of earthquake and the capability of the seismic wave for propagation at distance are thus proved to be used by magnetic dipole. If the diagrams of radiation of vertical electric dipole and horizontal magnetic dipole are the same, then electromagnetic field of earthquake cannot be measured in the epicenter. This can best be seen if the magnetic dipole radiation is shown in the Cartesian coordinate system.

To znači da je magnetsko polje horizontalne strujne konture, odnosno magnetskog dipola, po strukturi, identično sa električnim poljem vertikalnog električnog dipola.

Amperski moment magnetskog dipola na osnovu relacije (1.4.10.) je

$$\mathbf{m} = \mathbf{IS} = I a^2 \pi \dots\dots\dots(2.4.15.)$$

Međutim, posmatrano matematički, podesnije je operisati sa kulonskim magnetskim momentom.

Kulonski magnetski moment se definiše kao

$$p_m = \mu \mathbf{m} = \mu \mathbf{IS}, \quad \text{s druge strane}$$

$$p_m = Q_m l$$

-gde su Q_m promenljive kulonske mase a l rastojanje između njih.

$$j \omega a^2 \pi \mu \mathbf{I} = j \omega p_m = j \omega Q_m l$$

- gde je $j \omega Q_m$ kompleksna amplituda prostoperiodične magnetske struje I_m između promenljivih magnetskih masa.

Tada dobijamo da su komponente elektromagnetnog polja u indukcionalnoj zoni

$$\mathbf{H}_\theta = j (\sqrt{\epsilon / \mu}) (I_m l / 2 \lambda r) \sin \theta e^{-\beta r} \dots\dots\dots(2.4.16.)$$

$$\mathbf{K}_\varphi = -j (I_m l / 2 \lambda r) \sin \theta e^{-j \beta r} \dots\dots\dots(2.4.17.)$$

a komponente elektromagnetnog polja u zoni prostiranja

$$\mathbf{H}_r = 1 / 2\pi (\sqrt{\epsilon / \mu}) (1 / r^2 - j \lambda / r^3) I_m l \cos \theta e^{-j \beta r} \dots\dots\dots(2.4.18.)$$

$$\mathbf{H}_\theta = 1 / 4\pi (\sqrt{\epsilon / \mu}) (j 2\pi / \lambda r + 1 / r^2 - \lambda / 2\pi r^3) I_m l \sin \theta e^{-j \beta r}$$

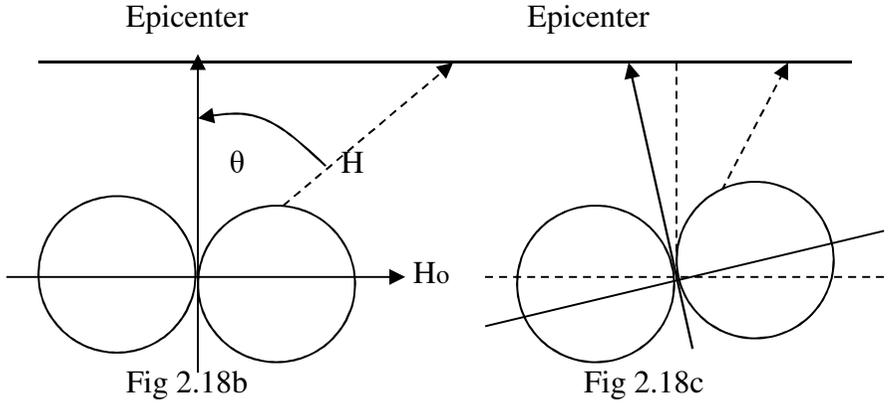
$$\mathbf{K}_\varphi = -1 / 4\pi (j 2\pi / \lambda r + 1 / r^2) I_m l \sin \theta e^{-j \beta r}$$

Matematički izrazi za električno i magnetno polje mogu se pisati u formi koja je potpuno simetrična za električnim i magnetnim poljem kod električnog dipola.

Ovim se dokazuje elektromagnetna osnova zemljotresa i sposobnost seizmičkog talasa za prostiranje na daljinu korišćenjem **Magnetnog dipola**.

Ako su dijagrami zračenja vertikalnog električnog dipola i horizontalnog magnetnog dipola isti onda da se u epicentru ne može meriti elektromagnetno polje zemljotresa. To se najbolje može sagledati ako se zračenje magnetnog dipola prikaže u Dekartovom koordinatnom sistemu.

Radiation pattern of horizontal magnetic dipole in Cartesian coordinates.



The least electromagnetic radiation is in the direction of the epicenter. From the epicenter, the intensity of the field changes with $H/H_0 = \sin\theta$. However, in nature the magnetic dipole is not horizontal, but is at an angle, while in the extreme case it can be vertical. Fig. 2.15c. Seismologists are very accurately determined the magnetic dipole radiation and the angle of radiation, but they called it the focus.

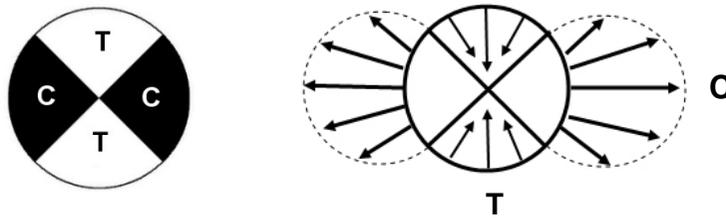


Fig 2.18.
Account of the physical motions and magnetic field lines

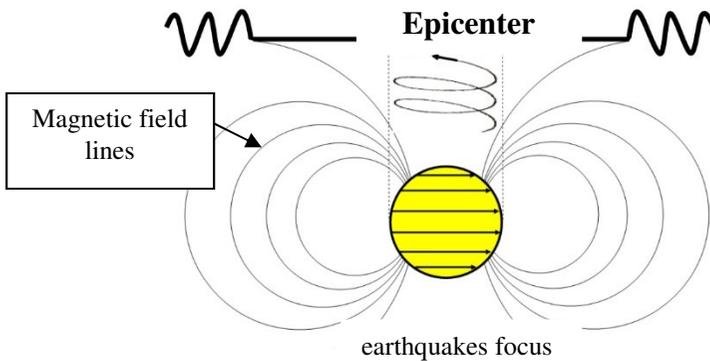
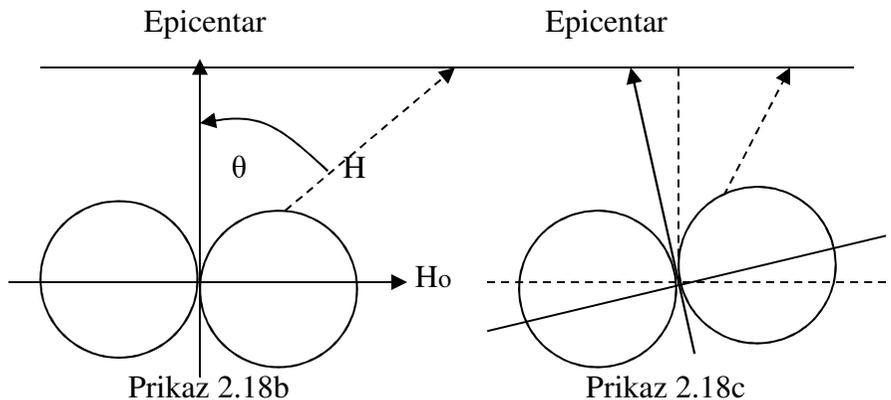


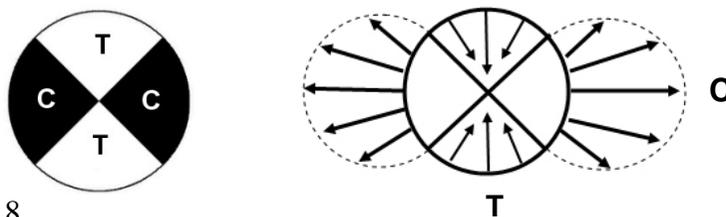
Fig. 2.19.

Dijagram zračenja horizontalnog magnetnog dipola u Dekartovim koordinatama:



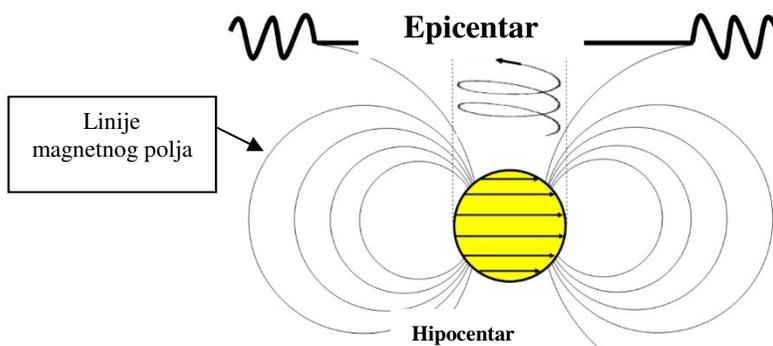
Najmanje elektromagnetno zračenje je u pravcu epicentra. Od epicentra intenzitet polja se menja sa $H/H_0 = \sin\theta$. Međutim, u prirodi magnetski dipol nije horizontalan već se nalazi pod nekim uglom α u krajnjem slučaju može biti vertikalan. Prikaz 2.17c.

Seizmolozi su veoma precizno odredili dijagram zračenja magnetnog dipola i ugao zračenja ali su ga nazvali fokus.



Prikaz 2.18.

Prikaz fizičkog kretanja tla i linija magnetnog polja



Prikaz 2.19.

Radiation characteristics of horizontal magnetic dipole in a polar coordinate system

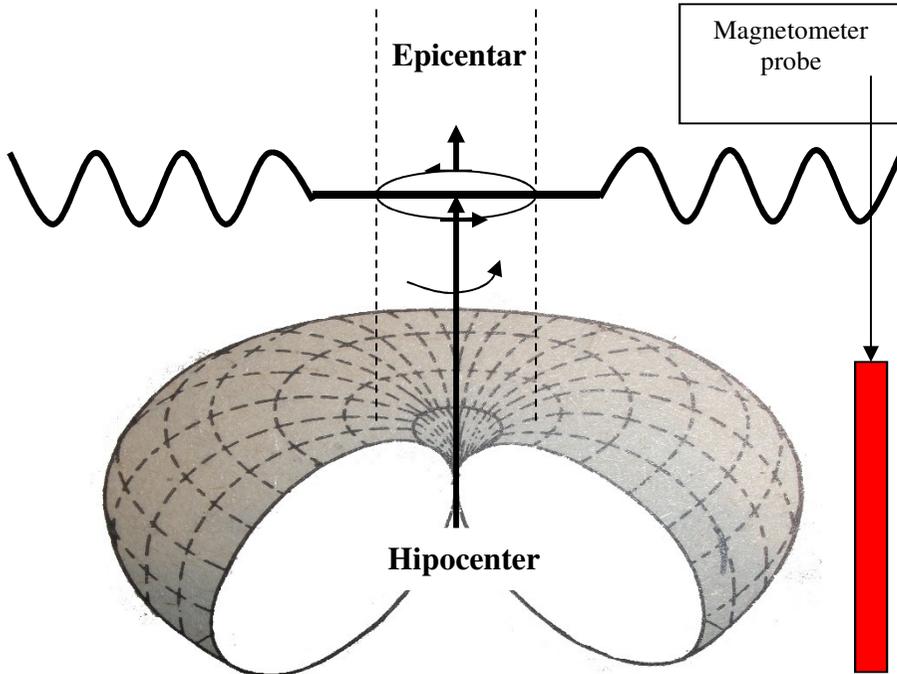


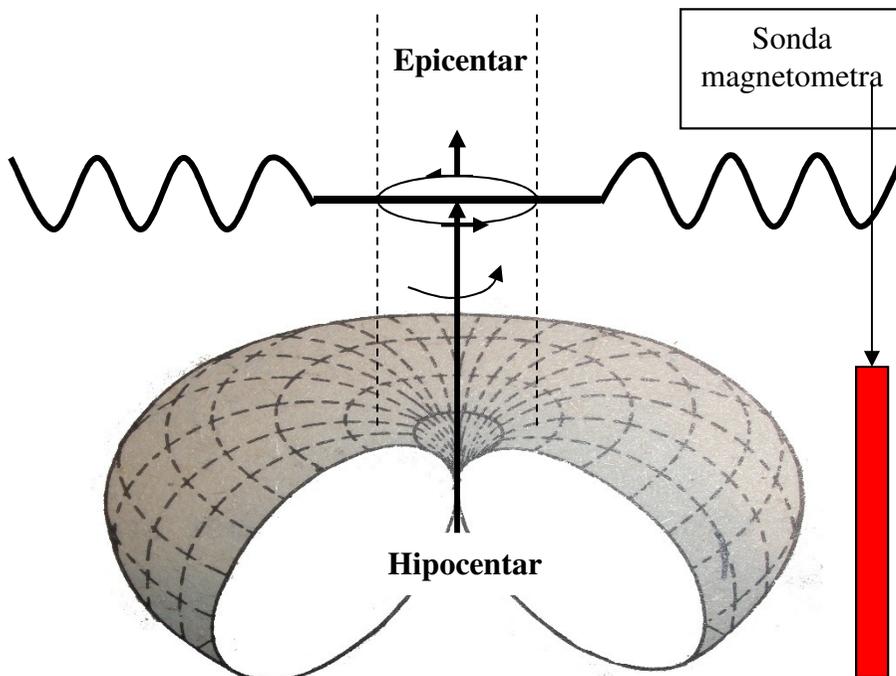
Fig. 2.20.

The spatial radiation pattern of horizontal magnetic dipole in the form of the torus. Such a magnetic dipole radiation does not give the opportunity to explore the earthquake using the magnetic field at the location of the epicenter.

However, theoretically speaking the changes of the magnetic field at the location of potential earthquake could be measured at a particular depth using probes. It would allow the measuring of the degree of magnetization of environments by current fields before the onset of the earthquake, as well as direct electromagnetic measurement of the intensity of an earthquake instead of the current physical.

Electromagnetic researches have shown that the earthquake is the most magnificent and most perfect natural magnetic machine, and due to low efficiency of magnetic dipole, the losses are large and are converted into heat, which is manifested by high temperature in earthquake focus, that is, red-hot magma.

Karakteristika zračenja horizontalnog magnetnog dipola u polarnom koordinatnom sistemu



Prikaz 2.20.

Prostorni dijagram zračenja horizontalnog magnetnog dipola je u obliku torusa. Ovakav dijagram zračenja magnetnog dipola ne daje mogućnost istraživanja zemljotresa pomoću magnetnog polja na lokaciji epicentra.

Međutim, teorijski posmatrano promene magnetnog polja na lokaciji potencijalnog zemljotresa moguće je meriti na određenoj dubini pomoću sonde. Ona bi omogućila merenja stepena magnećenja sredina od strane strujnih polja **pre pojave zemljotresa**, kao i direktno elektromagnetno merenje snage zemljotresa umesto sadašnjeg fizičkog.

Elektromagnetna istraživanja pokazala su da je zemljotres najveličanstvenija i najsavršenija prirodna magnetna mašina. Međutim, zbog malog korisnog dejstva magnetnog dipola, gubici su veliki i konvertuju se u toplotu koja se manifestuje visokom temperaturom u hipocentru, odnosno usijanjem magme.

Merenjem temperature na lokaciji zemljotresa za vreme magnetizacije moguće je prognozirati potencijalnu pojavu zemljotresa.

2.9.1. Propagation of seismic waves

One of the fundamental questions in seismology is the way of propagation of seismic waves at a distance. Based on electromagnetic studies earthquake focus occurs in the magma, which indicates that the electromagnetic wave propagated through the magma and not by tectonic plates. Seismic wave motion of tectonic plates is secondary and occurs as a result of natural fluctuations of magma under the influence of electromagnetic force. Wave motion of tectonic plates has similarities with the boat on the sea waves. Primary physical movement of tectonic plates occurs only in the epicenter.

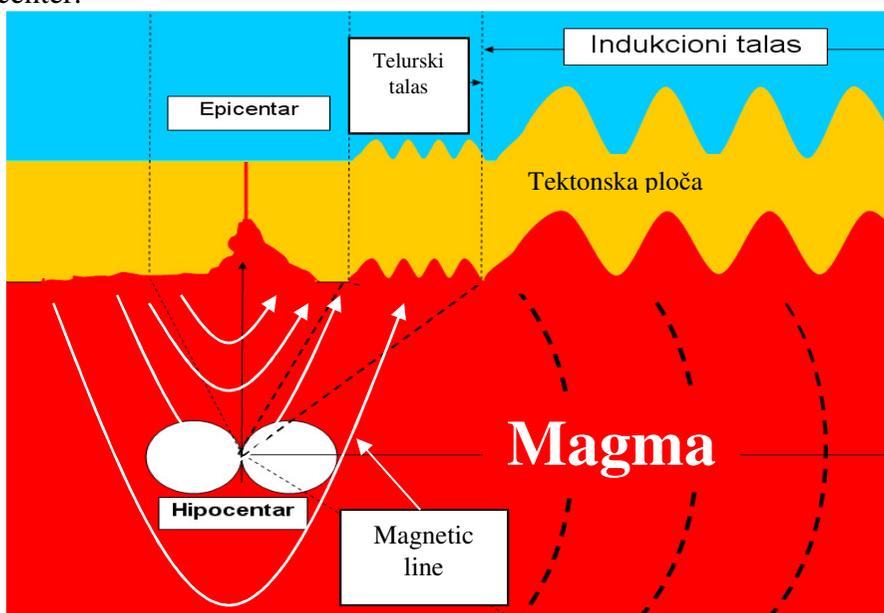


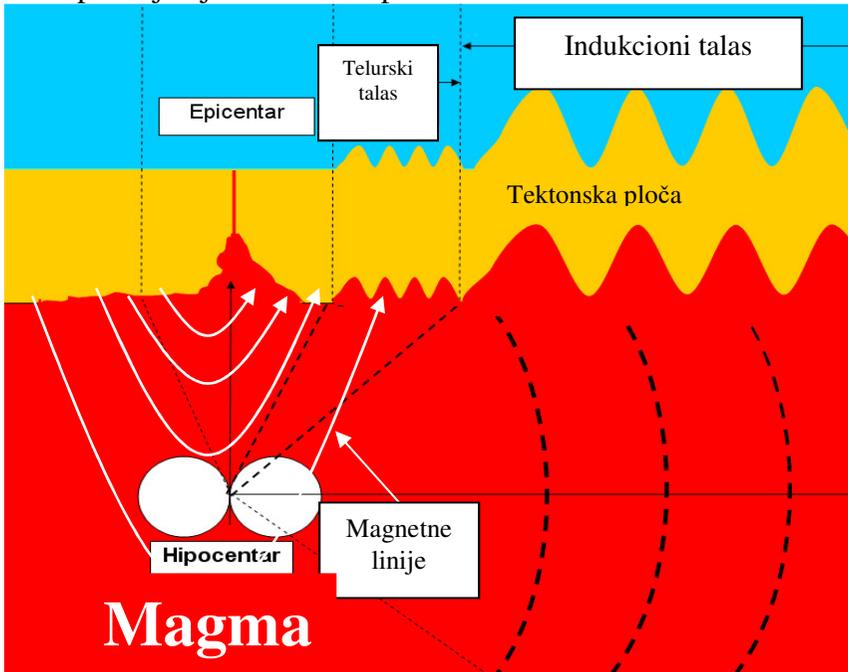
Fig. 2.21.

If the electromagnetic wave moved through the tectonic plates, then it would come to the discontinuity in propagation at the boundary between two tectonic plates. The appearance of discontinuities of the electromagnetic waves reflected to the accuracy of measurement for long distances.

For seismological station, located on different tectonic plates caused by the discontinuity, the gap between the tectonic plates, would come up with different readings of power, budget, location of epicenter azimuth and depth earthquakes focus. That the seismic wave does not travel through tectonic plate is easy to prove mathematical relations.

2.9.1. Prostiranje seizmičkog talasa.

Jedno od osnovnih pitanja u seizmologiji je način prostiranja seizmičkog talasa na daljinu. Na osnovu elektromagnetnih istraživanja hipocentar nastaje u magmi što ukazuje da se elektromagnetni talas prostire kroz magmu a ne kroz tektonske ploče. Seizmičko talasno kretanje tektonskih ploča je **sekundarno** i javlja kao posledica fizičkog talasanja magme pod dejstvom elektromagnetne sile. Talasno kretanje tektonskih ploča ima velike sličnosti sa čamcem na morskim talasima. **Primarno** fizičko kretanje tektonskih ploča javlja se samo u epicentru.



Prikaz 2.21.

Kada bi se elektromagnetni talas kretao kroz tektonske ploče tada bi na granici između dve tektonske ploče dolazilo do **diskontinuiteta prostiranja**. Pojava diskontinuiteta elektromagnetnog talasa odrazila bi se na tačnost merenja na velikim rastojanjima.

Za seizmološke stanice, koje se nalaze na različitim tektonskim pločama usled diskontinuiteta, na procepima između tektonskih ploča, dolazilo bi do različitog očitavanja snage, proračuna azimuta lokacije epicentra i dubine hipocentra. Da se seizmički talas ne prostire kroz tektonske ploče lako se dokazuje matematičkim relacijama.

2.9.2. Measuring the Earthquake Intensity

It is known that the intensity of earthquakes can be accurately measured over long distances. On the other hand we know that the speed of propagation of electromagnetic waves in perfect dielectric depends on the relationship of dielectric constant ϵ and magnetic permeability μ .

Components H_r and H_θ magnetic field radiating magnetic dipole terms are given where the relationship is dominated by a dielectric constant ϵ and magnetic permeability μ .

$$H_r = \frac{1}{2\pi} (\sqrt{\epsilon / \mu}) (1/r^2 - j\lambda / r^3) I_m \cos\theta e^{-j\beta r}$$

$$H_\theta = \frac{1}{4\pi} (\sqrt{\epsilon / \mu}) (j2\pi / \lambda r + 1/r^2 - \lambda / 2\pi r^3) I_m \sin\theta e^{-j\beta r}$$

On the other hand, there is the Pointing vector intensity

$$\Gamma = KH = (\sqrt{\epsilon / \mu}) H^2 \dots \dots \dots (2.4.19.)$$

Upper relation shows that the energy carried by electromagnetic wave is localized in electric and magnetic field and that the size of Pointing vector depends on the relationship between dielectric constant ϵ and magnetic permeability μ .

As each tectonic plate has a specific relationship between ϵ / μ this means that the size of the Pointing vector has changed from one tectonic plate and the seismic stations gained different values for the strength of earthquakes.

If we take into account the precise strength of earthquakes at great distances with all the necessary parameters, it clearly indicates that all seismic stations have the same measurement conditions.

The same conditions of measurement for all seismic stations in the world can only be achieved if an electromagnetic wave moving at all locations through relatively the same environment, or through magma.

When seismology, instead of determining the physical power switch on the electromagnetic earthquake, power calculations and azimuth shock wave would be much more precise.

2.9.2. Merenje snage zemljotresa

Poznato je da se snaga zemljotresa može precizno meriti na velikim razdaljinama. S druge strane znamo da brzina prostiranja elektromagnetnog talasa u savršenom dielektriku zavisi od odnosa dielektrične konstante ϵ i magnetske permeabilnosti μ .

Komponente H_r i H_θ magnetnog polja koje zrači magnetni dipol date su izrazima gde dominira odnos dielektrične konstante ϵ i magnetske permeabilnosti μ .

$$H_r = 1 / 2\pi (\sqrt{\epsilon / \mu}) (1 / r^2 - j\lambda / r^3) I_m \cos\theta e^{-j\beta r}$$

$$H_\theta = 1 / 4\pi (\sqrt{\epsilon / \mu}) (j 2\pi / \lambda r + 1/r^2 - \lambda / 2\pi r^3) I_m \sin\theta e^{-j\beta r}$$

S druge strane intenzitet Pointingovog vektora

$$\Gamma = KH = (\sqrt{\epsilon / \mu}) H^2 \dots \dots \dots (2.4.19.)$$

Gornja relacija pokazuje, da je energija koju nosi elektromagnetni talas lokalizovana u električnom i magnetskom polju a da veličina Pointingovog vektora zavisi od odnosa dielektrične konstante ϵ magnetske permeabilnosti μ .

Kako svaka tektonska ploča ima svoj specifičan odnos ϵ / μ to znači da bi se veličina Pointingovog vektora menjala od jedne do druge tektonske ploče pa bi seizmičke stanice dobijale različite vrednosti za snagu zemljotresa.

Ako se uzme u obzir precizno merenje snage zemljotresa na velikim rastojanjima, sa svim pratećim parametrima, to jasno ukazuje da sve stanice imaju iste uslove merenja.

Isti uslovi merenja za sve seizmološke stanice u svetu mogu se postići samo ako se elektromagnetni talas kreće na svim lokacijama kroz relativno istu sredinu, odnosno kroz magmu.

Kada seizmologija, umesto fizičkog određivanja snage zemljotresa pređe na elektromagnetno, proračuni snage i azimuta udarnog talasa biće mnogo precizniji.

2.9.3. Determination of the direction of propagation of seismic waves

Existing seismic stations accurately determine the relative location of the epicenter and earthquake focus. If we know that between two tectonic plates there is a discontinuity can then be mathematically proven that the propagation of electromagnetic waves, or seismic waves are not done through the tectonic plates.

Assuming that the propagation of electromagnetic waves carried through the two tectonic plates of different permeability μ_1 and μ_2 .

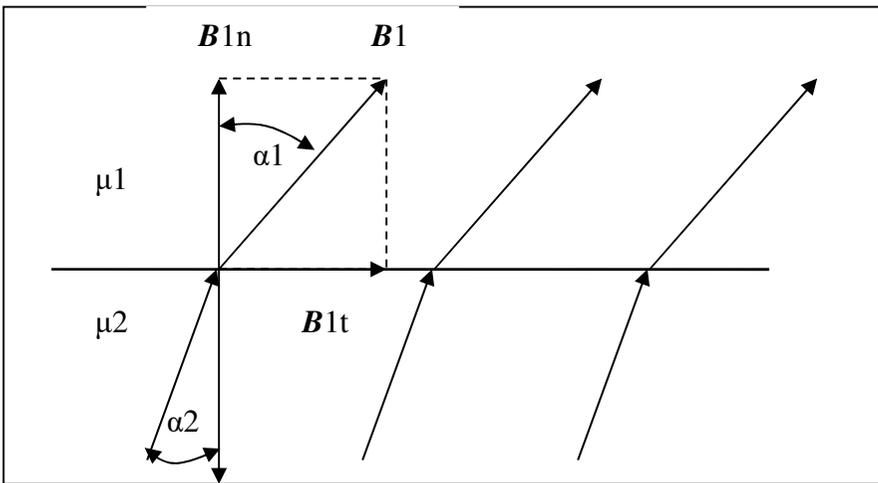


Fig. 2.22.

When the magnetic field lines passing obliquely through the interface between two tectonic plates and faults, then they are refraction, forming different angles α_1 and α_2 , according to the norm in both the tectonic plates. In order to prove breaking magnetic field lines on the fault and determine the boundary condition for the tangential component of magnetic field lines used Ampere's law on the circulation of the elementary contour a, b, c, d.

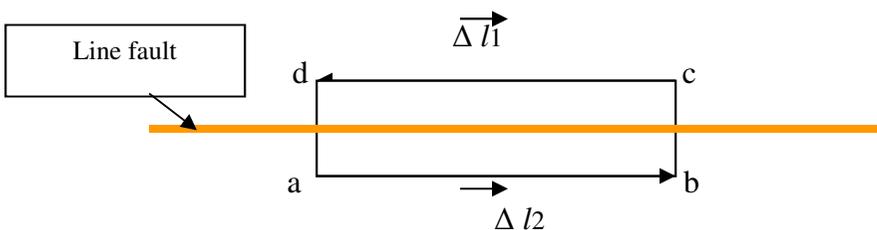
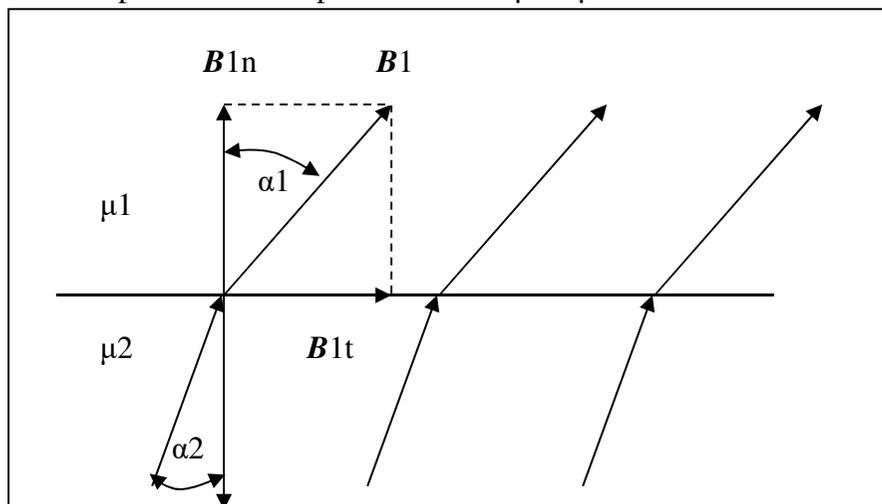


Fig. 2.23.

2.9.3. Određivanje pravca prostiranja seizmičkog talasa

Postojeće seizmičke stanice relativno tačno određuju lokaciju epicentra i hipocentra. Ako znamo da između dve tektonske ploče postoji diskontinuitet onda se može matematički dokazati da se prostiranje elektromagnetnog talasa, odnosno seizmičkog talasa ne vrši kroz tektonske ploče.

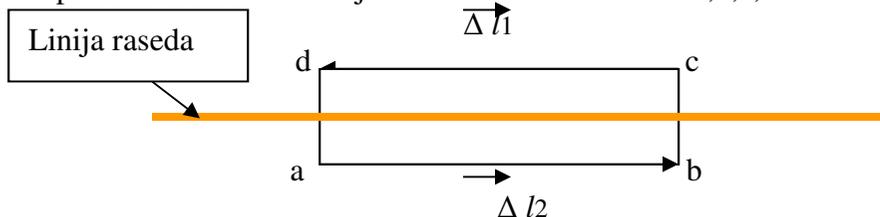
Pretpostavimo da se prostiranje elektromagnetnog talasa vrši kroz dve tektonske ploče različitih permeabilnosti μ_1 i μ_2 .



Prikaz 2.22.

Kada linije magnetskog polja prolaze koso kroz graničnu površinu između dve tektonske ploče ili raseda, onda se one prelamaju, obrazujući različite uglove α_1 i α_2 , prema normalni u obe tektonske ploče.

Da bi dokazali prelamanje linija magnetskog polja na rasedu i odredili granični uslov za tangencijalne komponente linija magnetskog polja koristi se Amperov zakon o cirkulaciji na elementarnu konturu a,b,c,d.



Prikaz 2.23.

If the sides of elementary contour **a-d** and **b-c** are let to tend to zero, then

$$\oint \mathbf{H} \, dl = \mathbf{H} \Delta l_1 + \mathbf{H} \Delta l_2 = 0 \dots\dots\dots(2.4.10.)$$

because $\Delta l_1 = \Delta l_2$ then

$$\mathbf{H} \Delta l_1 = \mathbf{H} \Delta l_2$$

If we know that the $\mathbf{B}_1 = \mu_1 \mathbf{H}_1$ and $\mathbf{B}_2 = \mu_2 \mathbf{H}_2$, then the tangential component of magnetic induction and the normal component of magnetic field strength must satisfy the following requirements:

$$B_{1t} / \mu_1 = B_{2t} / \mu_2$$

$$\mu_1 H_{1n} = \mu_2 H_{2n}$$

This means that the angles α_1 and α_2 that magnetic field lines to form an normal, must be satisfied that the

$$\text{tg } \alpha_1 = B_{1t} / B_{1n}$$

$$\text{tg } \alpha_2 = B_{2t} / B_{2n}$$

$$\text{tg } \alpha_1 / \text{tg } \alpha_2 = B_{1t} / B_{2t} = \mu_1 H_{1t} / \mu_2 H_{2t}$$

$$\text{tg } \alpha_1 / \text{tg } \alpha_2 = \mu_1 / \mu_2 \dots\dots\dots(2.4.11)$$

Upper relations (2.4.11) the law of refraction of magnetic field lines.

This proves that the propagation of the seismic wave is not carried out through the tectonic plates with different values of permeability, but through the magma.

If the propagation is done through the tectonic plates, the seismic stations could be unable to goniometer the locations of the epicenter due to the discontinuity of propagation.

Ako stranice elementarne konture a-d i b-c, pustimo da teže nuli tada je

$$\oint \mathbf{H} \, dl = \mathbf{H} \Delta l_1 + \mathbf{H} \Delta l_2 = 0 \dots\dots\dots(2.4.10.)$$

jer je $\Delta l_1 = \Delta l_2$ pa je

$$\mathbf{H} \Delta l_1 = \mathbf{H} \Delta l_1$$

Ako znamo da je $\mathbf{B}_1 = \mu_1 \mathbf{H}_1$ i $\mathbf{B}_2 = \mu_2 \mathbf{H}_2$, onda tangencijalne komponente magnetske indukcije i normalne komponente jačine magnetskog polja moraju da zadovolje sledeće uslove:

$$\mathbf{B}_{1t} / \mu_1 = \mathbf{B}_{2t} / \mu_2$$

$$\mu_1 \mathbf{H}_{1n} = \mu_2 \mathbf{H}_{2n}$$

To znači da uglovi α_1 i α_2 koje linije magnetskog polja zaklapaju sa normalom, moraju da zadovolje uslove da je

$$\text{tg } \alpha_1 = \mathbf{B}_{1t} / \mathbf{B}_{1n}$$

$$\text{tg } \alpha_2 = \mathbf{B}_{2t} / \mathbf{B}_{2n}$$

$$\text{tg } \alpha_1 / \text{tg } \alpha_2 = \mathbf{B}_{1t} / \mathbf{B}_{2t} = \mu_1 \mathbf{H}_{1t} / \mu_2 \mathbf{H}_{2t}$$

$$\text{tg } \alpha_1 / \text{tg } \alpha_2 = \mu_1 / \mu_2 \dots\dots\dots(2.4.11)$$

Gornja relacija (2.4.11) predstavlja zakon prelamanja linija magnetskog polja.

Ovim se dokazuje da prostiranje seizmičkog talasa nije kroz tektonske ploče sa različitim vrednostima permeabilnosti već kroz magmu.

Kada bi se prostiranje vršilo kroz tektonske ploče seizmičke stanice ne bi mogle da vrše goniometrisanje lokacija epicentra usled diskontinuiteta prostiranja.

2.10.1. Telluric currents as trigger pulse

In considering the conditions for the occurrence of earthquakes in the section 2.18, it has been said that if an earthquake is to occur, it is necessary for the magnetic induction to change the direction from the positive value $+B$ to $-B$. Bringing the magnetization curve B_r to H_c may be influenced by telluric electric current. In the northern hemisphere, telluric currents which flow from north to south encounter faults and gaps. In case that the magnetization is carried out in the fault or gap, telluric currents are passing through the magnetic field of the fault or gap. Magnetic analyses of the earthquake show that the telluric electric currents can be trigger impulse for the occurrence of earthquake. A typical example is the Spanish earthquake that occurred at a depth of 623.4 kilometers. At that depth there is no strong crust, but very hot magma through which telluric electric currents are flowing.

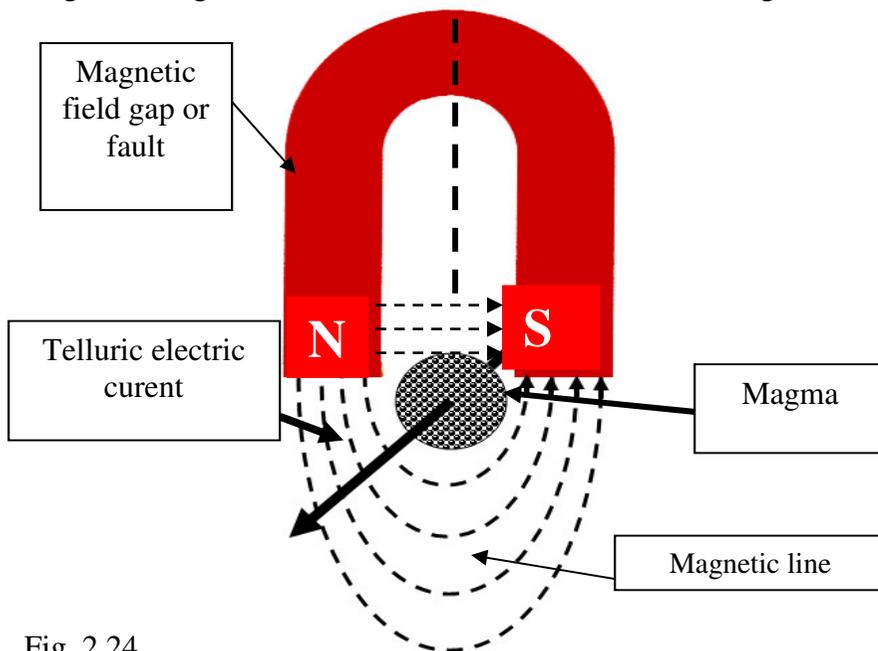


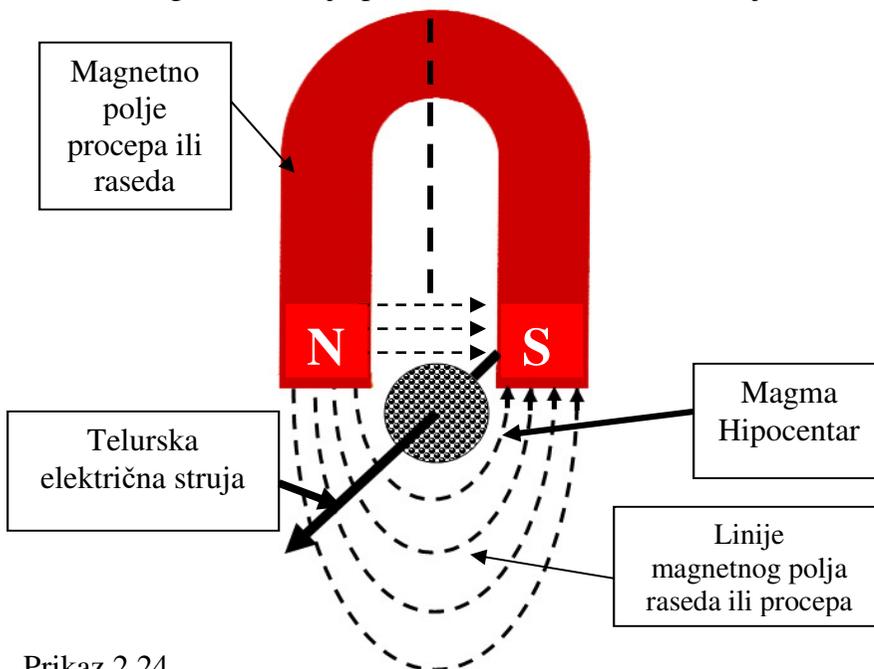
Fig. 2.24.

When the telluric currents pass through the magma, which is located in the magnetic field, the magma starts to spin (Tesla's egg) in accordance with the direction of the magnetic induction created by the telluric electric current.

Earthquake focus is always in the magma that has penetrated into the Fault or gap, or is located directly below the gap or fault.

2.10.1. Telurska struja kao okidni (triger) impuls

Prilikom razmatranja uslova za pojavu zemljotresa u odeljku (2.18.) rečeno je da bi došlo do pojave zemljotresa potrebno je da magnetna indukcija od pozitivne vrednosti $+B$ promeni smer na $-B$. Dovođenje krive razmagnećivanja B_r do H_c može biti pod dejstvom telurske električne struje. Na severnoj hemisferi telurske struje, koje teku od severa prema jugu, nailaze na rasede i procepe. U slučaju da je u rasedu ili procepu izvršeno magnećenje, telurske struje prolaze kroz magnetno polje raseda ili procepa. Magnetne analize zemljotresa pokazuju da telurske električne struje mogu biti okidni impuls za nastanak zemljotresa. Tipični primer je španski zemljotres koji se javio na dubini od 623,4 kilometra. Na toj dubini ne postoji čvrsta kora već užarena magma kroz koju prolaze telurske električne struje.

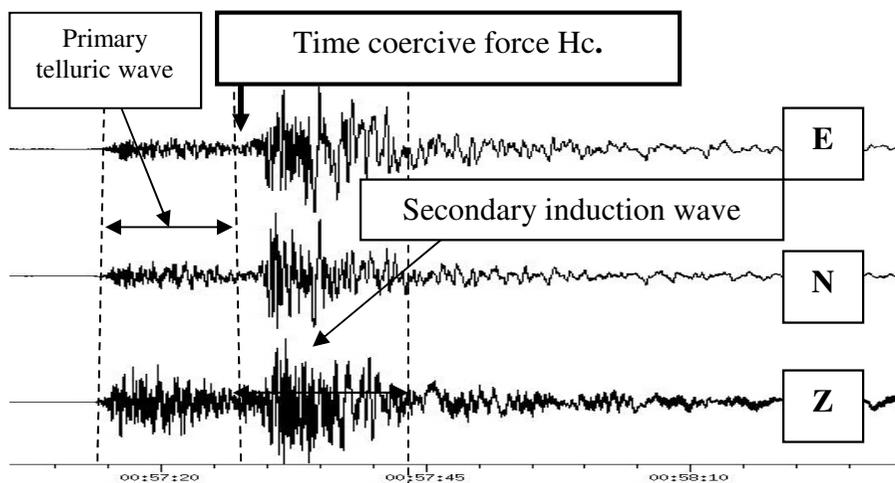


Prikaz 2.24.

Kada telurska struja prođe kroz magmu, koja se nalazi u magnetskom polju, magma počinje da se vrti (Teslino jaje) u skladu sa smerom magnetske indukcije koju stvara telurska električna struja.

Hipocentar je uvek u magmi koja je prodrla u rased ili procep ili se nalazi neposredno ispod procepa ili raseda.

The depth of magma in the faults and gaps will determine the depth of earthquake focus, that is, earthquake. This clearly indicates that the earthquake is not the consequence of the physical movement of tectonic plates as earthquake focus is not in the earth's crust and solid rocks. Tectonic plates have only the role of magnetic battery and at the time of earthquake they follow the agitation of the magma ocean. When the magnetic field of the fault or gap is weak, then the earthquake focus spins only under the influence of the telluric electric current. This type of weak seismic motion is called the telluric earthquake. However, at the strong magnetic field faults or gaps, the telluric electric current has a dual role. Telluric current performs simultaneously the primary physical movement of the earthquake focus and reduction of magnetization of environment. When reduction in magnetization of environment reaches the value of the coercitive field, then \mathbf{H} and $d\mathbf{B}$ are of different characters and energy is released, which is accumulated in the magnetic field of the fault or gap. Induction electric current overtakes the role of the telluric electric current and strong spins the earthquake focus from side to side. This type of seismic motion is called the induction earthquake. Induction earthquake, the trigger impulse of which is telluric electric current, has two kinds of waves. The first, primary weak wave arises due to the effect of telluric electric current and represents the trigger impulse, and the other, secondary, higher one arises because of the effect of induction electric current which is accumulated in the magnetic field of the fault or gap and represents the induction earthquake.

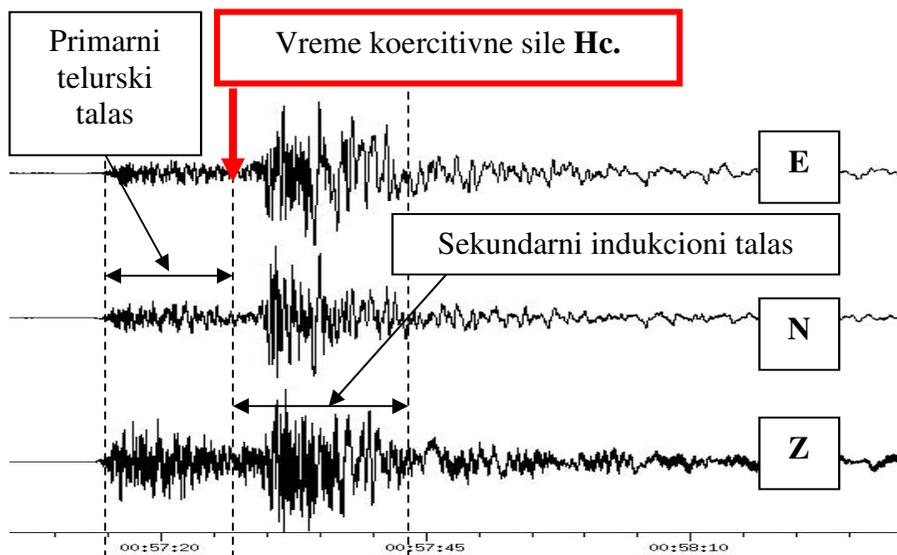


Seismogram earthquake.

Dubina magme u rasedima i procepima određuje dubinu hipocentra, odnosno zemljotresa. To jasno ukazuje da zemljotres nije posledica fizičkog kretanja tektonskih ploča jer se hipocentar ne nalazi u zemljinoj kori i čvrstim stenama. Tektonske ploče imaju samo ulogu elektrode magnetnog akumulatora i u vreme zemljotresa prate talasanje okeana magme.

Kada je magnetno polje raseda ili procepa slabo, tada se hipocentar vrti samo pod dejstvom telurske električne struje. Ovaj tip slabog seizmičkog kretanja naziva se **telurskim zemljotresom**.

Međutim, kod snažnih magnetnih polja raseda ili procepa, telurska električna struja ima dvojaku ulogu. Telurska struja vrši istovremeno primarno fizičko kretanje hipocentra i razmagnećivanje sredine. Kada razmagnećivanje sredine dostigne vrednost koercitivnog polja, tada su H i dB različitog znaka i dolazi do **oslobađanja energije**, koja je akumulirana u magnetnom polju raseda ili procepa. Indukciona električna struja, preuzima ulogu telurske električne struje i snažno vrti hipocentar levo-desno. Ovaj tip seizmičkog kretanja naziva se **indukcionim zemljotresom**. Indukcioni zemljotres, čiji je okidni impuls telurska električna struja, ima dve vrste talasa. Prvi, primarni slab talas, javlja se usled dejstva telurske električne struje i predstavlja okidni impuls a drugi sekundarni, jači, usled dejstva indukcione električne struje koja je akumulirana u magnetnom polju raseda ili procepa, predstavlja indukcioni zemljotres.



Seizmogram zemljotresa.

Thus, we concluded that the induction of strong earthquakes, which have a trigger pulse telluric electricity, there are three phases.

The first phase of the Magnetization faults after the opening of the Current Field. The energy spent on establishing magnetog field is accumulated in a magnetic field. Fault is a natural magnet battery pack that has the ability to accumulate magnetic energy. Depending on the conductivity of the middle of the Magnetization, magnetic batteries can hold a magnetic power for several days. Stored energy in a magnetic field faults gradually lost due to the imperfections of the magnetic battery.

The second phase is the penetration of the telluric electric current in the magnetic field of fault or gap. The penetration of telluric electric current causes the primary mechanical effect in the form of a rotation of the earthquake focus from left to right, while the current contour in the earthquake focus radiates weak electromagnetic wave and at the same time consumes energy of the magnetic field of the fault, making the magnetization reduction of magma in the fault or gap. When the magnetization reduction of magma reaches the point of the coercive force H_c , the sign of magnetic induction B changes and accumulated magnetic energy is getting released.

In the third phase, magnetic dipole is powered by energy that is accumulated in the magnetic field of the fault or gap and then an induction earthquake begins, that is, strong physical rotation of the earthquake focus from left to right and appearance of the secondary induction electromagnetic wave.

In Europe most earthquakes have telluric electric current as the trigger impulse, that is, the seismogram has two parts, the telluric, trigger and the induction one. It is identified by the first primary wave that is the strongest of all others occurring after it in the zone of propagation.

Going from the zone of propagation toward the induction zone, wave motion becomes weak and at a certain distance from the epicenter it disappears.

In order to demonstrate this using the seismograms of the same components at different distances from the epicenter. (Earthquake in Kraljevo)

Tako dolazimo do saznanja da kod snažnih indukcionih zemljotresa, koji kao okidni impuls imaju telursku električnu struju, postoje tri faze.

Prva faza je magnećenje raseda ili procepa posle otvaranja strujnog polja. Energija koja se utroši na uspostavljanje magnetnog polja akumulira se u magnetnom polju. Rasedi ili procepi predstavljaju prirodne **magnetne akumulatore** koji imaju sposobnost da akumuliraju magnetnu energiju. U zavisnosti od provodnosti sredine koja se magnetiše, magnetni akumulatori mogu da drže magnetnu energiju više dana. Akumulirana energija u magnetnom polju procepa ili raseda postepeno se gubi usled nesavršenosti magnetnog akumulatora.

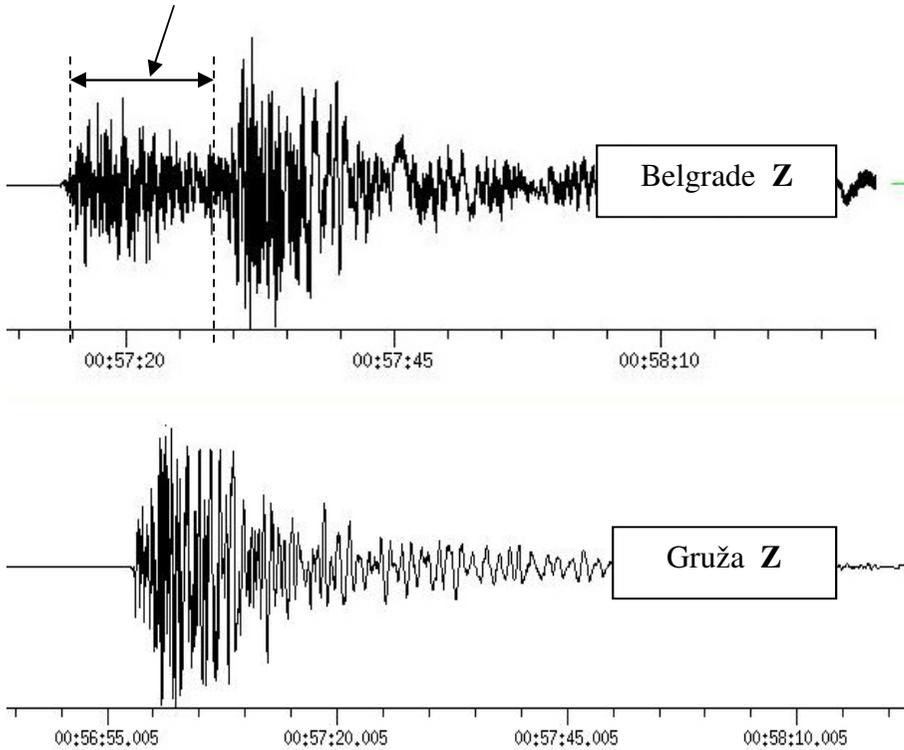
Druga faza je prodor telurske električne struje u magnetno polje raseda ili procepa. Prodor telurske električne struje izaziva primarno mehaničko dejstvo u vidu rotacije hipocentra levo-desno a strujna kontura u hipocentru zrači slab elektromagnetni talas. U isto vreme troši energiju magnetnog polja raseda i vrši razmagnećivanje magme u procepu ili rasedu. Kada razmagnećivanje magme dostigne tačku koercitivne sile H_c , menja se znak magnetske indukcije B i dolazi do oslobađanja akumulirane magnetne energije.

U trećoj fazi magnetska indukcija B i interplanetarno magnetno polje H imaju suprotne predznake pa energija, koja je akumulirana u magnetnom polju procepa, počinje da napaja magnetni dipol. To je trenutak kada počinje indukciono zemljotres, odnosno snažna fizička rotacija hipocentra levo-desno i pojava sekundarnog indukcionog elektromagnetnog talasa.

Većina zemljotresa u Evropi ima kao okidni impuls telursku električnu struju. Seizmogram ima dva dela, telurski i indukciono. Prepoznaje se po tome što je, u zoni prostiranja, prvi primarni talas slabiji od svih drugih koji se javljaju posle njega.

Da bi se ovo dokazalo koriste se seizmogrami jedne iste komponente na različitim rastojanjima od epicentra. (zemljotres u Kraljevu)

Poor telluric wave motion



In the seismogram of Gruža, there is no primary wave motion that comes from weak telluric electric currents, because the radiation power of magnetic dipole is small at close distance. At larger distances there is also the primary wave motion due to the weakening of propagation.

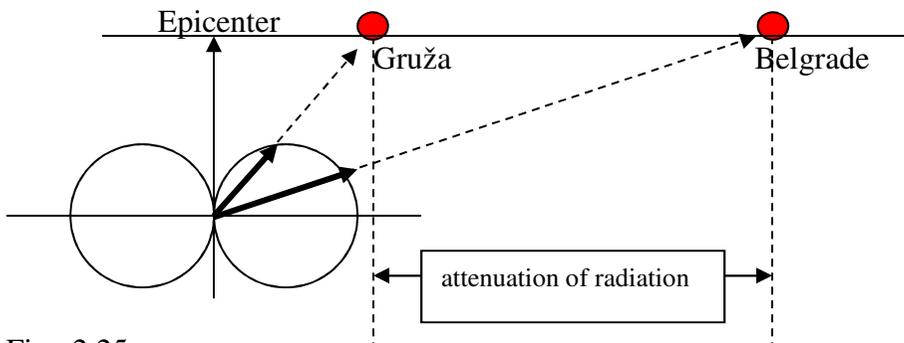
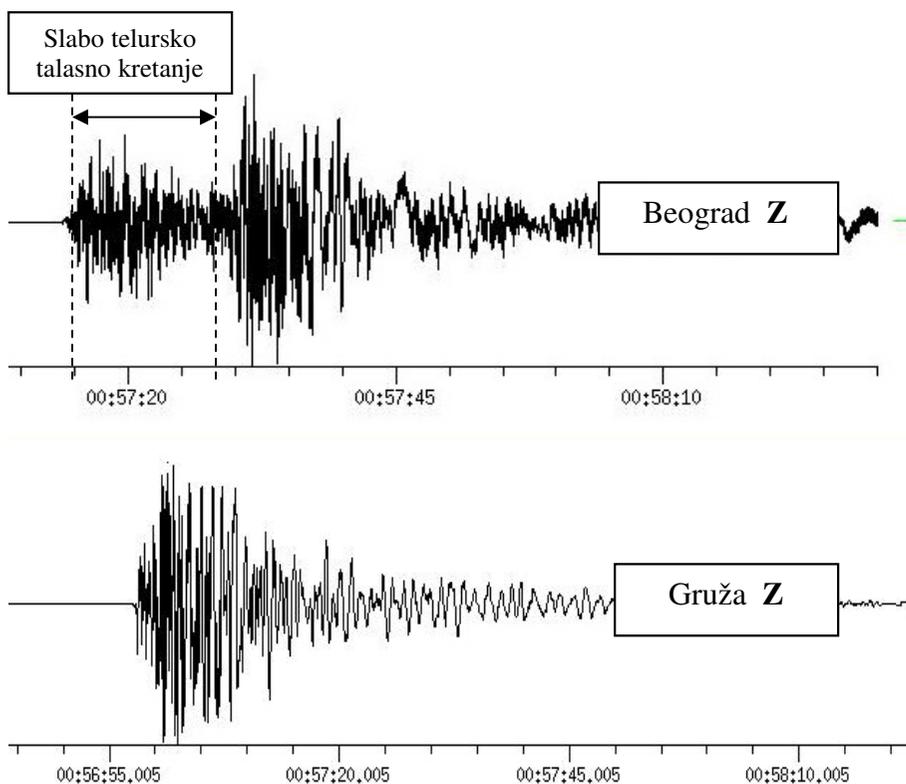
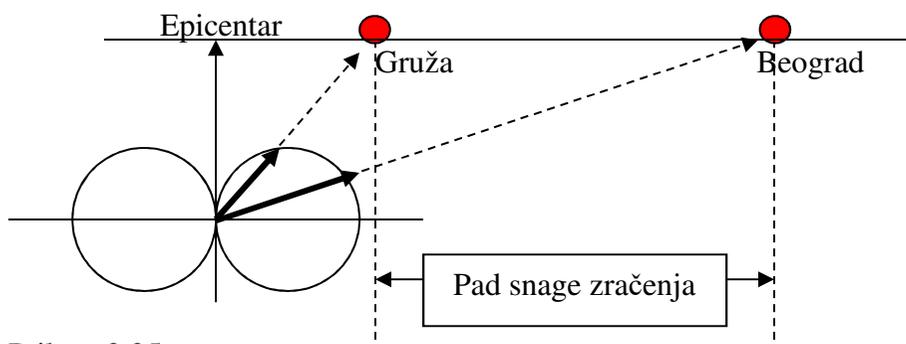


Fig. 2.25.



Kod seizmograma u Gruži **ne postoji** primarno talasno kretanje koje potiče od slabih telurskih električnih struja, jer je snaga zračenja magnetnog dipola na bliskom rastojanju mala.

Na većim rastojanjima takođe ne postoji primarno talasno kretanje usled slabljenja prostiranja.



Prikaz 2.25.

2.10.2. The occurrence of earthquakes as a function of the direction of Bz component

Studies have shown that the direction of Bz component of the interplanetary magnetic field determines in which hemisphere an earthquake is going to appear. The basic characteristic of the earthquakes in the northern hemisphere is the negative value of the Z component of the interplanetary magnetic field. This means that the solar wind particles that carry the frozen magnetic field are attracted by the geomagnetic field in the northern hemisphere only if the Z component of the interplanetary magnetic field is negative. In the southern hemisphere it is necessary that the Z component of the interplanetary magnetic field is positive for the particles to penetrate into the atmosphere. The following can be concluded:

1. the Z component of the interplanetary magnetic field determines in which hemisphere the penetration of free electric loads is going to occur, that is, in which hemisphere there are conditions for the occurrence of earthquake;
 2. if polarization of the Z component determines in which hemisphere the earthquake occurs, then it proves that earthquakes are not of earthly origin.
- In the exceptional cases when there is rapid change in direction of Bz component, free electric loads penetrate into the atmosphere in both hemispheres in accordance with the intensity and direction of the Bz component.

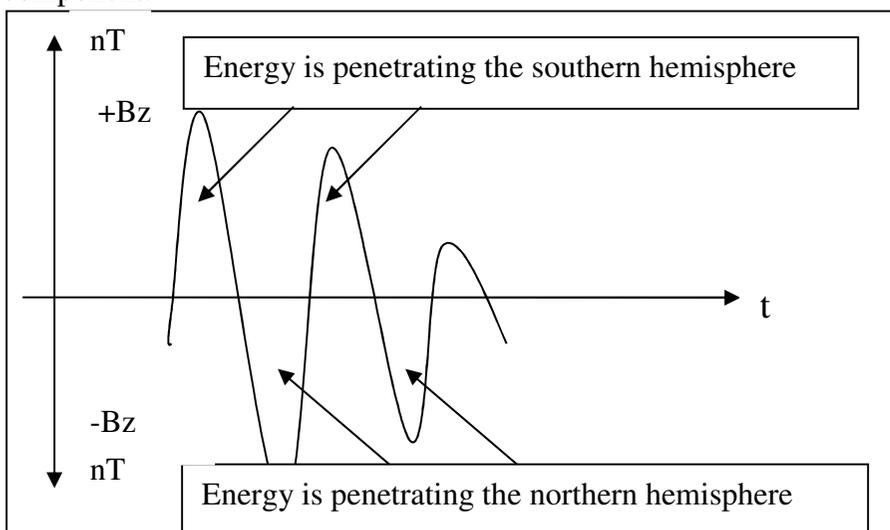


Fig. 2.26.

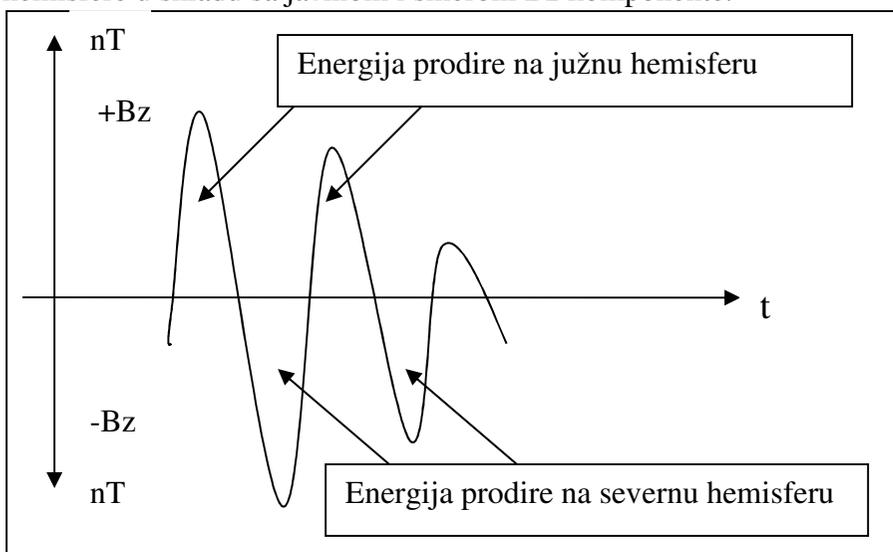
2.10.2. Pojava zemljotresa kao funkcija smera Bz komponente

Istraživanja su pokazala da smer Bz komponente interplanetarnog magnetnog polja određuje na kojoj će se hemisferi pojaviti zemljotres. Osnovna karakteristika zemljotresa na severnoj hemisferi je negativna vrednost Z komponente interplanetarnog magnetnog polja. To znači da čestice Sunčevog vetra koje nose zamrznuto magnetno polje bivaju privučene od strane geomagnetskog polja na severnoj hemisferi samo ukoliko je Z komponenta interplanetarnog magnetnog polja negativna. Na južnoj hemisferi da bi čestice prodrle u atmosferu potrebno je da Z komponenta interplanetarnog magnetnog polja bude pozitivna.

Odavde se može zaključiti:

1. da Z komponenta interplanetarnog magnetnog polja određuje na kojoj će se hemisferi dogoditi prodor slobodnih električnih opterećenja, odnosno na kojoj hemisferi postoje uslovi za pojavu zemljotresa;
2. ako polarizacija Z komponente određuje na kojoj će se hemisferi javiti zemljotres onda je to jedan od dokaza da zemljotresi nisu zemaljskog porekla.

U izuzetnim slučajevima kada postoji brza promena smera Bz komponente, slobodna električna opterećenja prodiru u atmosferu na obe hemisfere u skladu sa jačinom i smerom Bz komponente.



Prikaz 2.26.

Comparison of diagrams of the **Z** component of the interplanetary magnetic field and geomagnetic activity in Europe shows a correlation between these two time parameters.

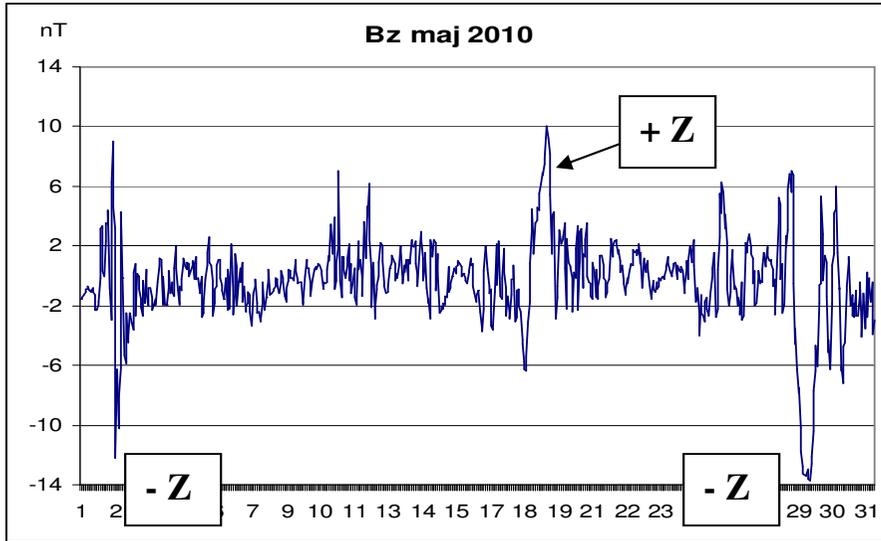


Diagram 2.9.

Geomagnetic Activity May 2010.

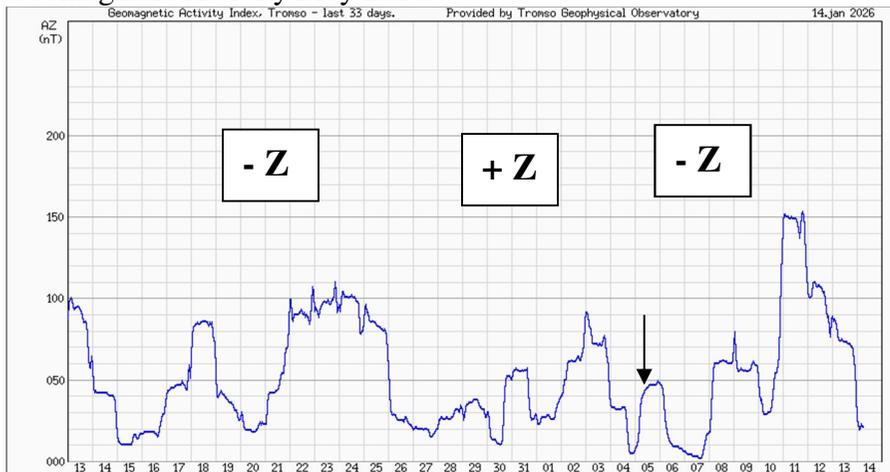
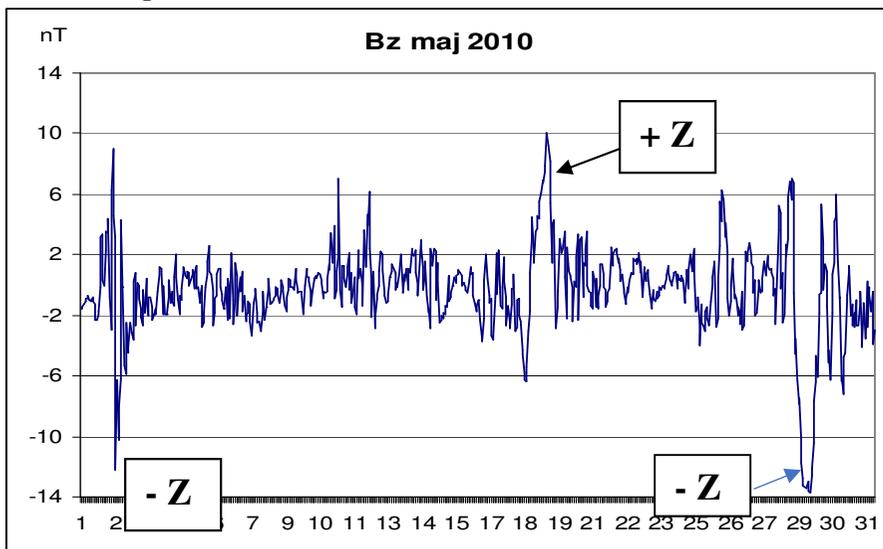


Diagram 2.10.

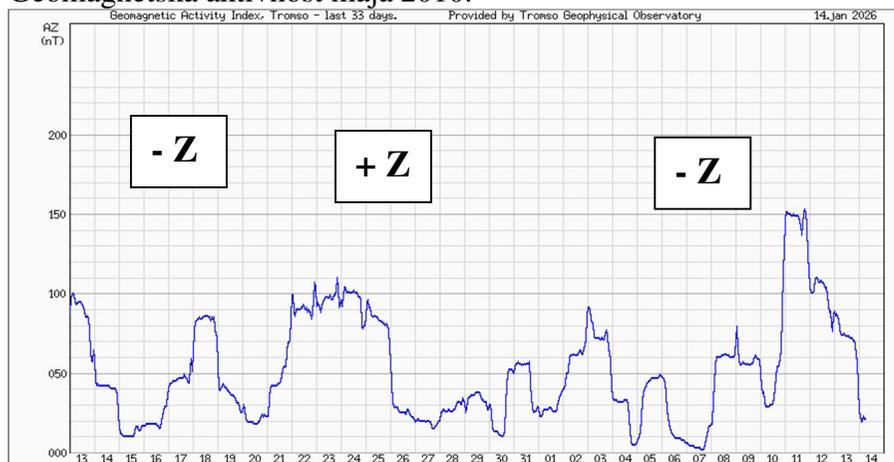
When the **Z** component is positive, geomagnetic activity is weak in Europe.

Upoređenjem dijagrama Z komponente interplanetarnog magnetnog polja i geomagnetske aktivnosti u Evropi pokazuje korelaciju ova dva vremenska parametra.



Dijagram 2.9.

Geomagnetska aktivnost maja 2010.



Dijagram 2.10.

Kada je Z komponenta pozitivna u Evropi je geomagnetska aktivnost slaba.

2.11.1. Planetary distribution of seismic

Based on current seismic division, Europe belongs to the Eurasian tectonic plate. However, from the electromagnetic viewpoint Europe and Asia are two separate continents that have no electromagnetic and seismic correlation. Therefore, the European earthquakes cannot be associated with the Eurasian tectonic plate.

From the electromagnetic viewpoint, those are two completely independent continents where each of them makes a single whole. There is the Ural between Asia and Europe, that is, the space that has the role of electric and magnetic insulator which clearly divides the European from the Asian earthquakes.

Asian earthquakes are, in principle, the strongest in the Northern Hemisphere and the European the weakest. The balance of power of earthquakes is one of the indicators that there is no seismic correlation between these two continents.

Electromagnetic researches have shown another disagreement with current geographical distribution of earthquakes.

Geographically, Turkey is not in Europe, but from the electromagnetic viewpoint Turkey is firmly linked with Europe and earthquakes occurring in Turkey belong to the group of European earthquakes. North West European geomagnetic line, at which all solar energies move, spreads across the entire territory of Europe and moves to the territory of Turkey and thus connects Europe and Turkey.

Therefore, Turkey, from the seismic viewpoint, can be considered a European country and the earthquakes in Turkey are European. All European earthquakes are distinguished by - Z component of the interplanetary magnetic field.

When in the inter-planetary space magnetic line covers the Earth, and when the Z component of the interplanetary magnetic field is negative, the free electrical loads penetrate to the northern hemisphere through the northern **planetary magnetic door**.

Earthquakes south of the dividing line between Europe and Africa belong to the southern African telluric currents with the + Z component of the interplanetary magnetic field.

Therefore, the earthquakes on the southern shores of the Mediterranean, that is, in Africa, cannot be considered earthquakes of the Northern Hemisphere.

2.11.1. Planetarna seizmička raspodela

Na osnovu važeće seizmičke podele, Evropa pripada evroaziskoj tektonskoj ploči. Međutim, sa elektromagnetnog stanovišta Evropa i Azija su posebna dva kontinenta koji nemaju elektromagnetnu i seizmičku povezanost.

Zbog toga se evropski zemljotresi ne mogu povezivati sa evroazijskom tektonskom pločom.

Sa elektromagnetnog stanovišta to su potpuno dva nezavisna kontinenta gde svaki za sebe čini jedinstvenu celinu. Između Azije i Evrope nalazi se Ural, odnosno prostor koji ima ulogu električnog i magnetnog izolatora koji jasno deli evropske od azijskih zemljotresa.

Azijski zemljotresi su, u principu, **najjači** na severnoj hemisferi a evropski **najslabiji**. Odnos snaga zemljotresa je jedan od pokazatelja da ne postoji seizmička povezanost ova dva kontinenta.

Elektromagnetna istraživanja pokazala su još jednu nesaglasnost sa važećom geografskom raspodelom zemljotresa.

Geografski posmatrano, Turska nije u Evropi, ali sa elektromagnetnog stanovišta Turska je čvrsto povezana sa Evropom pa zemljotresi koji se javljaju u Turskoj pripadaju grupi evropskih zemljotresa.

Severozapadna evropska geomagnetska linija, po kojoj se kreću sve energije Sunca prostire se duž cele teritorije Evrope i prelazi na teritoriju Turske i na taj način povezuje Evropu i Tursku.

Zbog toga se Turska sa, seizmološkog stanovišta, može smatrati evropskom zemljom a zemljotresi u Turskoj su evropski.

Svi evropski zemljotresi prepoznaju se po **-Z** komponenti interplanetarnog magnetnog polja.

Kada u interplanetarnom prostoru magnetna linija prekrije Zemlju, i kada je Z komponenta interplanetarnog magnetnog polja negativna, slobodna električna opterećenja prodiru na severnu hemisferu kroz severna **Planetarna magnetna vrata**.

Zemljotresi južno od linije razdvajanja između Evrope i Afrike pripadaju afričkim južnim telurskim strujama sa **+Z** komponentom interplanetarnog magnetnog polja.

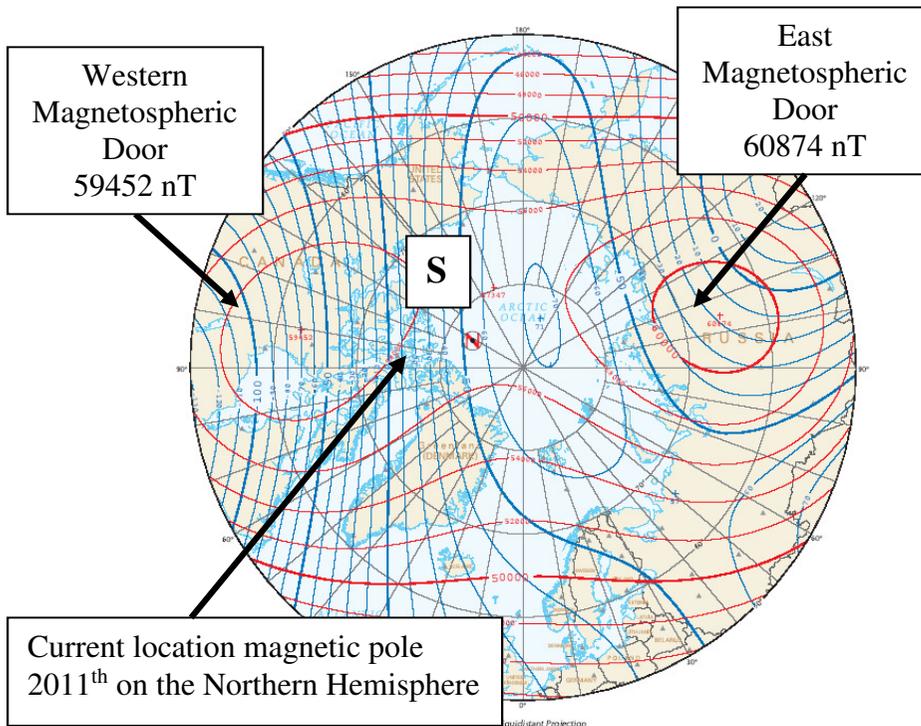
Zbog toga se zemljotresi na južnim obalama Mediterana, odnosno u Africi, ne mogu smatrati zemljotresima severne hemisfere.

2.11.2. Geographic distribution of geomagnetic field strength

The geomagnetic field in the northern hemisphere has two locations where the magnetic field is stronger than the location of magnetic poles. One location with enhanced geomagnetic field is located in Canada and another in Siberia. At these sites today are magnetospheric door through which pass electrical load in the free atmosphere.

In the northern hemisphere solar wind energy is divided into two parts, which significantly reduces their effect on weather and seismic phenomenon. Magnetic pole in the northern hemisphere was a unique all to 1900. year and then there was a division.

Geographic distribution of geomagnetic field intensity in the northern hemisphere is an anomaly for which science has no explanation. Besides this anomaly in the northern hemisphere is located south magnetic pole S, which indicates that the Earth is an inversion of magnetic poles.



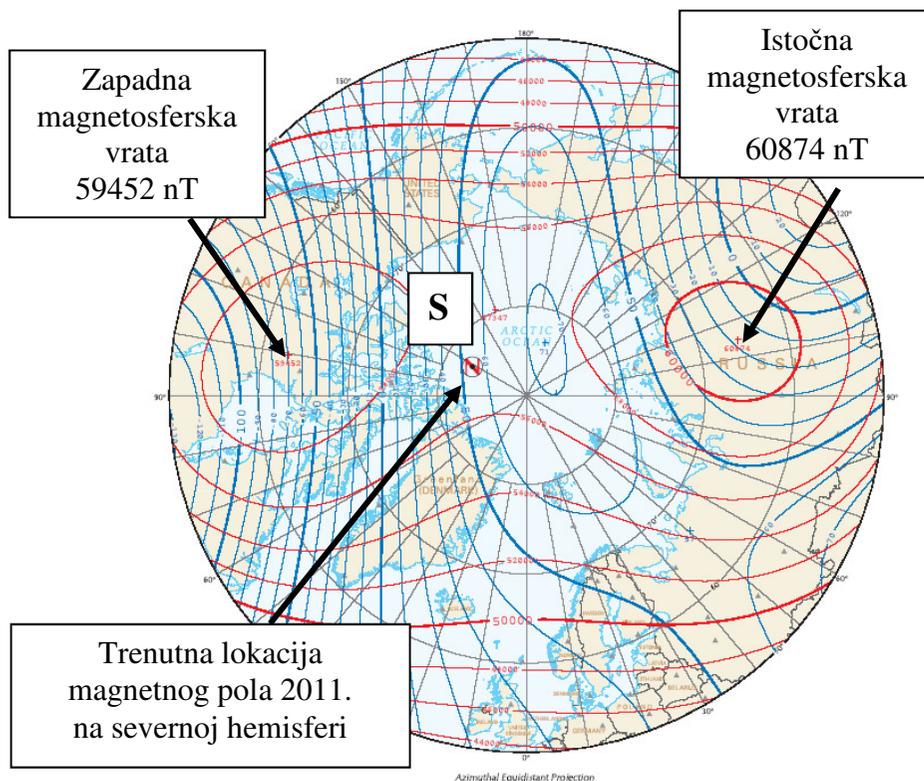
Map. 2. 4.

Strength of the vertical component of geomagnetic field in Canada is 59,452 nT and 60,874 nT Siberia.

2.11.2. Geografska raspodela jačine geomagnetskog polja

Geomagnetsko polje na severnoj hemisferi ima dve lokacije gde je magnetno polje jače nego na lokaciji magnetnog pola. Jedna lokacija sa pojačanim geomagnetskim poljem nalazi se u Kanadi a druga u Sibiru. Na tim lokacijama danas se nalaze magnetosferska vrata kroz koja prodiru slobodna električna opterećenja u atmosferu. Na severnoj hemisferi energija sunčevog vetra deli se na dva dela što znatno ublažava njihovo dejstvo na meteorološke i seizmološke pojave. Magnetni pol na severnoj hemisferi bio je jedinstven sve do 1900. godine a onda je došlo do deobe.

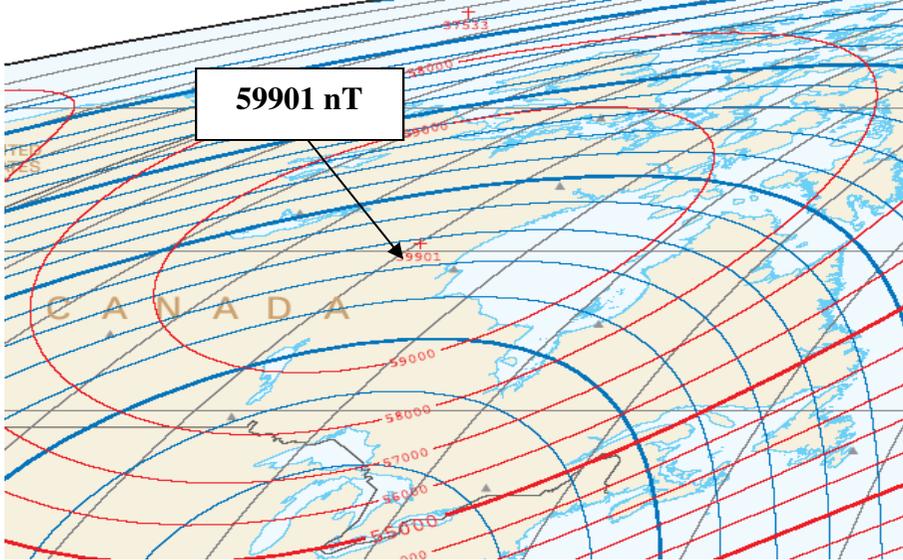
Geografska raspodela jačine geomagnetskog polja na severnoj hemisferi predstavlja anomaliju za koju nauka nema objašnjenje. Osim ove anomalije na severnoj hemisferi nalazi se južni magnetni pol S što ukazuje da na planeti Zemlji postoji inverzija magnetnih polova.



Karta 2. 4.

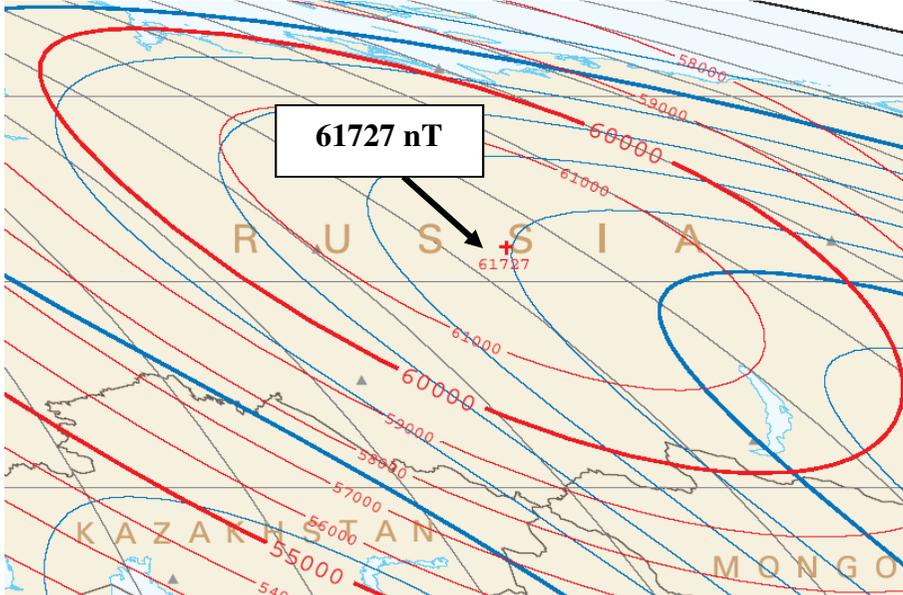
Jačina vertikalne komponente geomagnetskog polja u Kanadi je 59452 nT a u Sibiru 60874 nT.

The intensity of the total geomagnetic field in Canada is 59,901 nT.



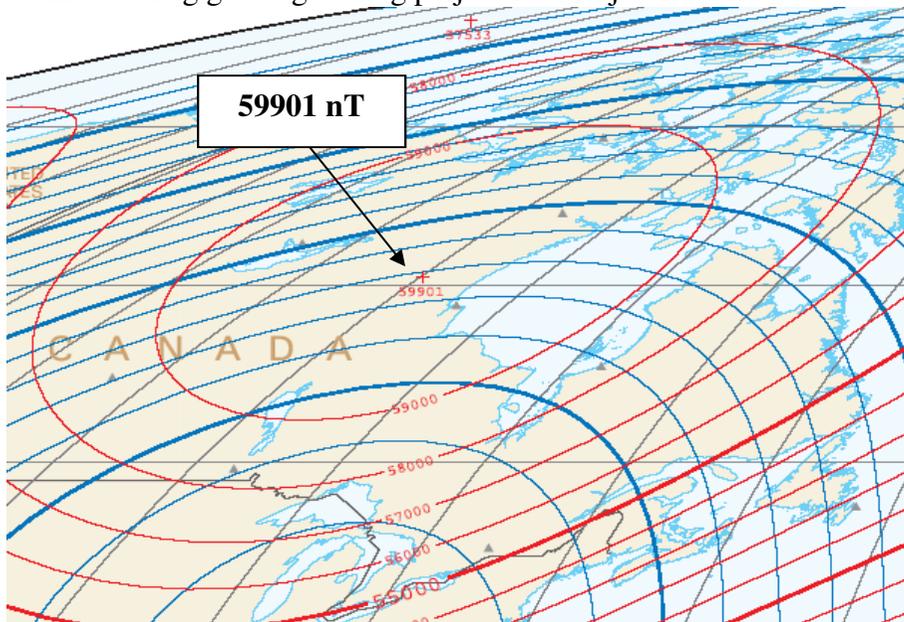
Map. 2.5.

The intensity of the total geomagnetic field in Siberia is 61,727 nT.



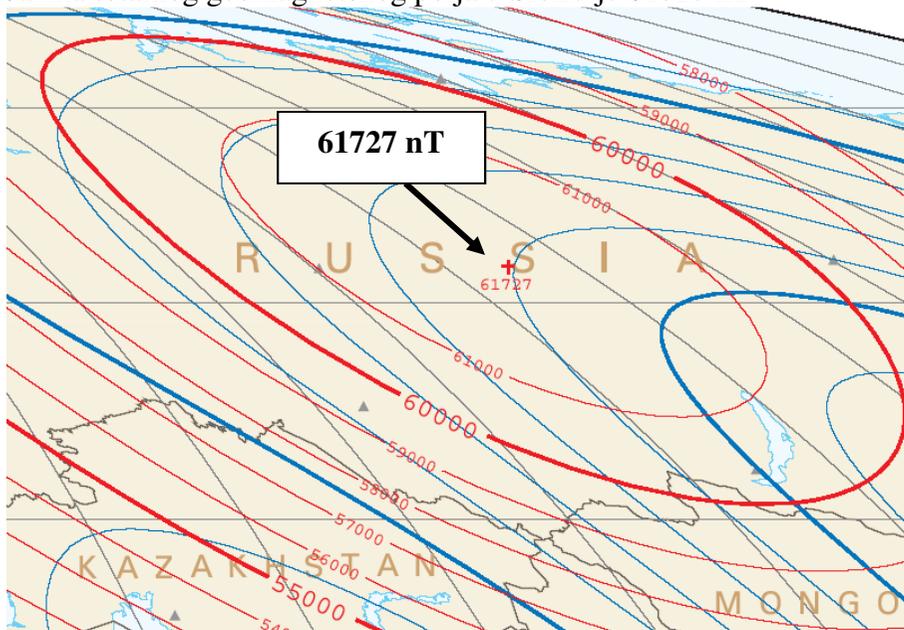
Map. 2.6.

Jačina totalnog geomagnetskog polja u Kanadi je 59901 nT



Map. 2.5..

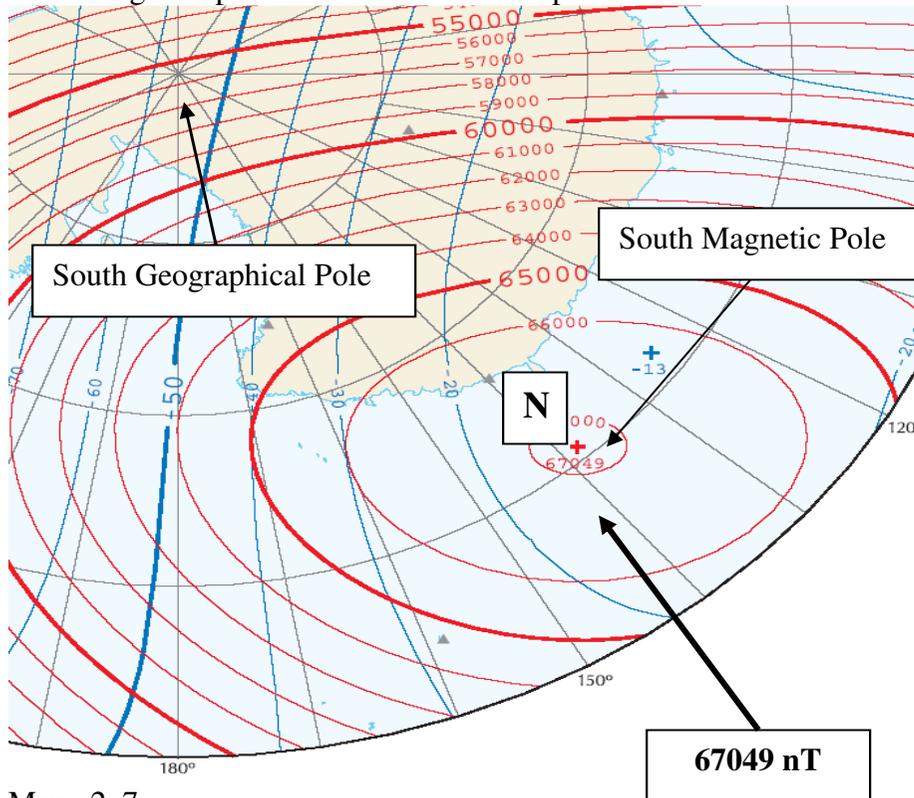
Jačina totalnog geomagnetskog polja u Sibiru je 61727 nT



Map. 2.6.

Studies have shown that the intensity of the penetration of free electric loads is in the correlation with the intensity of the geomagnetic field. On the other hand, the intensity of the induced telluric electric currents in the Earth's interior is directly proportional to the intensity of the geomagnetic field. This shows why the Asian electric telluric currents are stronger than the telluric currents in North America. Unlike the northern hemisphere, the magnetic pole in the southern hemisphere is unique and the magnetic field is the strongest at the location of the magnetic pole.

North magnetic pole in the southern hemisphere



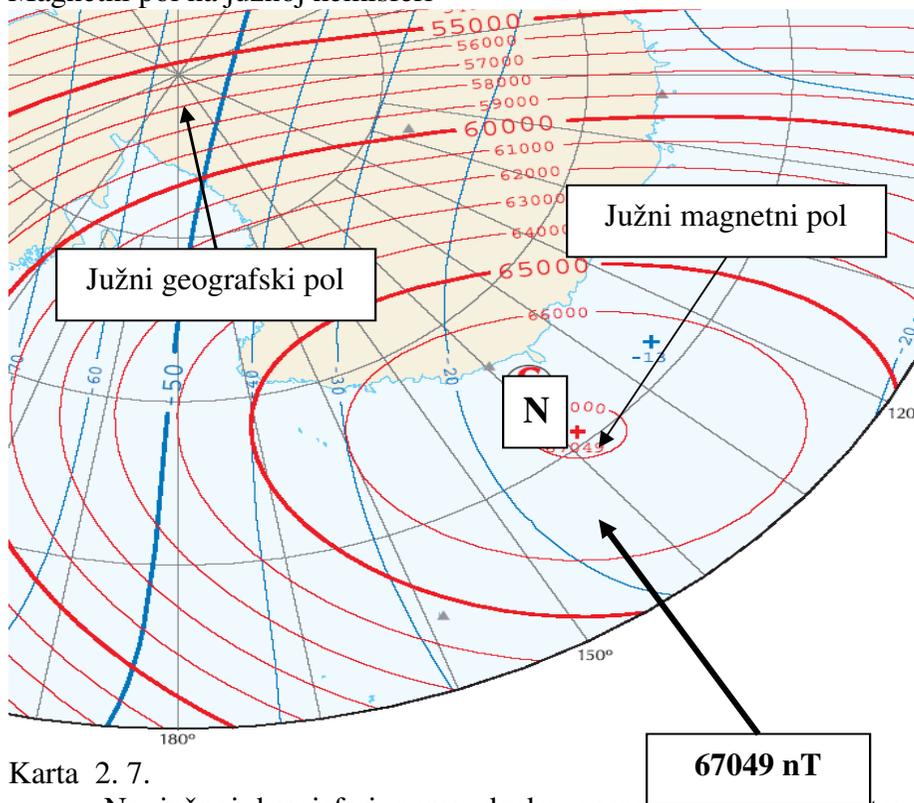
Map. 2. 7.

In the southern hemisphere does not have the energy division of the solar wind and the meteorological and seismological phenomena much more pronounced. Winds in the southern hemisphere are the strongest winds on the planet

Istraživanja su pokazala da je jačina prodora slobodnih električnih opterećenja u korelaciji sa jačinom geomagnetskog polja. S druge strane, jačina indukovanih telurskih električnih struja u unutrašnjosti Zemlje direktno je proporcionalna jačini geomagnetskog polja. To pokazuje zašto su azijske telurske električne struje jače od telurskih struja u Severnoj Americi.

Za razliku od severne hemisfere, magnetni pol na južnoj hemisferi je jedinstven pa je magnetno polje najjače na lokaciji magnetnog pola.

Magnetni pol na južnoj hemisferi



Karta 2.7.

Na južnoj hemisferi nema deobe energija Suncevog vetra pa su meteorološke i seizmološke pojave znatno izraženije. Vetrovi na južnoj hemisferi su najjači vetrovi na planeti.

The importance of Magnetic Doors in the northern hemisphere can be seen across the fields of atmospheric pressure.

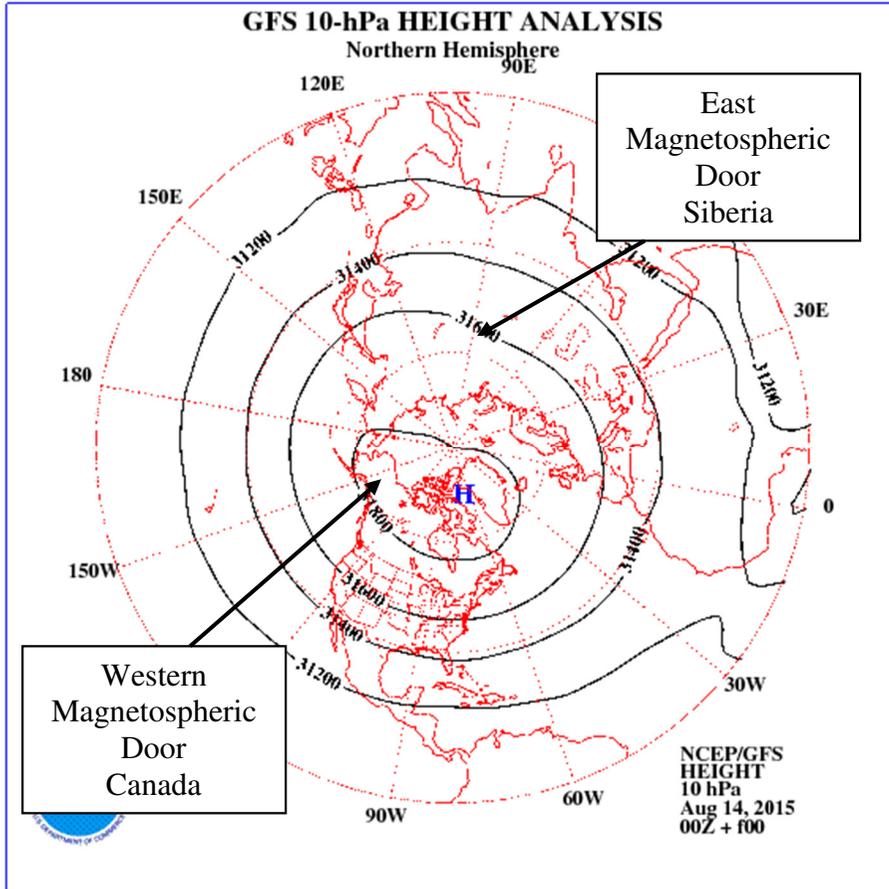


Diagram 2.11

Circulation geomagnetic field created in the Northern Hemisphere, Eastern and Western magnetospheric door. This is the door through the solar wind particles penetrate into the atmosphere. If the door is open or closed, regulating Z component of the interplanetary magnetic field.

In the northern hemisphere doors are opened only if the Z component of the interplanetary magnetic field is negative.

In the southern hemisphere there is only one planetary doors that open only when the Z component is positive. (2009. *Belgrade School of Meteorology, Volume 2.*)

Značaj magnetosferskih vrata na severnoj hemisferi može se sagledati preko polja atmosferskog pritiska.

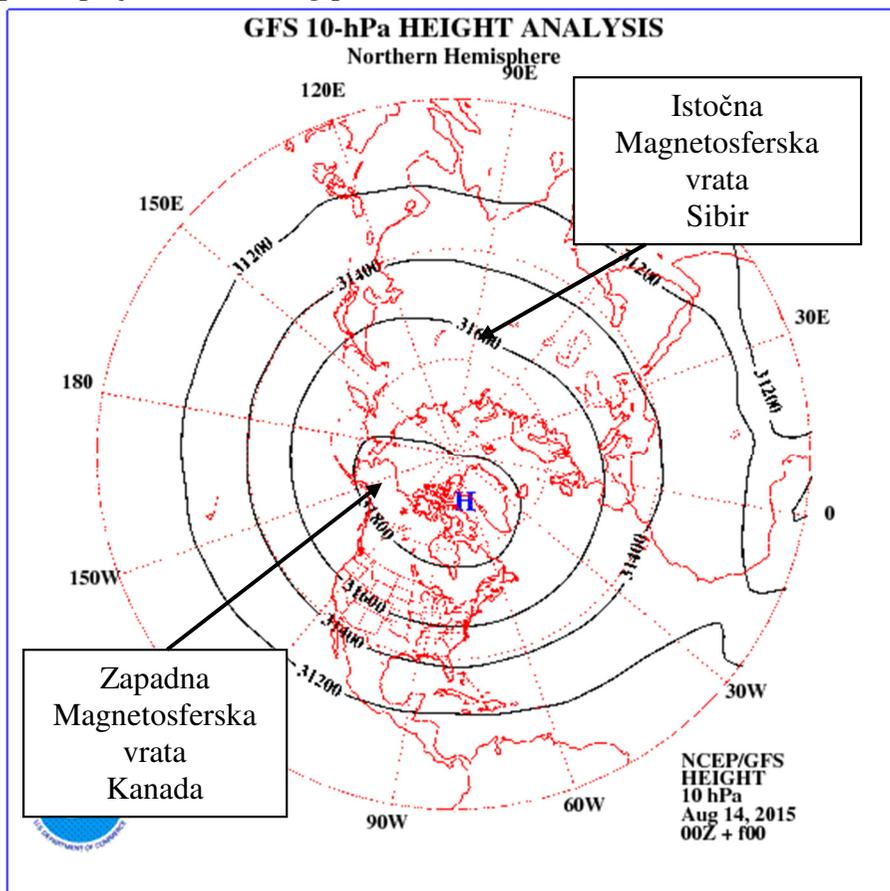


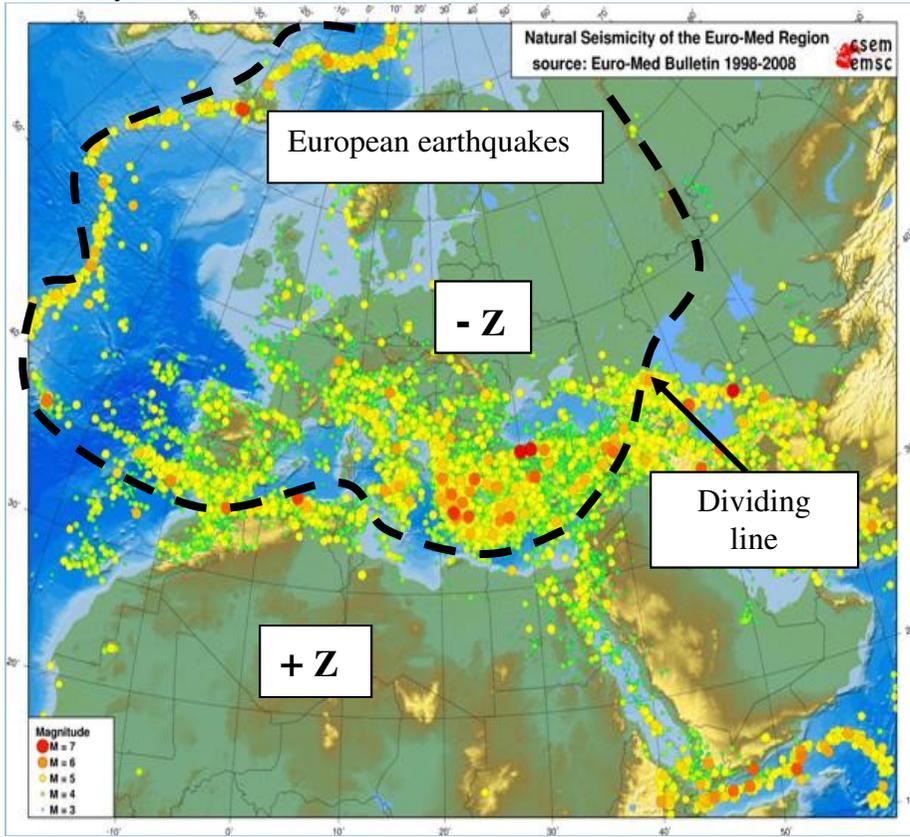
Diagram 2.11

Cirkulacija geomagnetskog polja stvara na severnoj hemisferi istočna i zapadna magnetosferska vrata. To su vrata kroz prodiru čestice Sunčevog vetra u atmosferu. Da li su vrata otvorena ili zatvorena reguliše Z komponenta interplanetarnog magnetnog polja. Na severnoj hemisferi vrata su otvorena samo ako je Z komponenta interplanetarnog magnetnog polja negativna,

Na južnoj hemisferi postoje samo jedna Planetarna vrata koja su otvorena samo ako je Z komponenta pozitivna. (2009. *Beogradska škola meteorologije, Sveska druga*)

2.12.1. European telluric earthquakes

If we take as a measure of earthquake generated by European telluric currents, then the European Alley earthquake extends from the Atlantic Ocean to Turkey.



Map.

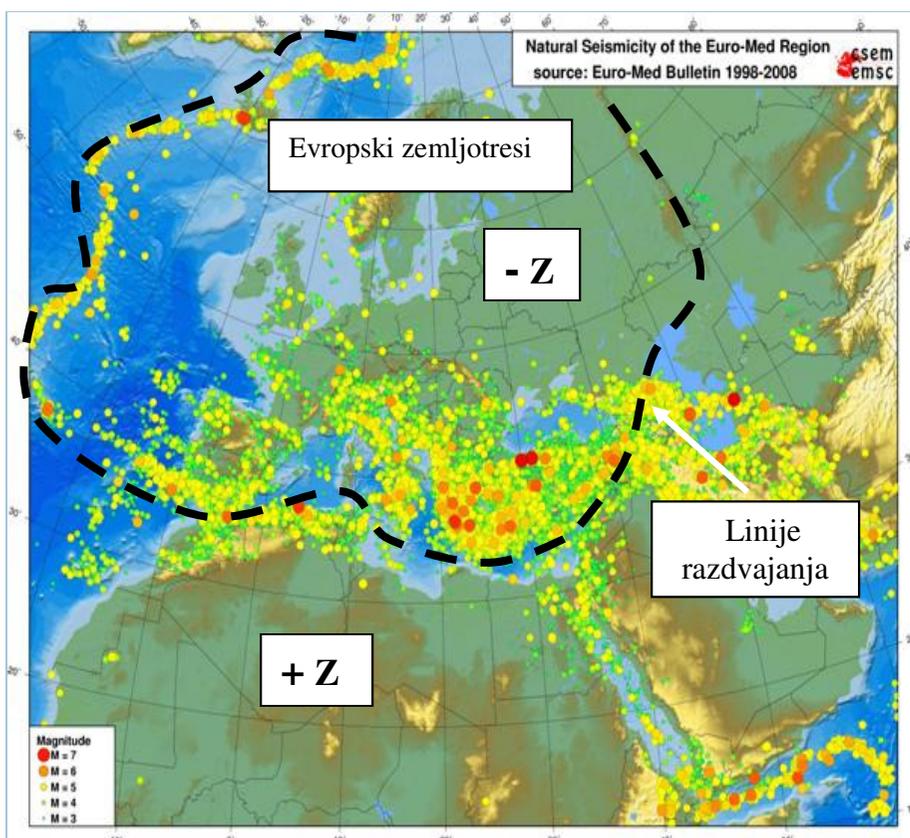
2. 12.

Dividing line clearly shows that there is no connection between the Asian and European earthquakes and tectonic plates can not be the basis for the seismic distribution of earthquakes.

It can also be seen that Atlantic earthquakes partly belonging to the European telluric earthquakes and other north American earthquakes induction. Flow fields derived from the free electrical load, which broke through the door above the magnetospheric Western Canada, crossing the whole territory of North America and hit the gap between European and North American tectonic plates, thus creating induction earthquakes.

2.12.1. Evropski telurski zemljotresi

Ako kao merilo uzmemo zemljotrese koje stvaraju evropske telurske struje, onda se evropska aleja zemljotresa prostire od Atlantskog okeana do Turske.



Karta 2. 12.

Linija razdvajanja jasno pokazuje da ne postoji veza između azijskih i evropskih zemljotresa i da tektonske ploče ne mogu biti osnova za seizmičku raspodelu zemljotresa. Takođe se može videti da atlantski zemljotresi jednim delom pripadaju evropskim **telurskim** zemljotresima a drugim, severnoameričkim **indukcionim** zemljotresima. Strujna polja nastala od slobodnih električnih opterećenja, koja su prodrla kroz zapadna magnetosferska vrata iznad Kanade, prelaze preko cele teritorije Severne Amerike i udaraju u procep između evropske i severno američke tektonske ploče i tako stvaraju indukcione zemljotrese.

Diagram of a typical European induction of earthquakes in the gap that is identified by negative values of Z component.

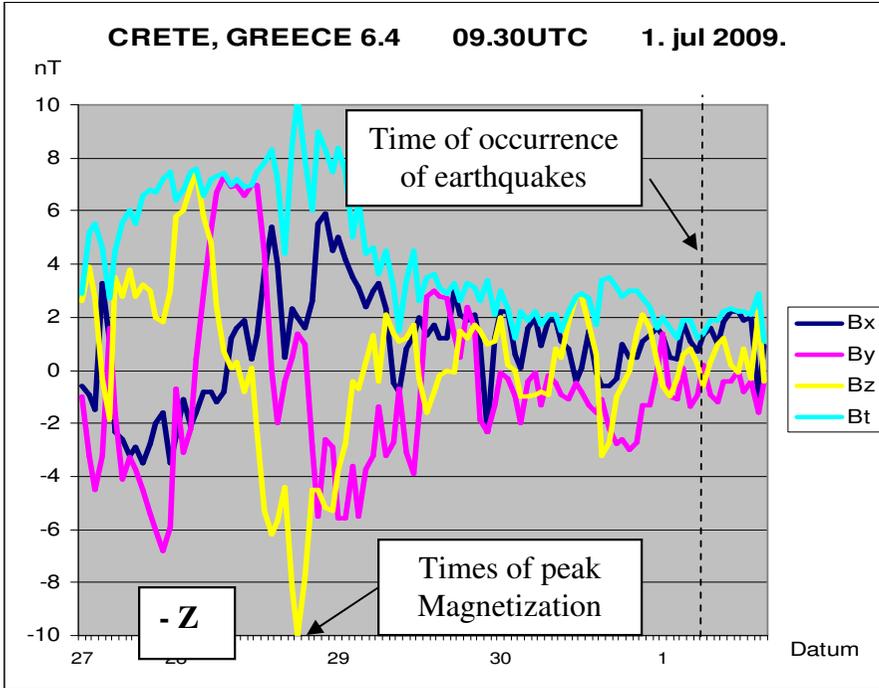


Diagram 2.12.

Induction of electric currents in the Earth 28th July 2009.

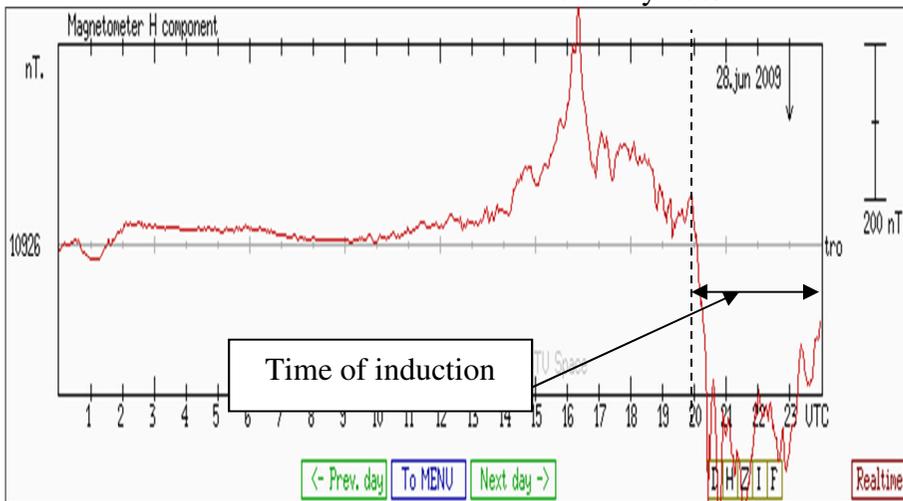
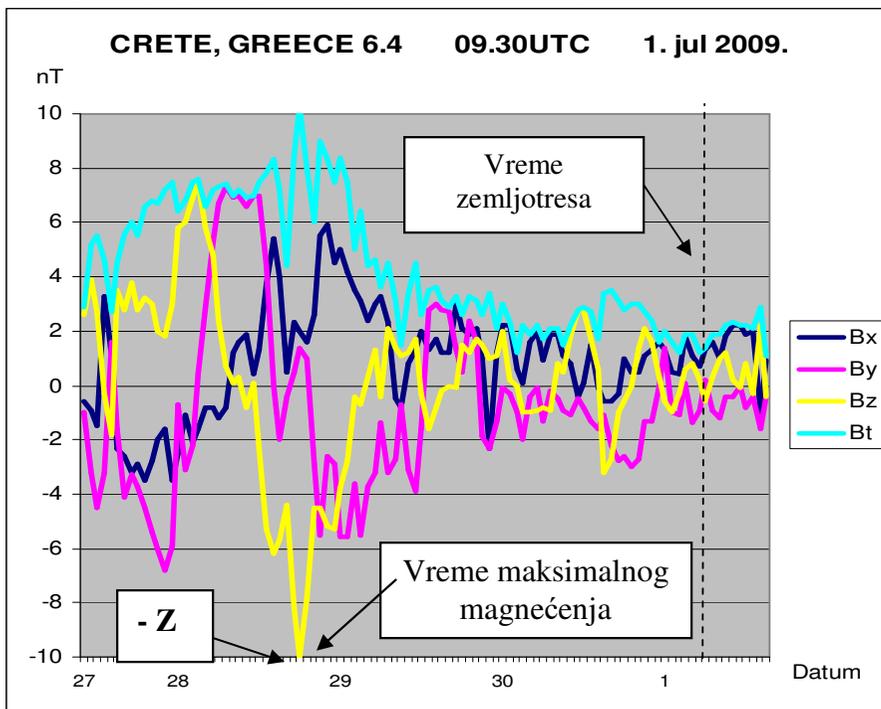


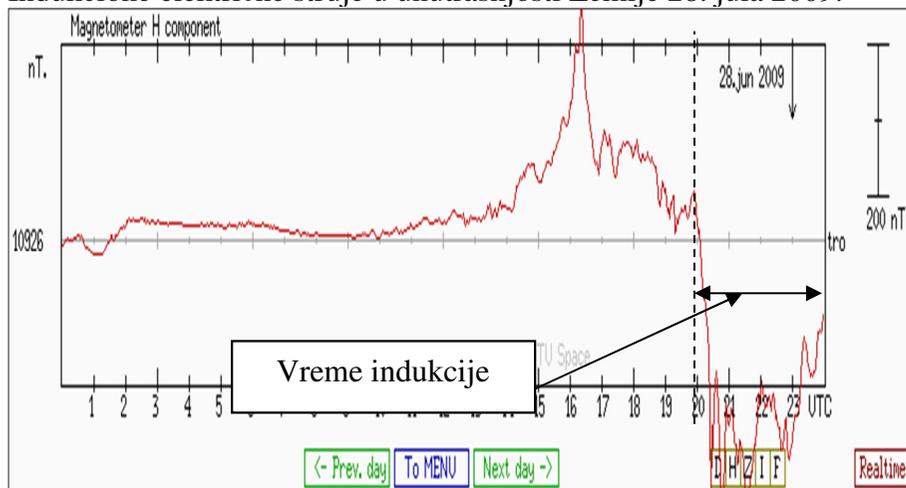
Diagram 2.13.

Dijagram tipičnog evropskog indukcionog zemljotresa u procepu koji se prepoznaje po negativnoj vrednosti **Z** komponente.



Dijagram 2.12.

Indukcione električne struje u unutrašnjosti Zemlje 28. jula 2009.



Dijagram 2.13.

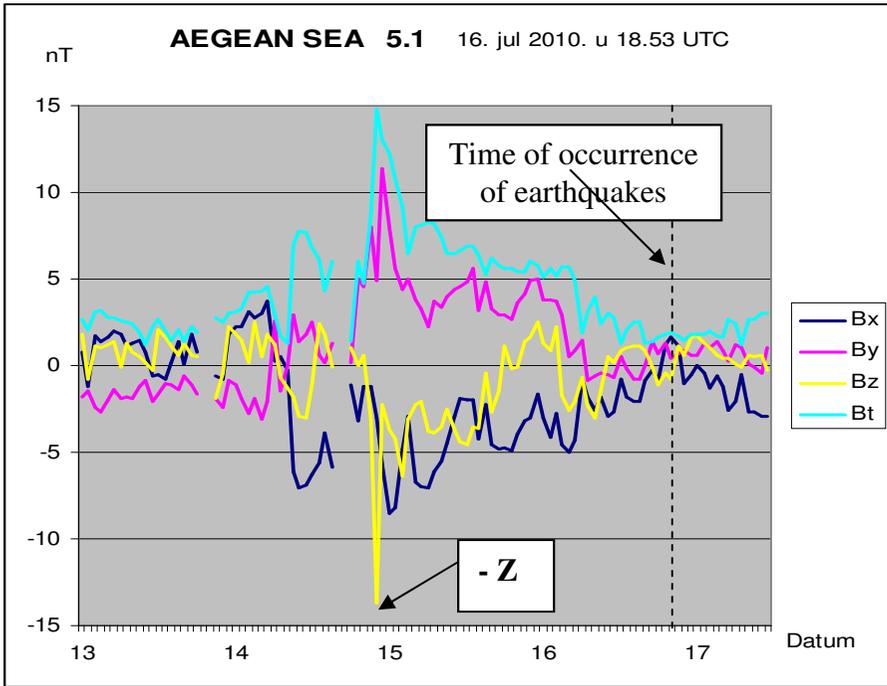


Diagram 1. 14.

Induction of electric currents in the Earth 14th July 2009.

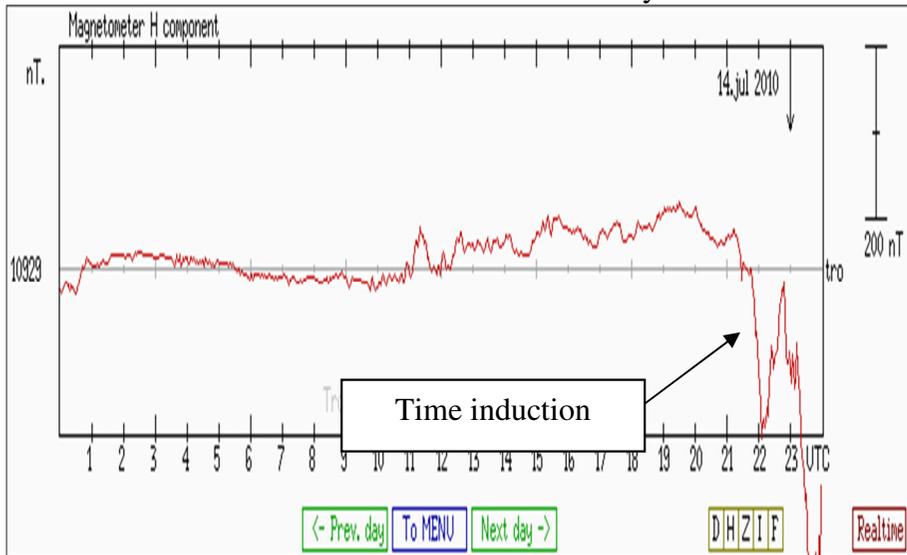
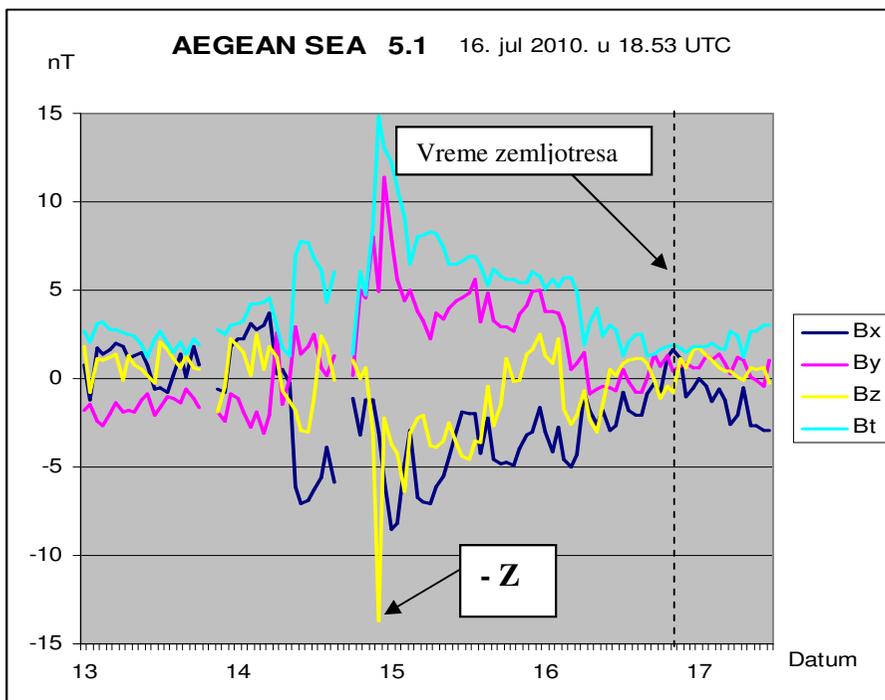
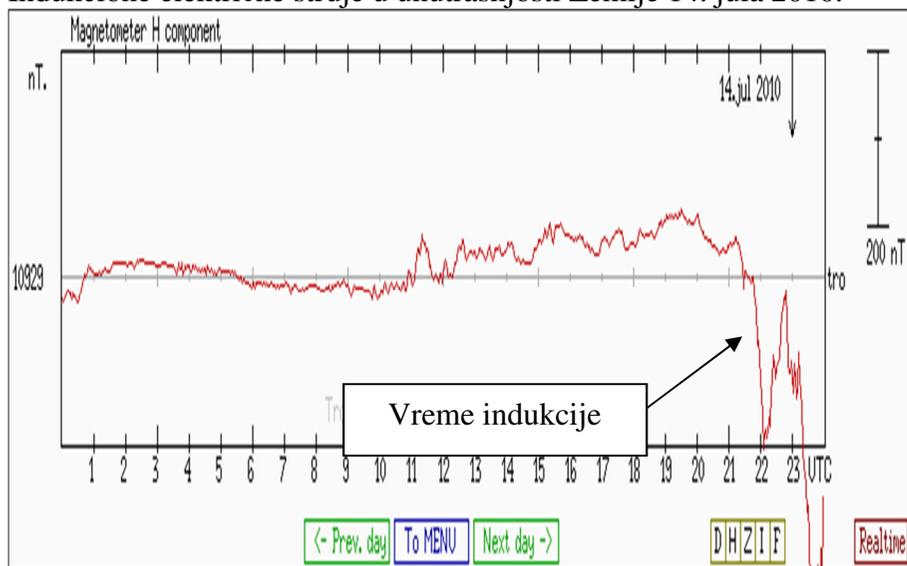


Diagram 2. 15.



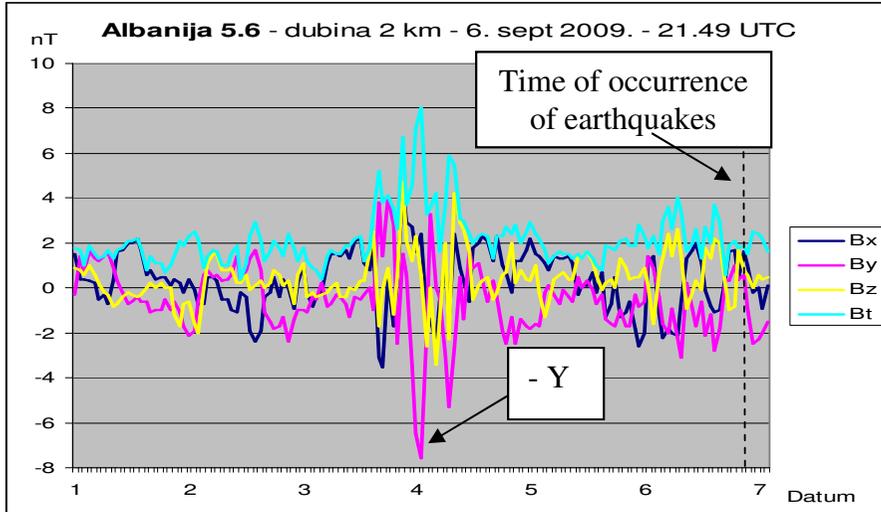
Dijagram 1. 14.

Indukcione električne struje u unutrašnjosti Zemlje 14. jula 2010.



Dijagram 2. 15.

In general, when the induction earthquake occurs at fault, earthquake forces is lower.



Dijagram 2. 16.

Aquila earthquake that occurred 2009-04-06 01:32:41.4 UTC belongs to the proton induction earthquake and resulted from cyclone activity in Genoa Bay.

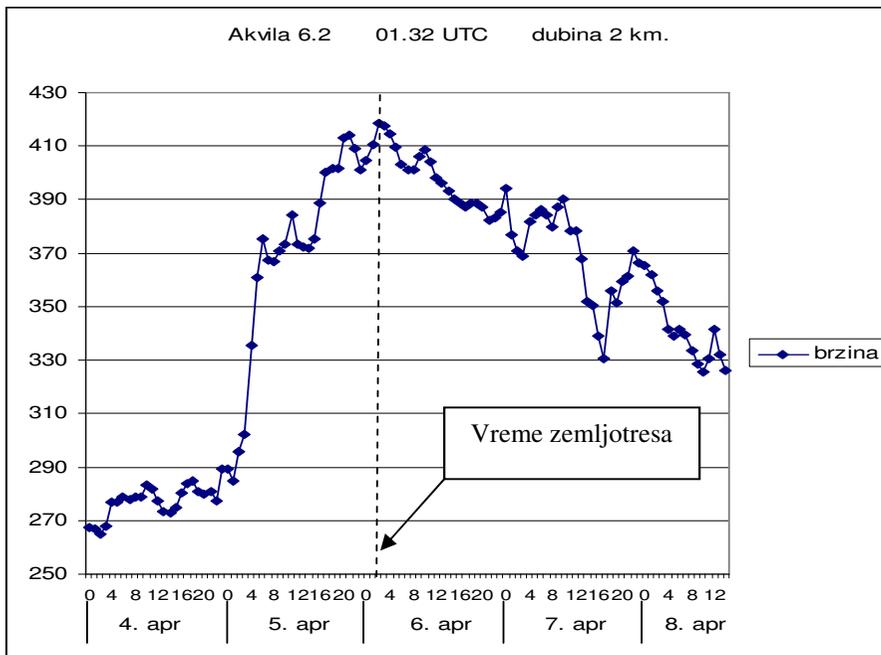
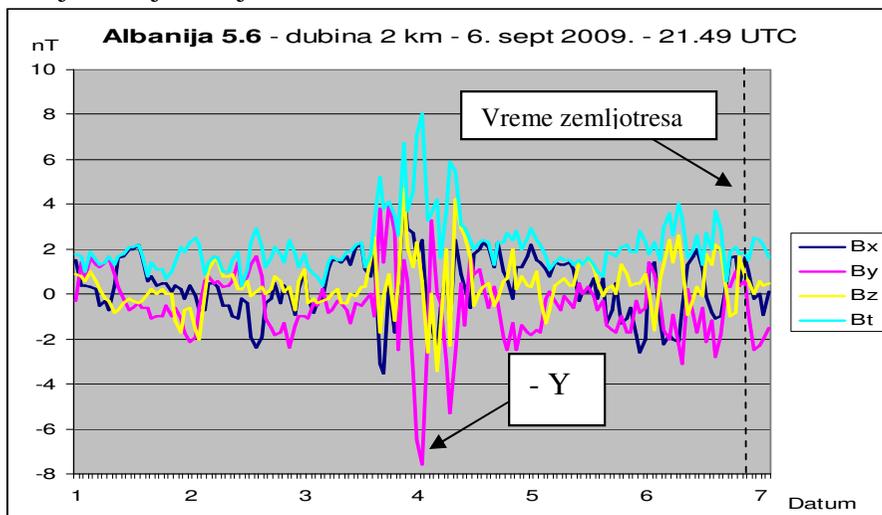


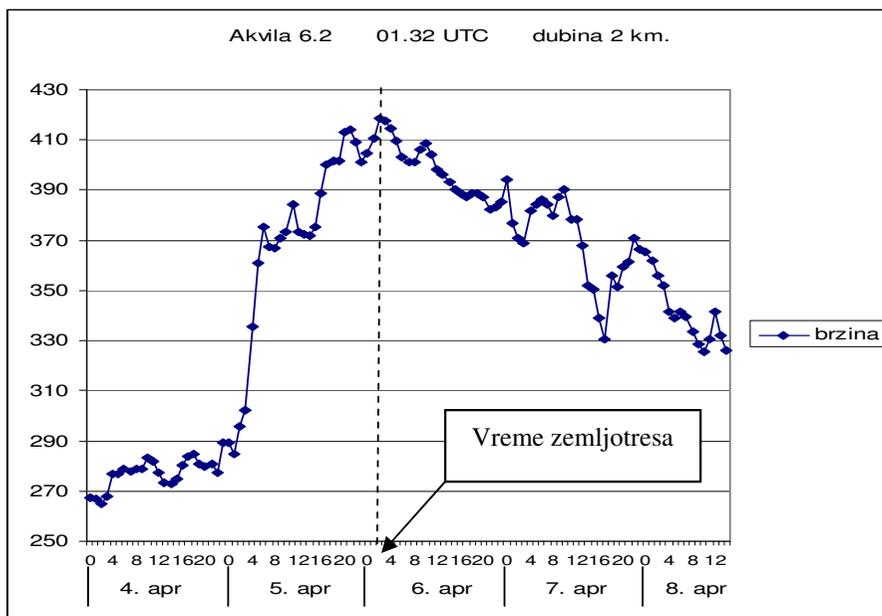
Diagram 2. 17

U principu, kada se indukcioni zemljotres javi na rasedu, snaga zemljotresa je manja.



Dijagram 2. 16.

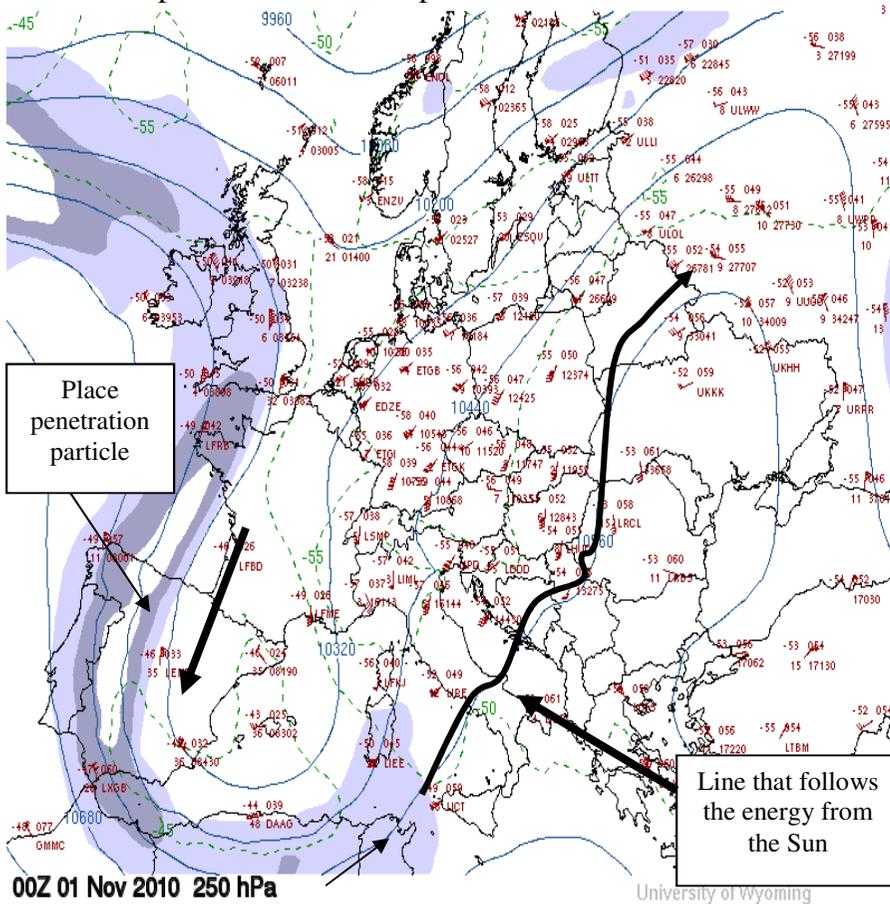
Akvila zemljotres koji se javio 2009-04-06 01:32:41.4 UTC pripada grupi **protonskih indukcionih zemljotresa** i posledica je ciklonske aktivnosti u Denovskom zalivu.



Dijagram 2. 17.

2.13.1. Proton induction earthquake in Serbia 3 November 2010.

The earthquake that occurred on the third of November 2010 belonged to the class of proton induction earthquakes. This earthquake has great similarities with the earthquake in Aquila, as both earthquakes occurred after the cyclonic activity over the Gulf Genovese. The first hint that there may be an earthquake in the Balkans was the current field which penetrated into Europe on the 1st of November 2010.



Map. 2.13

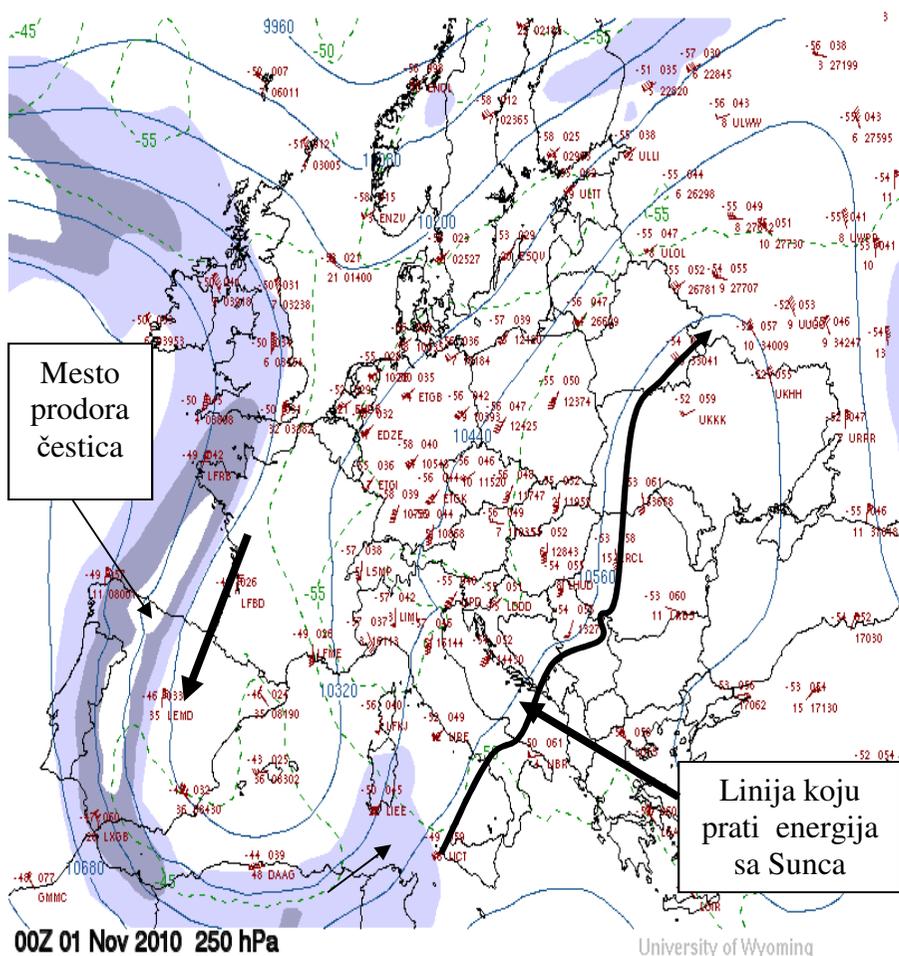
Credit : [Larry Oolman](#)

The map shows that the central line crosses the geomagnetic field Serbia West Morava River valley, and indicates the possible occurrence of earthquakes.

2.13.1. Protonski indukcionni zemljotres u Srbiji 3. novembra 2010.

Zemljotres koji se dogodio 3. novembra 2010. godine pripadao je klasi protonskih indukcionih zemljotresa. Ovaj zemljotres ima velike sličnosti sa zemljotresom u Akvili i Kopaoniku M6.0 jer su sva tri zemljotresa nastala posle ciklonske aktivnosti iznad Đenovskog zaliva.

Prvi nagoveštaj da može doći do zemljotresa na Balkanu bilo je strujno polje koje je prodrlo u Evropu 1. novembra 2010. godine.



Karta 2.13.

Credit : [Larry Oolman](#)

Na karti se može zapaziti da centralna linija geomagnetskog polja prelazi preko Srbije dolinom Zapadne Morave i nagoveštava moguću pojavu zemljotresa.

Current field originated from the eruption from the coronary hole CH426

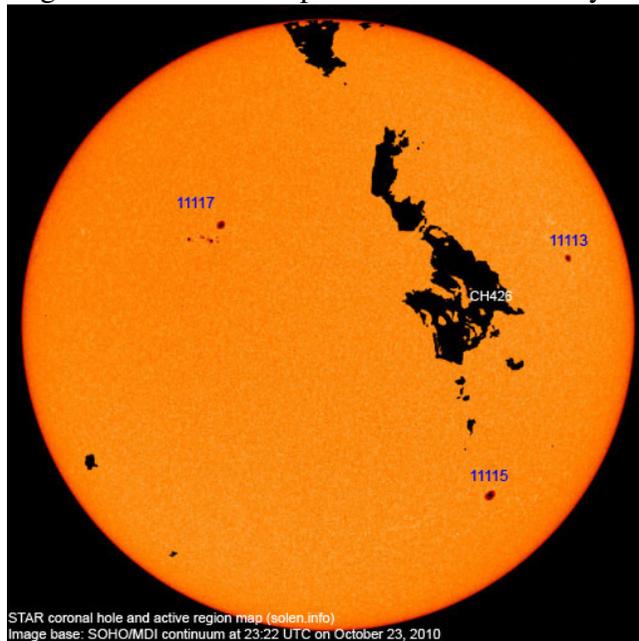


Fig. 2.27.

Another indication of the earthquake was the arrival of the interplanetary magnetic field with a negative Z component.

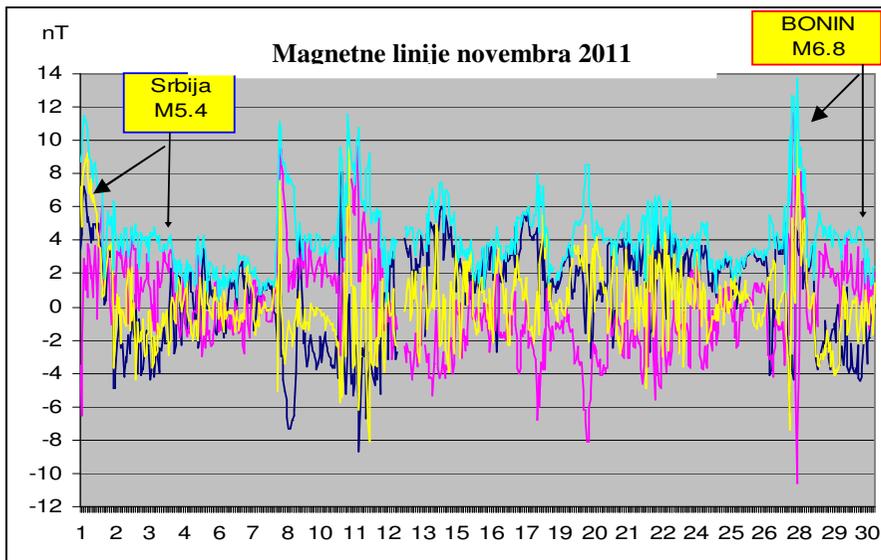
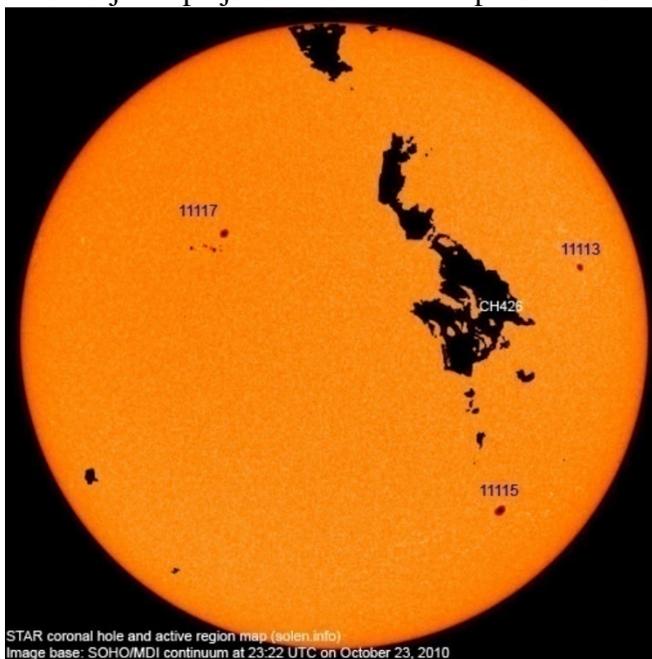


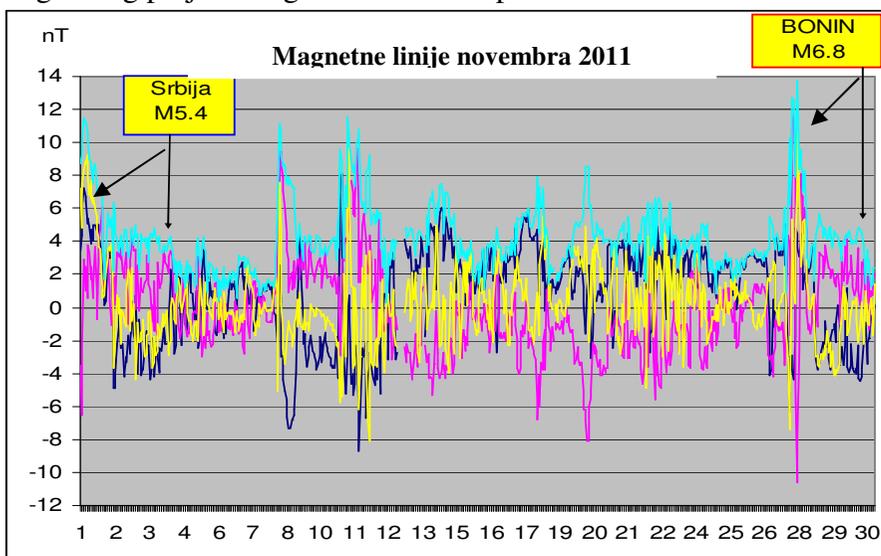
Diagram 2.18.

Strujno polje nastalo je erupcijom iz koronarne rupe CH 426.

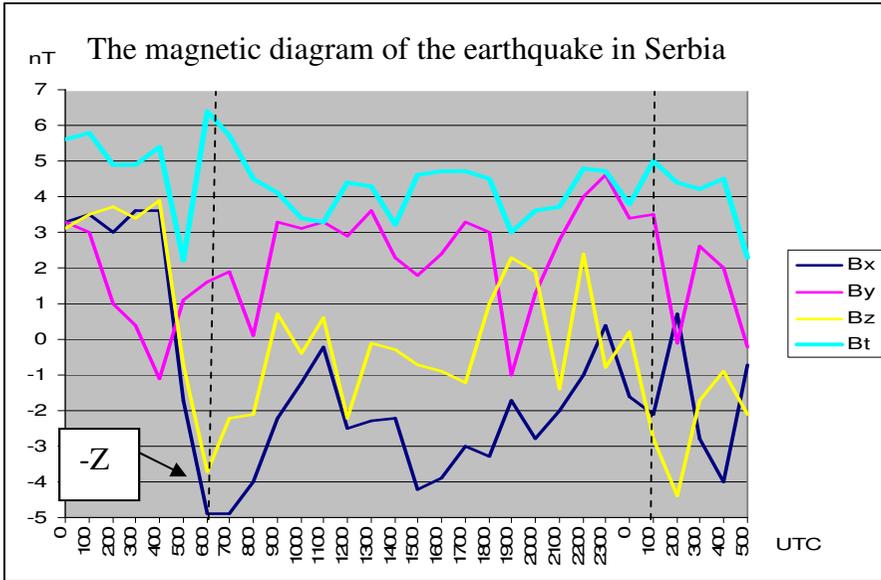


Slika 2.27.

Drugi nagoveštaj zemljotresa je bio dolazak interplanetarnog magnetnog polja sa negativnom Z komponentom.



Dijagram 2.18.



Dijagram 2.19.

Energy that penetrated the northern hemisphere in November 2010.

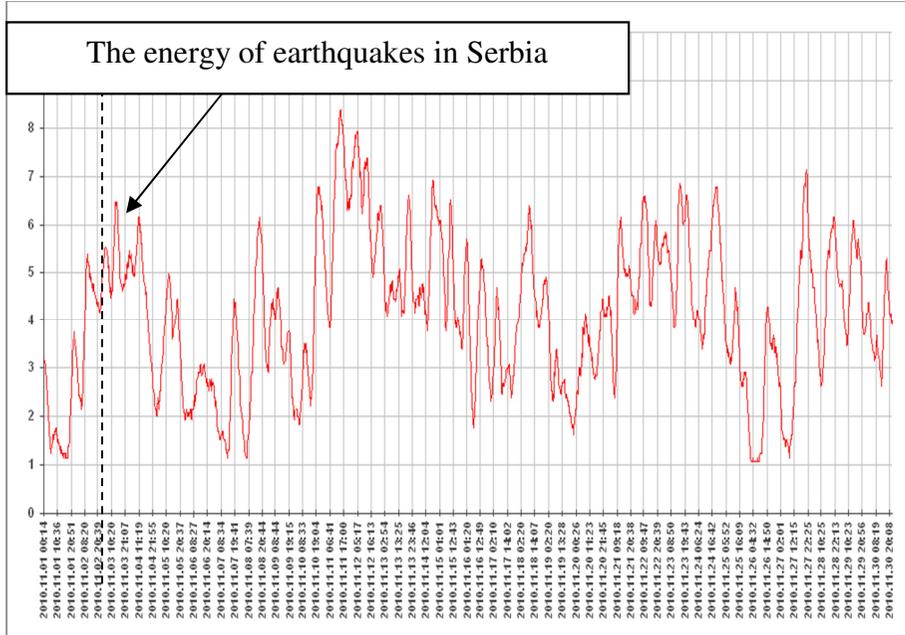
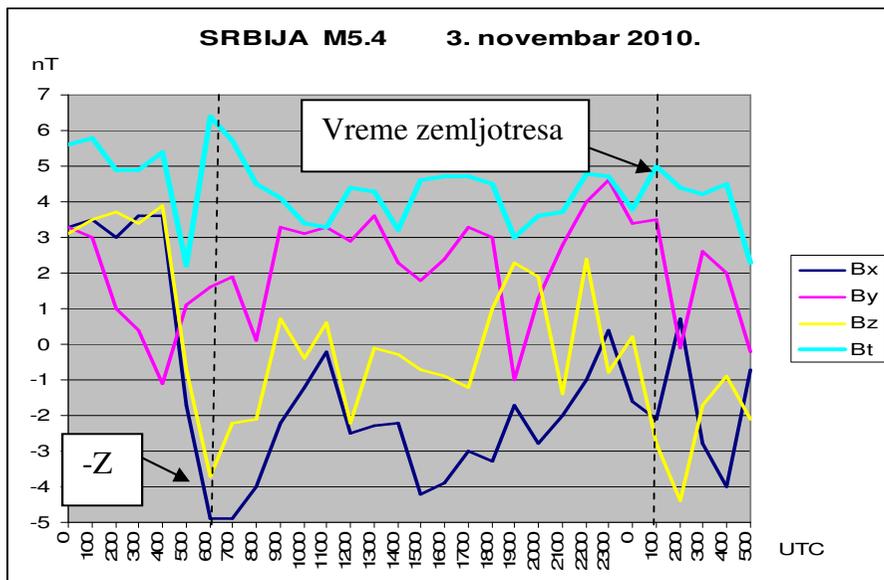
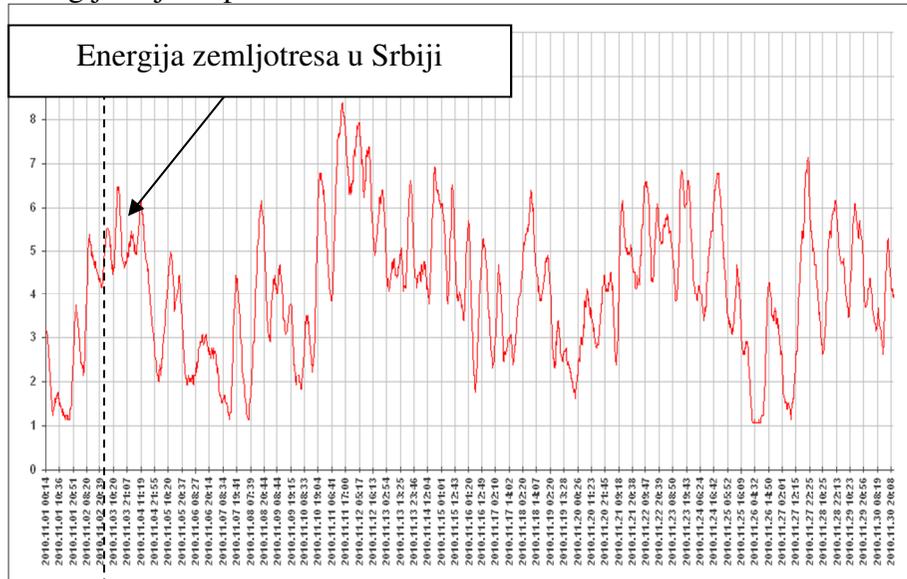


Diagram 2.20.



Dijagram 2.19.

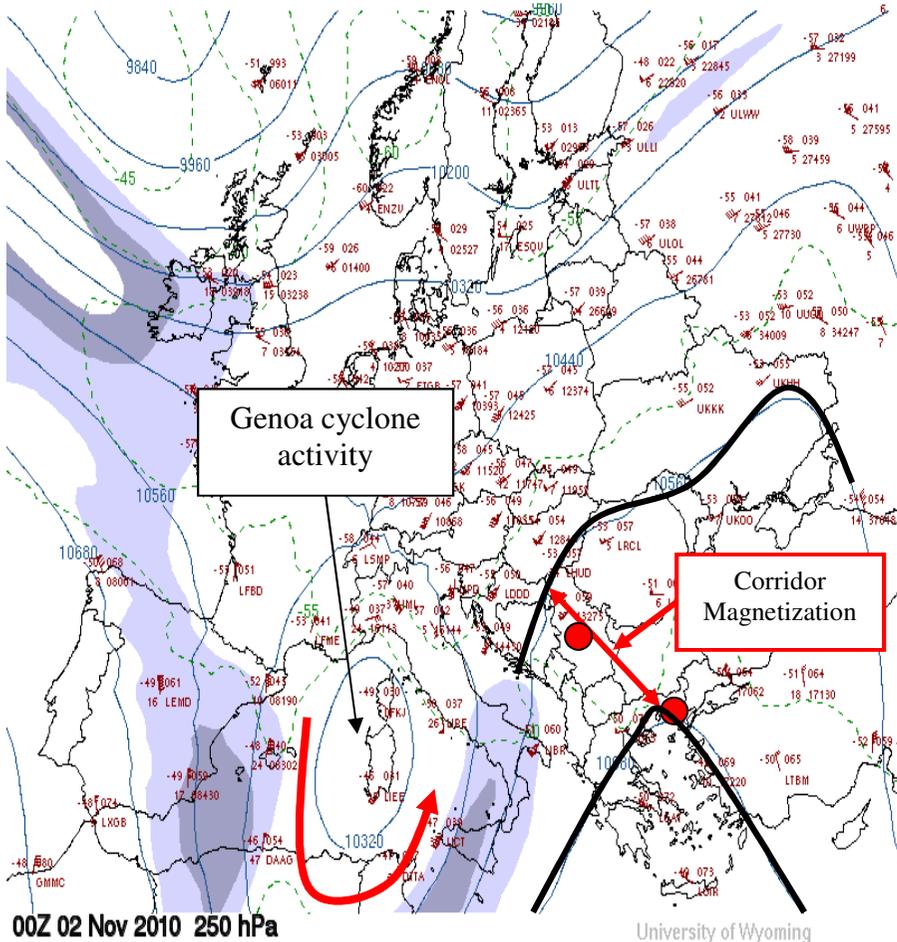
Energije koje su prodrle na severnu hemisferu u toku novembra



Dijagram 2.20.

The penetration of free electrical load formed cyclonic activity over the Gulf Genovese which is identical with cyclonic activity, the earthquake in Aquila.

Radial velocity Current Field over Italy was more than 50 knot, and the Current Field was closed.



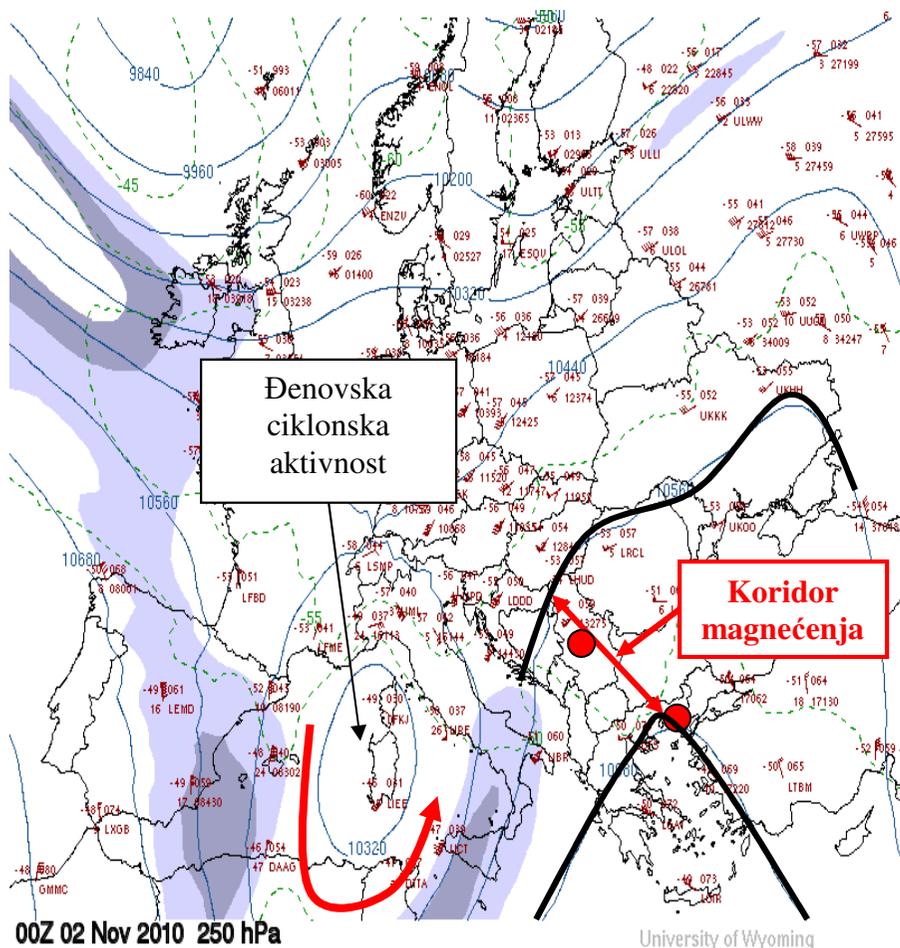
Map. 2.14.

Credit : [Larry Oolman](#)

Reduction of the radial velocity below 50 knot occurred over Serbia 2nd November 2010. Corridor Magnetization Balkans was of Palic to Turkey.

Prodor slobodnih električnih opterećenja formira ciklonsku aktivnost iznad Đenovskog zaliva koja je identična sa ciklonskom aktivnošću zemljotresa u Akvili i Kopaoniku M6.0.

Radijalna brzina strujnog polja iznad Italije bila je veća od 50 knota pa je strujno polje bilo zatvoreno.



Karta 2.14.

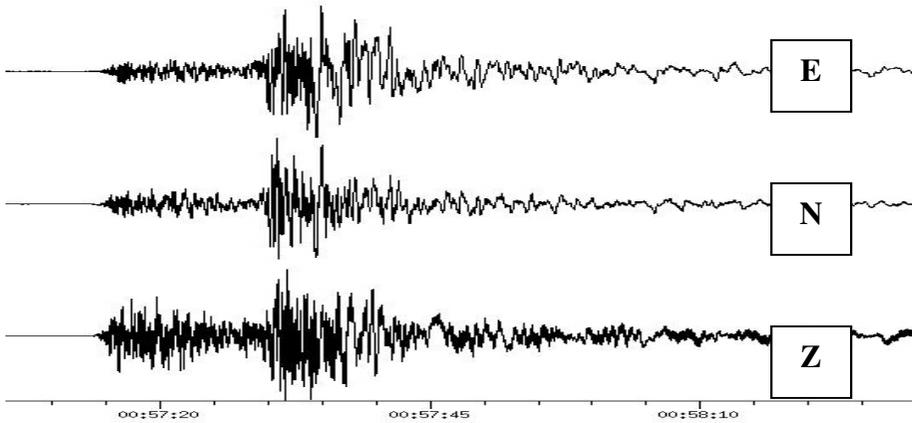
Credit : [Larry Oolman](#)

Međutim, smanjenje radijalne brzine ispod 50 knota dogodilo se iznad Srbije 2. novembra 2010. Koridor magnećenja Balkana bio je od Palića do Turske.

Based on theoretical grounds, earthquakes can occur only on the faults or gaps that are normal to one of the components of the frozen interplanetary field that carries a jet stream. Jet stream caused two stronger and several weak earthquakes in one day.

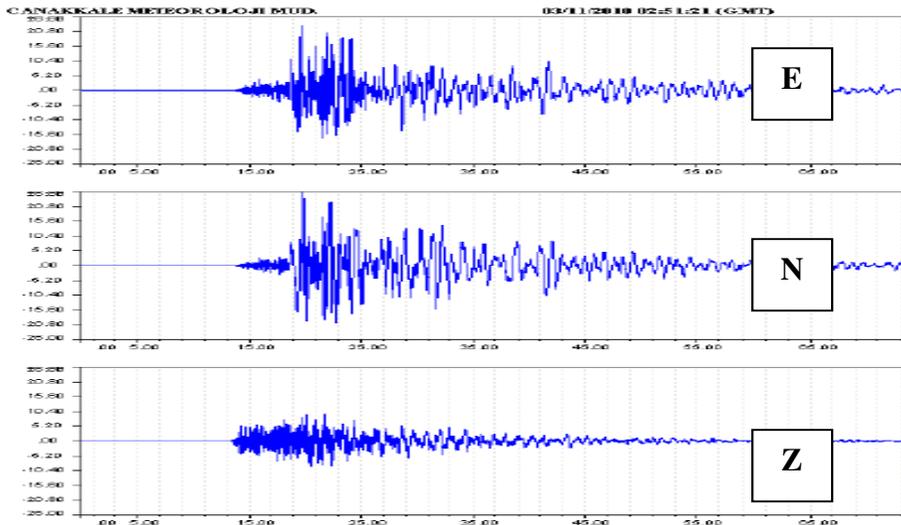
The approximate strength of the earthquake in Srbijii M5.4 and M5.3 Turkey indicates that it has created the same energy.

Serbie



Credit : RSZ Srbije

Turkey



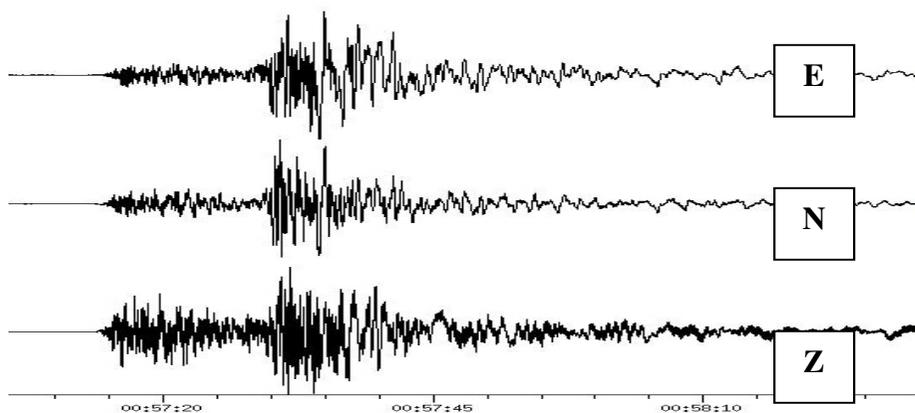
Diagrams 2.21a. i 2.21b

Na osnovu teorijskih osnova, Zemljotresi se mogu javiti samo na rasedima ili procepima koji su normalni na jednu od komponenti zamrznutog interplanetarnog polja koje nosi strujni mlaz. Strujni mlaz je izazvao dva jača i više slabih zemljotresa u toku jednog dana.

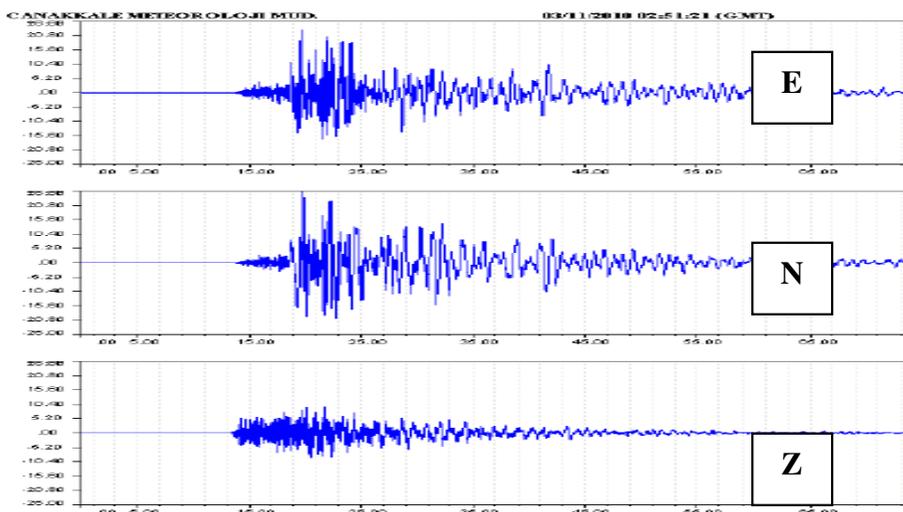
Približna jačina zemljotresa u Srbiji **M5.4** i Turskoj **M5.3** ukazuje da ih je stvorila ista energija.

Srbija

Credit : RSZ Srbije



Turska



Dijagrami 2.21a. i 2.2.b

Opening of the north Planetary magnetic door for the area of Europe began at about 22:00 on the 2nd of November 2010.

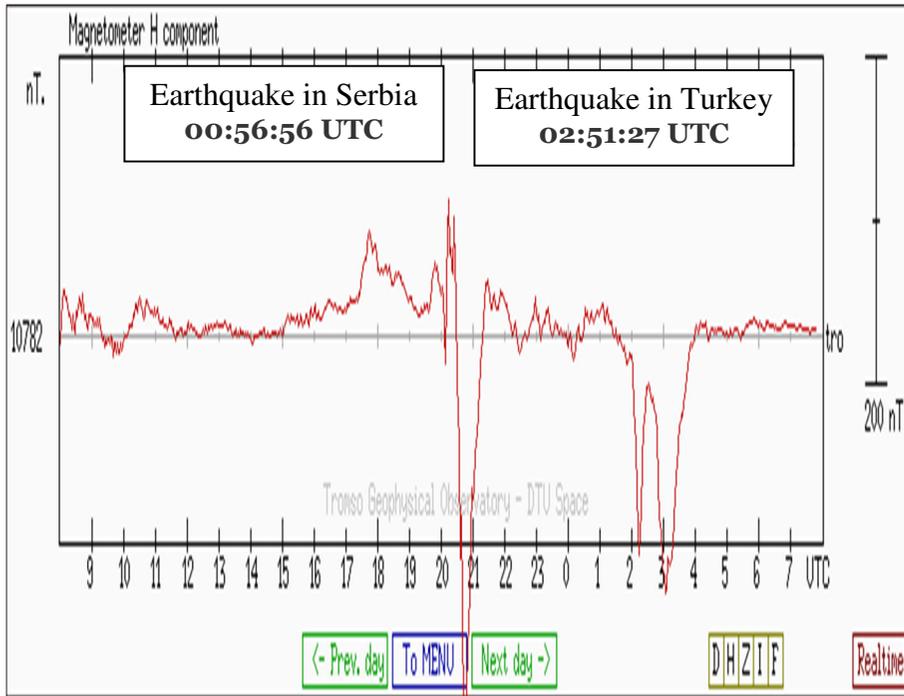


Diagram 2.23.

Telluric electric current was the trigger pulse earthquake in Serbia and Turkey. This is further evidence of the correlation between Turkey and Europe

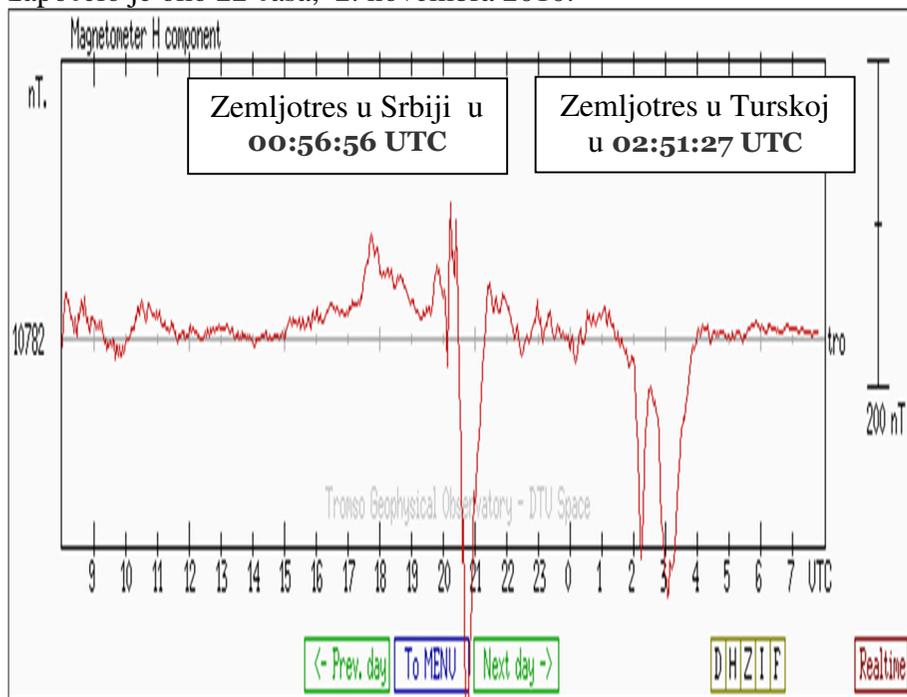
Conclusion

An earthquake is a national model that can be used to create a future earthquake forecasting. Prognostic parameters of European earthquakes proton induction are:

1. The arrival of the interplanetary magnetic field with a negative Z component;
2. The existence of electromagnetic Current Flow over Europe;
3. Increasing the flow of solar wind particles and
4. The penetration of particles in the northern hemisphere and the emergence of telluric currents in Europe.

These are all parameters that can be the basis for future forecasting the Heliocentric Electromagnetic Seismology.

Otvaranje severnih Planetarnih magnetnih vrata, za prostor Evrope, započelo je oko 22 časa, 2. novembra 2010.



Dijagram 2.23.

Telurska električna struja bila je trigger impuls zemljotresa u Srbiji i Turskoj. Ovo je još jedan dokaz o povezanosti Turske sa Evropom

Zaključak

Zemljotres u Srbiji predstavlja model koji se može koristiti za stvaranje buduće prognostike zemljotresa. Parametri prognostike protonskih indukcionih evropskih zemljotresa su:

1. Dolazak interplanetarnog magnetnog polja sa negativnom **Z** komponentom;
2. Postojanje strujnog polja iznad Evrope;
3. Povećanje protoka čestica Sunčevog vetra i
4. Prodor čestica na severnoj hemisferi i pojava telurskih struja u Evropi.

Sve su to parametri koji mogu biti osnova buduće prognostike u heliocentričnoj elektromagnetnoj seizmologiji.

2.14.1. Earthquakes in the deep

Earthquakes that occur at great depths are due to strong energy coming from the sun. The basic characteristics of these earthquakes is strong magnetic lines, which carry the heavy chemical elements. Magnetized magma has a great remenentnu induction. Bringing the magnetic induction at the level of coercive force is the second magnetic lines. The period from the moment of maximum magnećenja to the occurrence of earthquakes is very long.

2.14.2. Analysis of the earthquake in Spain 11th April 2010.

The Scientific analysis of the earthquake has to start from natural forces, as well as independent sources of information. The analysis should include processes on the Sun, inter-planetary space, the atmosphere and the Earth with a special focus on: a source of free electrical load, the magnetic structure of the interplanetary magnetic field, magnetic lines of energy balance, geomagnetic activity and the geographical position of the flow field in the atmosphere.

In seismology, there are two rules:

1. when there are strong ulterior electromagnetic energy has a strong earthquake;
2. when there is no strong ulterior electromagnetic energy does not appear strong earthquakes.

Image Sun 3rd April 2010.

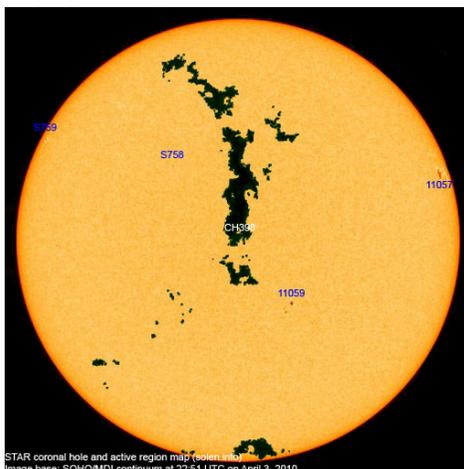


Fig. 2. 28.

Coronary hole CH 398 entered the geo-effective position 2 April and sent back to Earth the fastest solar wind in 2010. year.

2.14.1. Zemljotresi na velikim dubinama

Zemljotresi koji se javljaju na velikim dubinama posledica su snažnih energija koje dolaze sa Sunca. Prepoznaju se po magnetnim linijama, koje nose teške hemijske elemente. Namagnetisana magma ima veliku remanentnu indukciju. Dovođenje magnetne indukcije na nivo koercitivne sile vrši druga magnetna linija Period od trenutka maksimalnog magnećenja do pojave zemljotresa je dugo.

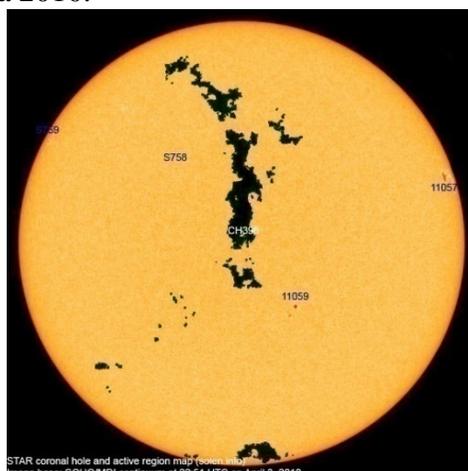
2.14.2 Analiza zemljotresa u Španiji 11. aprila 2010. godine

Naučna analiza zemljotresa mora početi od prirodne sile, kao nezavisnog izvora informacija. Analiza treba da obuhvati procese na Suncu, interplanetarnom prostoru, atmosferi i unutrašnjosti Zemlje sa posebnim osvrtom na: izvor slobodnih električnih opterećenja, magnetnu strukturu interplanetarnog magnetnog polja, energetske bilans magnetne linije, geomagnetsku aktivnost i geografsku poziciju strujnog polja u atmosferi.

U seizmologiji postoje dva pravila:

3. када постоји јака спољашња електромагнетна енергија, долази до јаких земљотреса;
4. када нема јаке спољне енергије нема ни јаких земљотреса.

Slika Sunca 3. aprila 2010.



Slika 2. 28.

Koronarna rupa CH 398 ušla je u geoefektivnu poziciju 2. aprila i uputila prema Zemlji najbrži Sunčev vetar u 2010. godini.

During April there were five lines of the interplanetary magnetic field

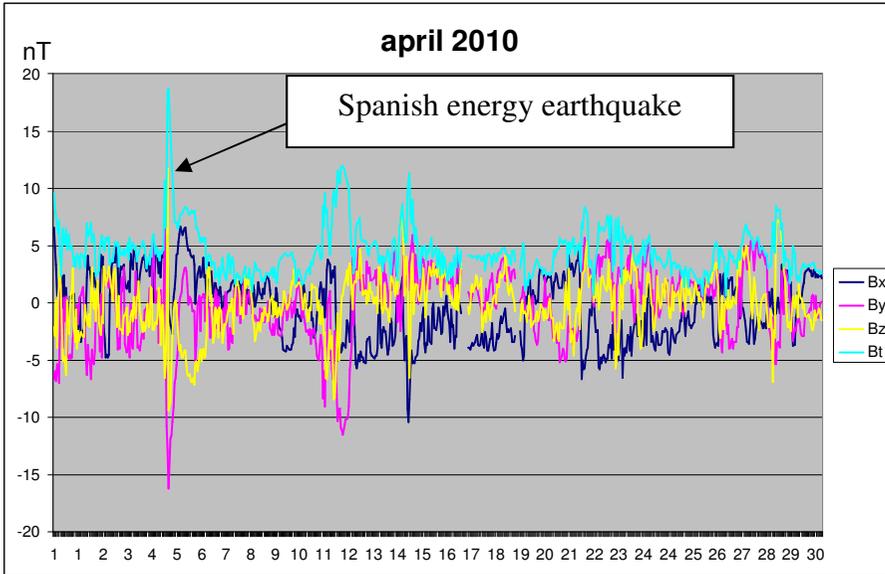


Diagram 2. 24.

Magnetic lines of 4 April was the strongest in April. Solar wind was carrying a large concentration of iron.

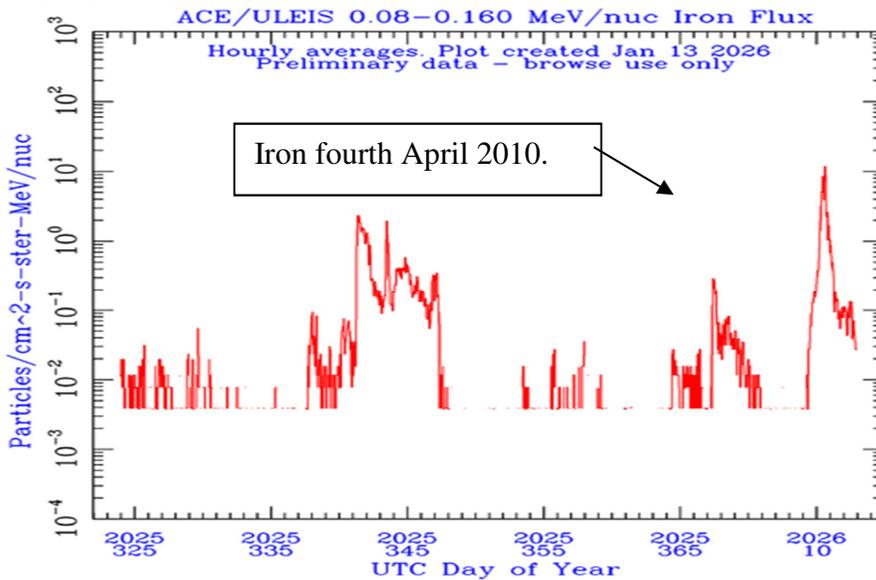
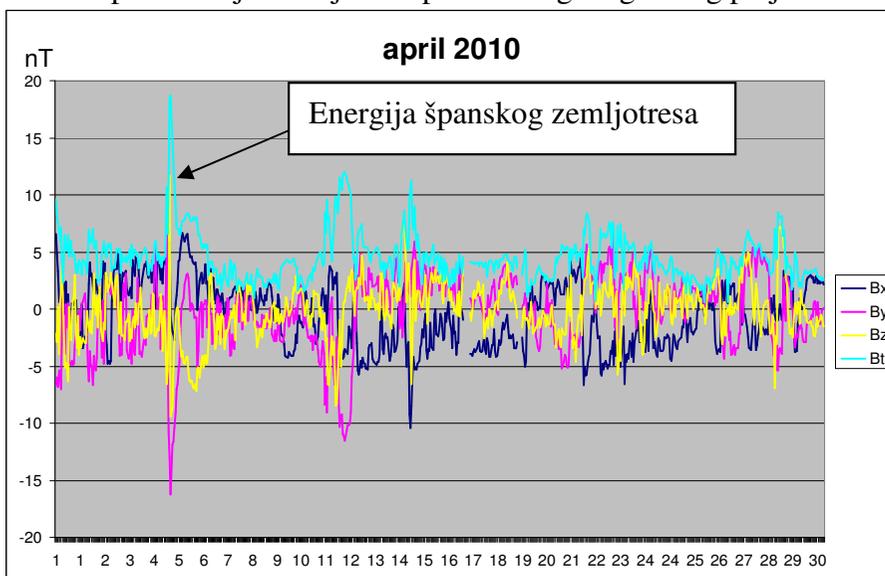


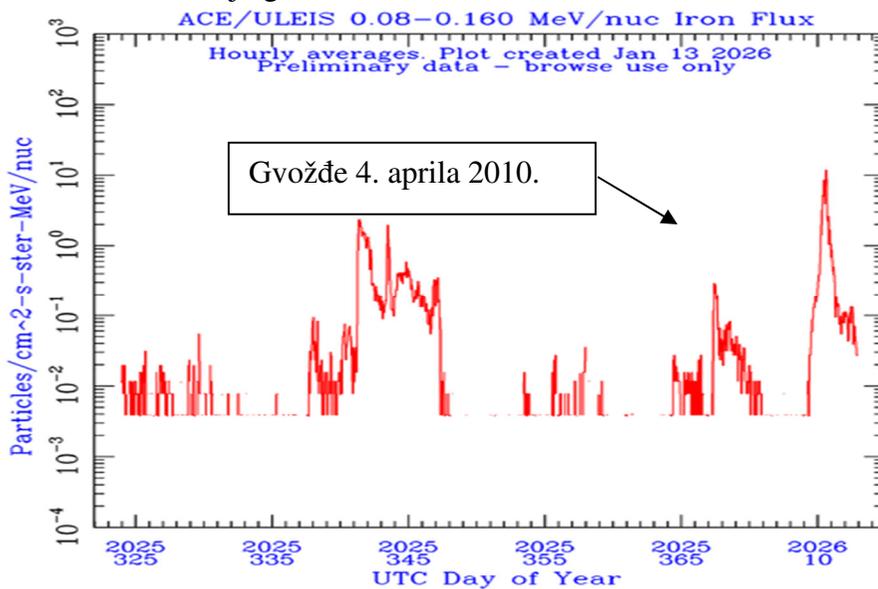
Diagram 2. 25.

U toku aprila bilo je 5 linija interplanetarnog magnetnog polja.



Dijagram 2. 24

Magnetna linija od 4. aprila bila najjača u aprilu. Sunčev vetar nosio veliku koncentraciju gvožđa.



Dijagram 2. 25.

Energy balance of magnetic lines of 4 April

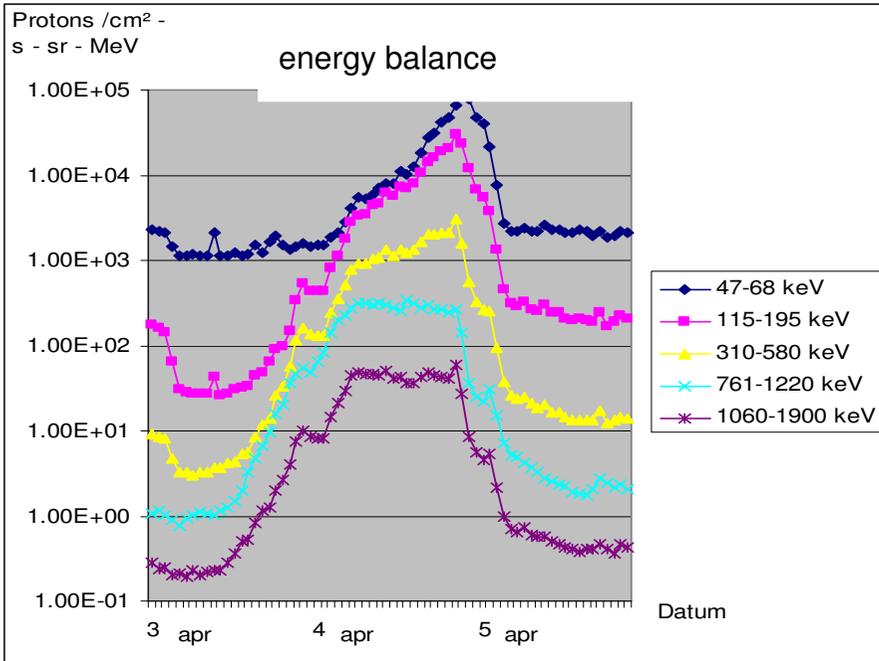


Diagram 2. 26

Speed solar wind particles reached 832 kilometers per second.

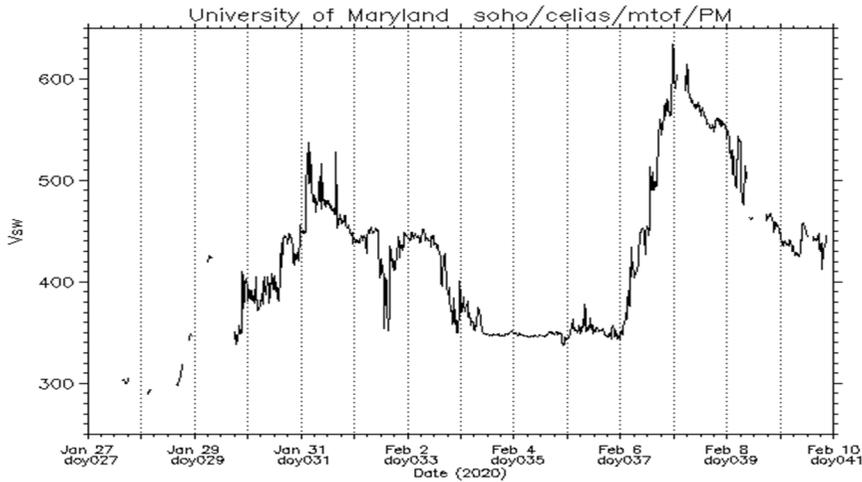
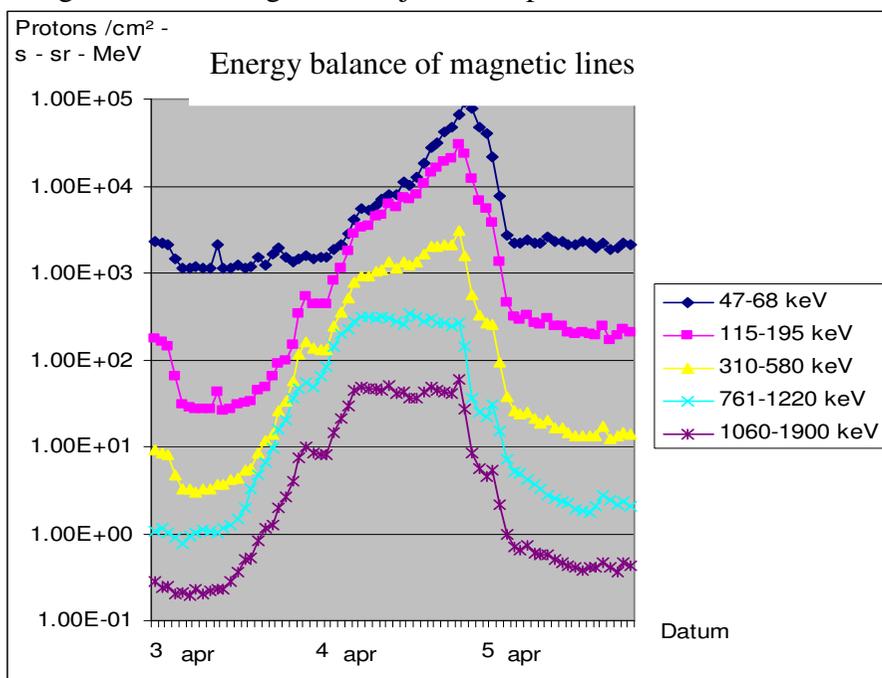


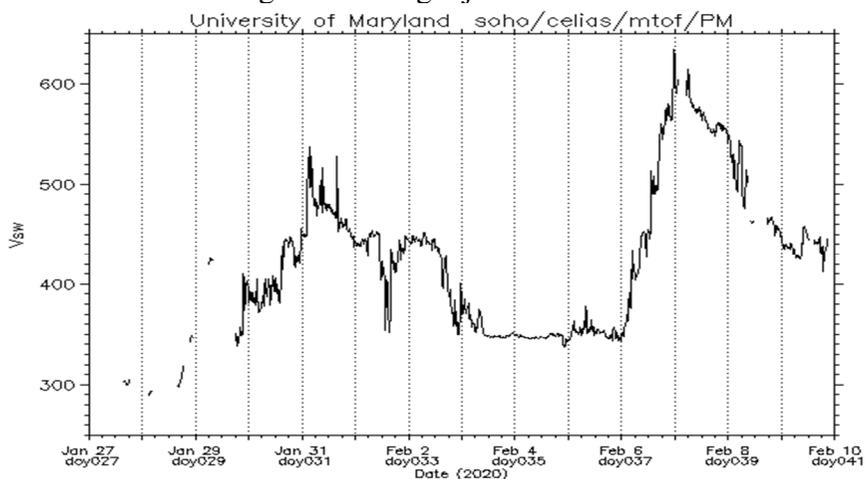
Diagram 2.27.

Energetski bilans magnetne linije od 4. aprila



Dijagram 2. 26.

Brzina čestica Sunčevog vetra dostigla je 832 kilometara u sekundi.



Dijagram 2.27.

Geomagnetic activity started on April 4. and reached a maximum value of the sixth April 2010. of 211 nT

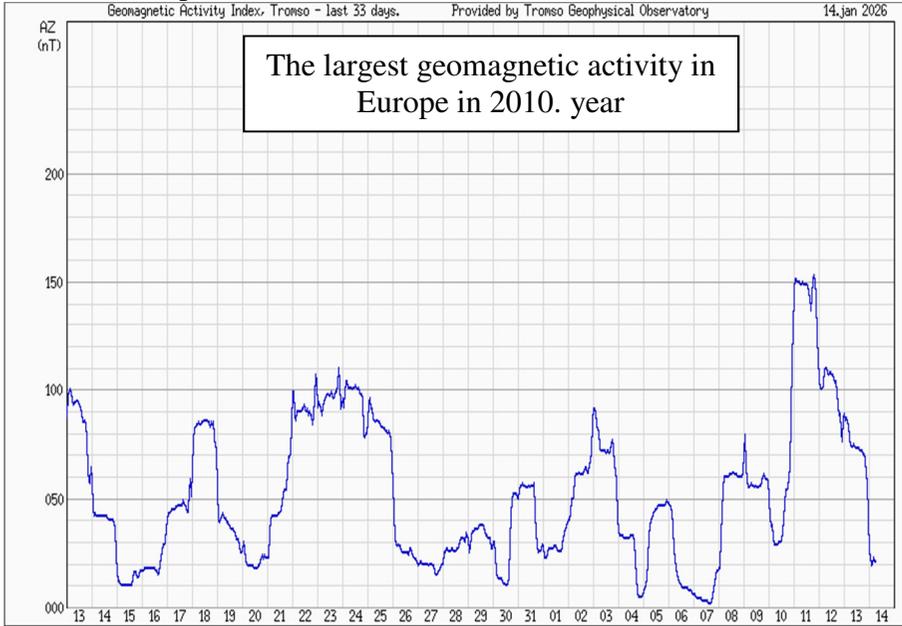


Diagram 2.28.

The induction of electric currents began on 4 April around 22:00 UTC.

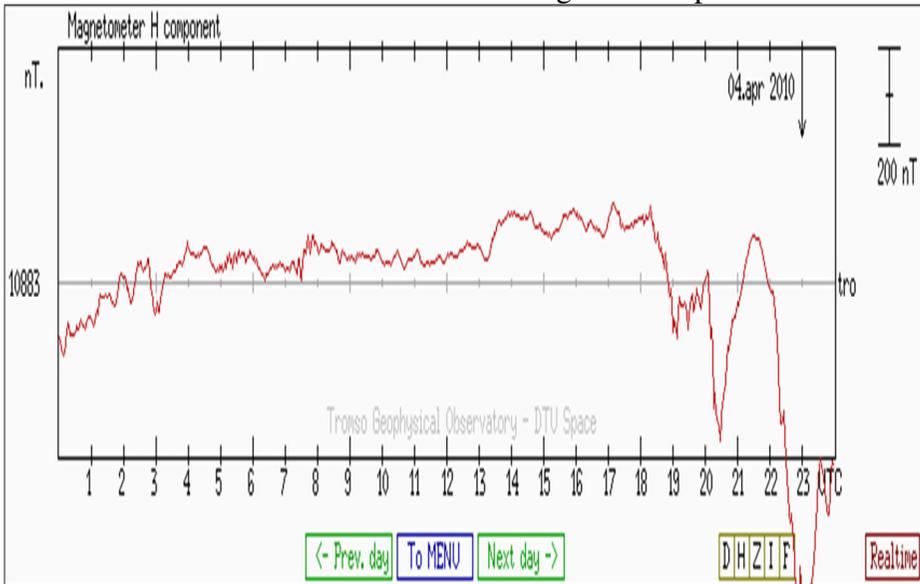


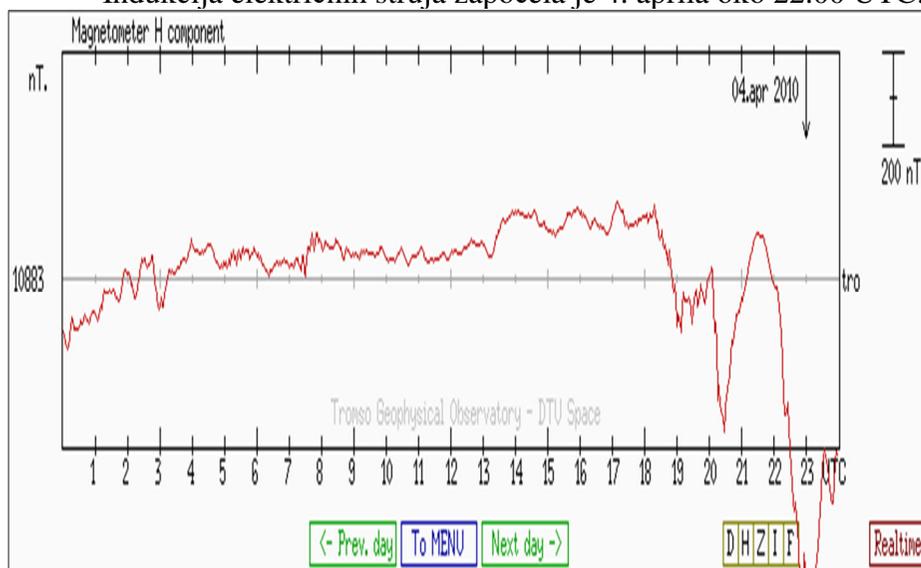
Diagram 2. 29.

Geomagnetska aktivnost započela je 4. aprila a dostigla je maksimalnu vrednost 6. aprila 2010. od 211 nT,



Dijagram 2.28.

Indukcija električnih struja započela je 4. aprila oko 22.00 UTC.



Dijagram 2. 29.

Until the emergence of strong electric currents occurred on 5 April.

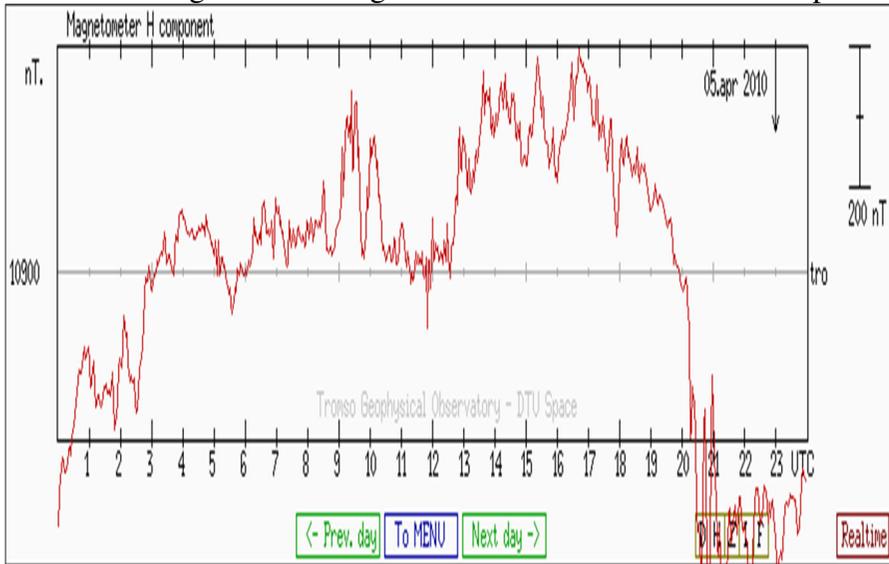


Diagram 2. 30.

Strong electrical currents continued to sixth April 2010.

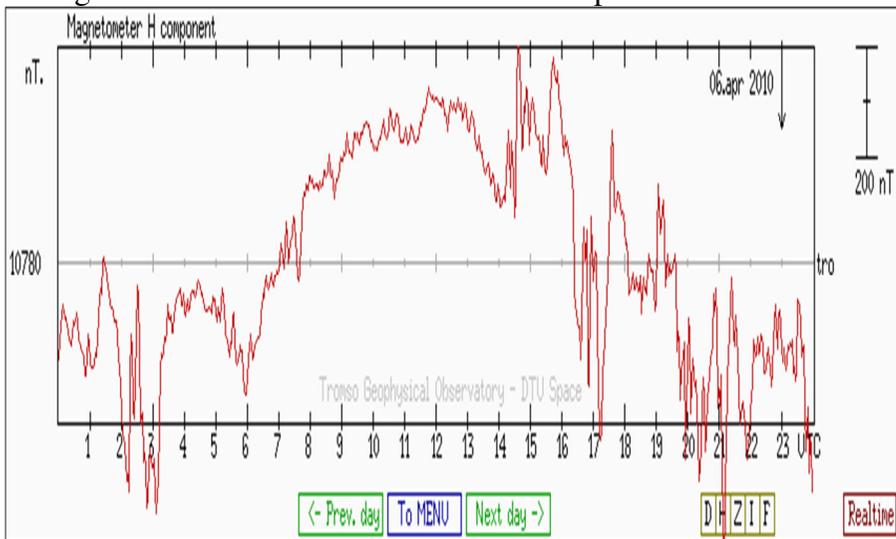
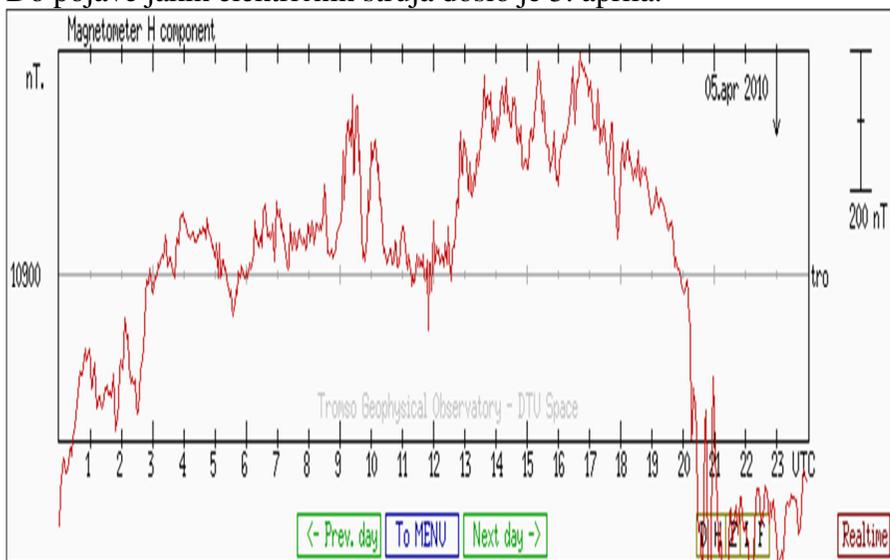


Diagram 2. 31.

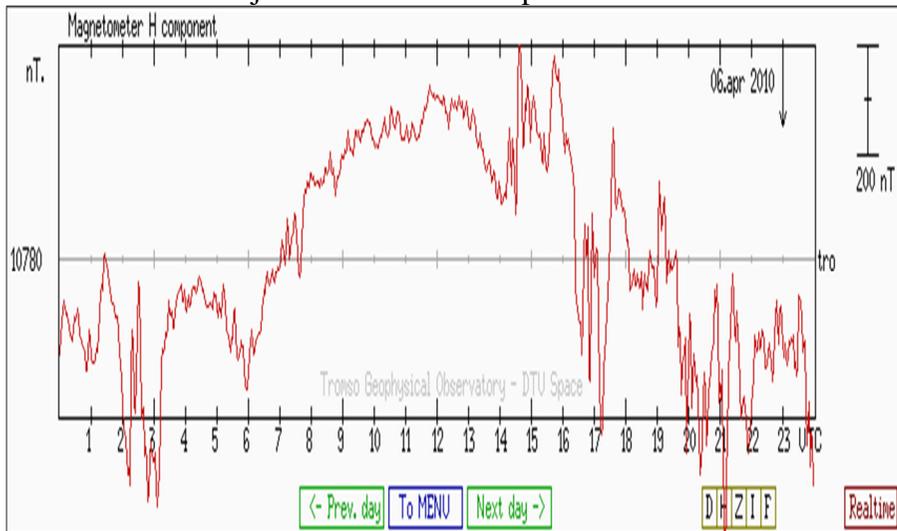
Shown above diagrams show that a large electromagnetic energy that has penetrated the areas of Europe.

Do pojave jakih električnih struja došlo je 5. aprila.



Dijagram 2. 30.

Jake električne struje nastavile su se 6. aprila 2010.



Dijagrami 2. 31.

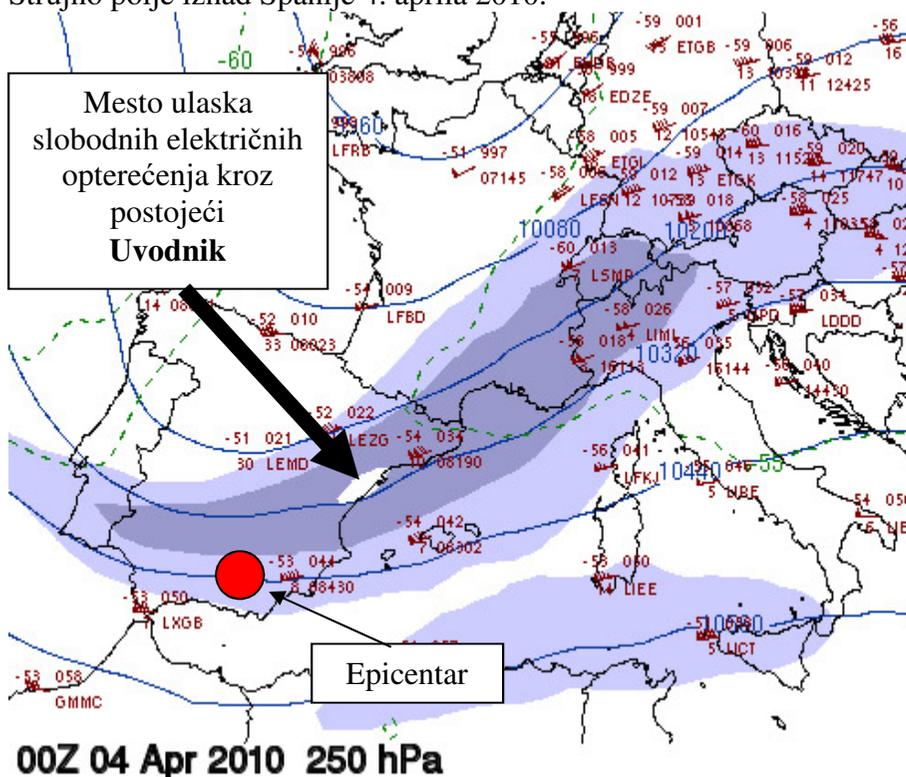
Gore prikazani dijagrami pokazuju da se radi o velikoj elektromagnetnoj energiji koja je prodrla na prostore Evrope.

2.14.3. Direktno magnećenje lokacije španskog zemljotresa.

Osnova direktnog magnećenja je postojanje strujnog polja iznad lokacije raseda ili procepa u trenutku dolaska magnetne linije interplanetarnog magnetnog polja.

Tipičan primer direktnog magnećenja je španski zemljotres. Prikaz 2.21.

Strujno polje iznad Španije 4. aprila 2010.



Karta 2. 151.

Epicentar nalazi se ispod strujnog polja što je uobičajeno kod većine snažnih zemljotresa. Slobodna električna opterećenja prodrli su u atmosferu 4. aprila preko postojećeg ulaznika. Tako su slobodna električna opterećenja bez gubitka električne i magnetne energije prodrli u strujno polje koje se već nalazilo iznad posmatrane lokacije.

Magnetic diagram Spanish earthquake of 11 April 2010.

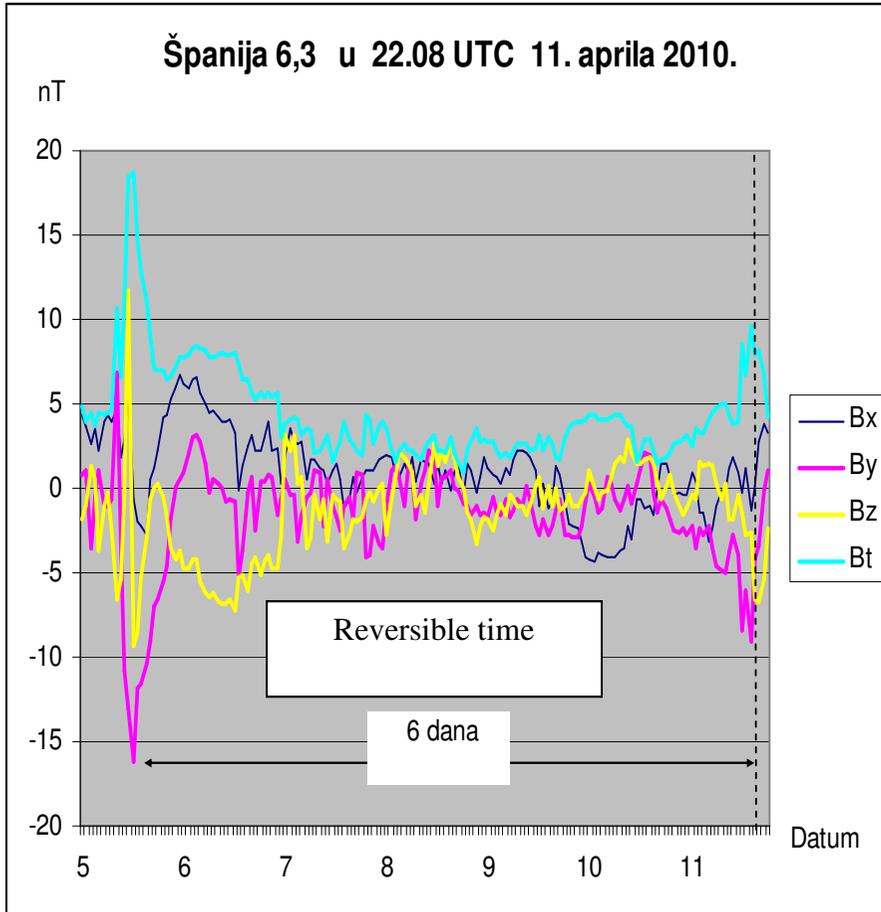
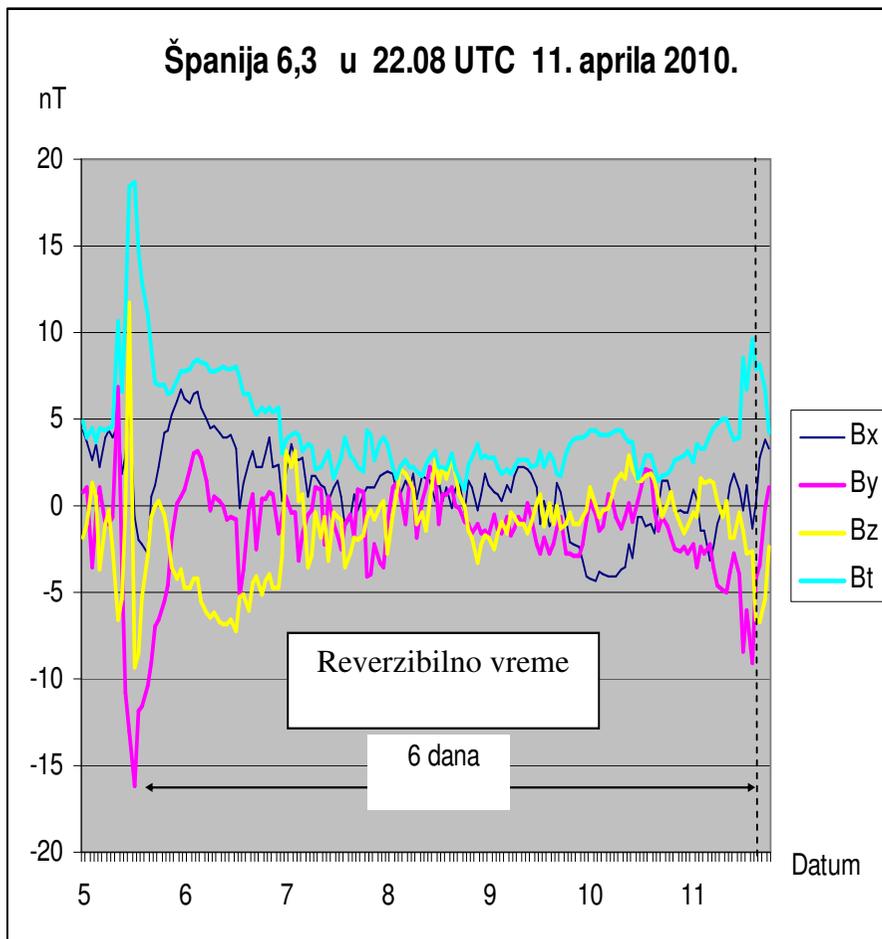


Diagram 2.32.

Magnetic diagram shows that the maximum protection was 5th Magnetization April about 12 hours by interplanatarnog magnetic field.

After reducing the intensity of the interplanetary magnetic field both sides of the gap act as two magnetic battery electrodes and retain the remanent induction at high level. In order to achieve complete reduction in magnetization and restore the previous state, a strong magnetic field was necessary, that is, coercitive field.

Magnetni dijagram španskog zemljotresa od 11. aprila 2010.



Dijagram 2.32

Magnetni dijagram pokazuje da je maksimalna magnećenost sredine bila 5. aprila oko 12 sati od strane interplanetarnog magnetnog polja.

Posle smanjenja jačine interplanetarnog magnetnog polja obe strane procepa ponašaju se kao dve elektrode magnetnog akumulatora i zadržavaju remanentnu indukciju na visokom nivou. Da bi došlo do razmagnećivanja i vraćanje na prethodno stanje bilo je potrebno snažno magnetno polje, odnosno koercitivno polje.

Decreased of Magnetization has committed a second interplanetary magnetic field, which arrived 11th April 2010. year. Therefore, the earthquake occurred just after 6 days of maximum Magnetization. Interplanetary magnetic field of 11 April is essentially a trigger pulse earthquake. The earthquake occurred at a depth of 623.4 kilometers.

For precise understanding of the entire electromagnetic processes are used telluric electric currents inside the Earth in Europe. On the basis of electric currents teluskih learn that the free electrical loads penetrated the atmosphere at 13:00 UTC. A strong magnetic storm began at 19.00UTC. Magnetic storm reached its maximum at 22:08 UTC.

Time of maximum magnetic storms and during an earthquake is the same, 22.08 UTC.

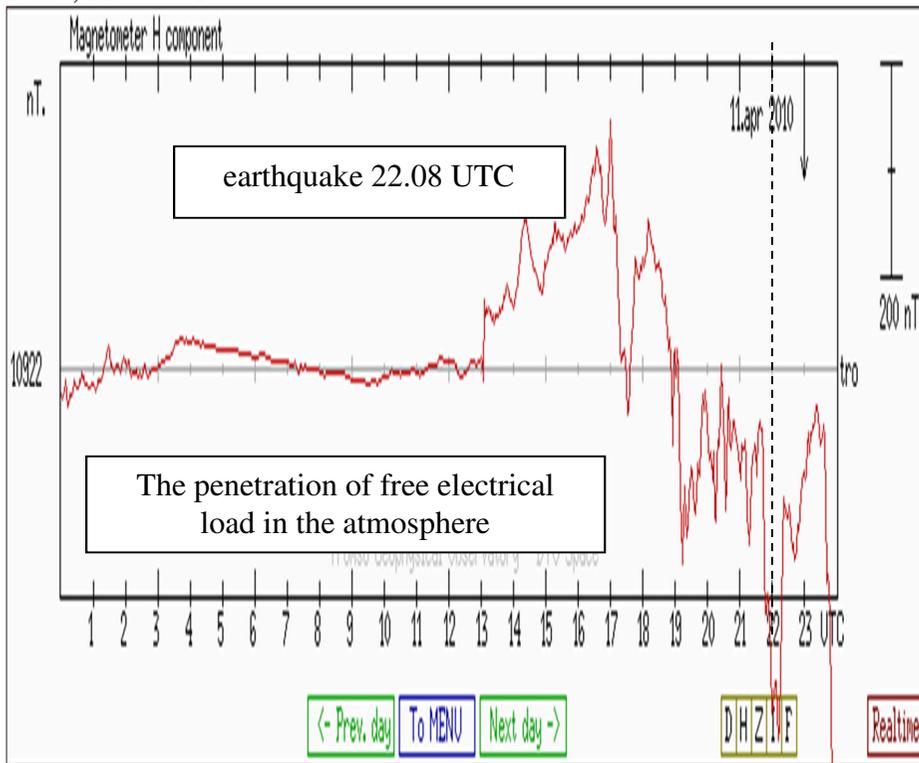


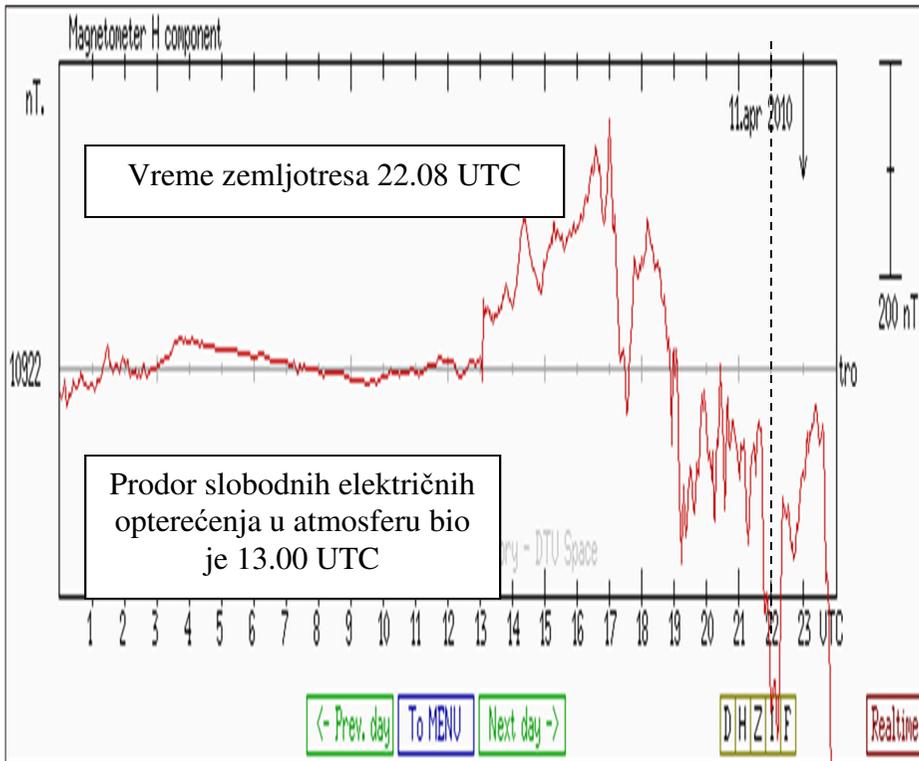
Diagram 2.33.

This is a typical example where the telluric current pulse trigger earthquakes.

Potpuno razmagnećivanje sredine izvršilo je drugo interplanetarno magnetno polje koje je stiglo 11. aprila 2010. godine. Zbog toga se zemljotres javio tek posle 6 dana od dana maksimalne magnecenosti sredine. Interplanetarno magnetno polje od 11. aprila je u suštini trigger impuls zemljotresa. Zemljotres se javio na dubini od 623,4 kilometara.

Za precizno sagledavanje celokupnog elektromagnetnog procesa koriste se telurske električne struje u unutrašnjosti Zemlje u Evropi. Na osnovu telurskih električnih struja saznajemo da su slobodna električna opterećenja prodrli u atmosferu u 13.00 UTC. Snažna magnetna bura je započela u 19.00UTC. Magnetna bura dostigla je maksimum u 22.08 UTC.

Vreme maksimuma magnetne bure i vreme zemljotresa je isto, 22.08 UTC.



Dijagram 2.33.

Ovo je tipičan primer kada je telurska struja trigger impuls zemljotresa.

2.14.4. Earthquake at great depth in the CELEBES SEA

The earthquake that occurred in the CELEBES SEA, at a depth of 524 kilometers, has similarities with the earthquake in Spain. Strong magnetic lines in February

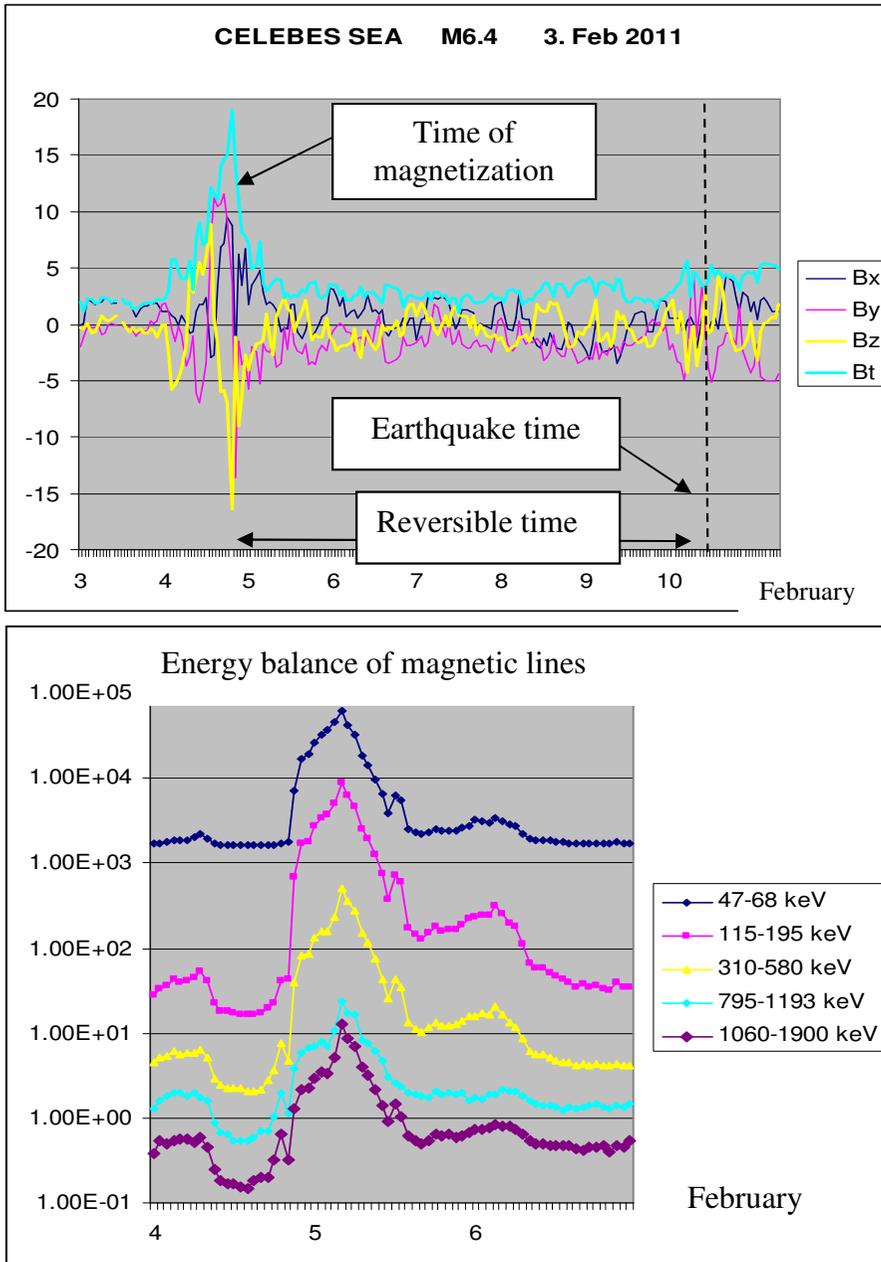
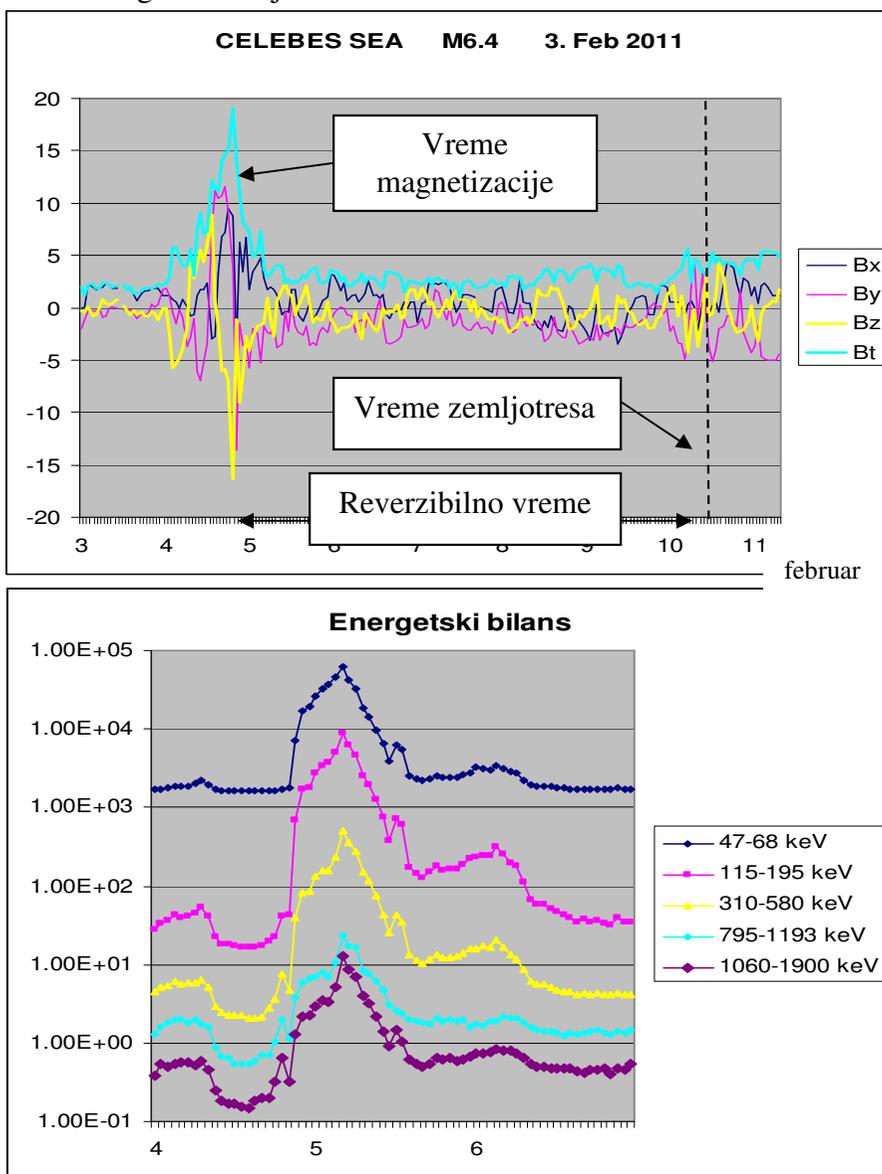


Diagram 2.34.

2.14.4. Zemljotres CELEBES SEA

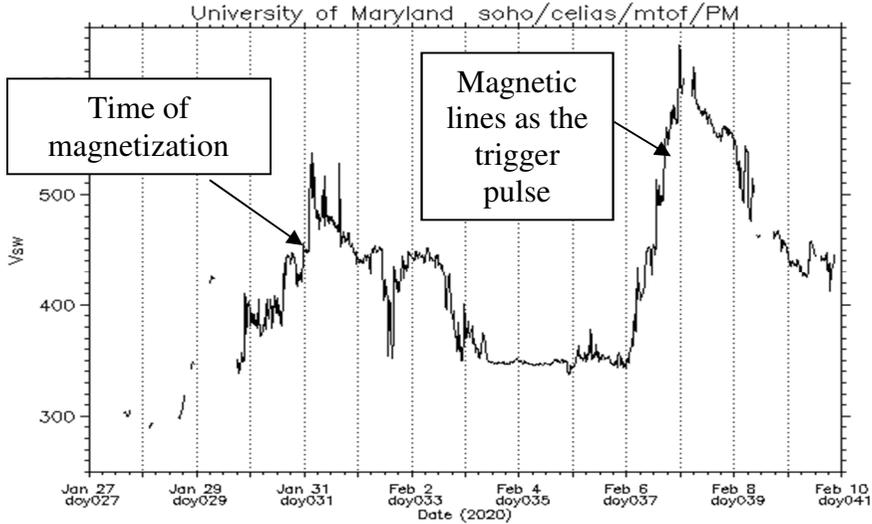
Zemljotres koji se dogodio u **CELEBES SEA**, na dubini 524 kilometra ima velike sličnosti sa zemljotresom u Španiji.

Snažna magnetna linija u februaru



Dijagram 2.34.

Speed solar wind particles reached 617 kilometers per second.



The first magnetic line of all earthquakes carry high concentration of iron.

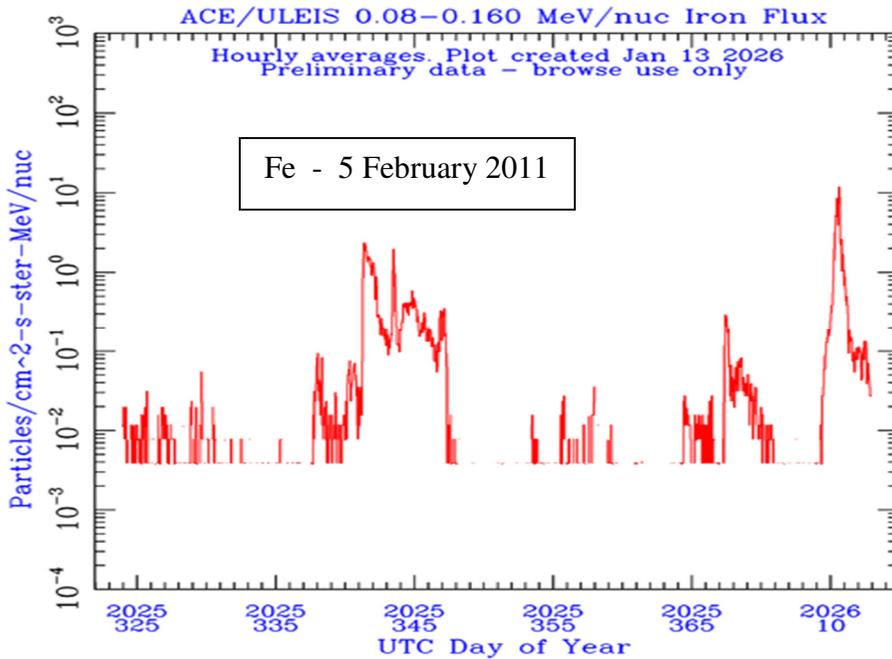
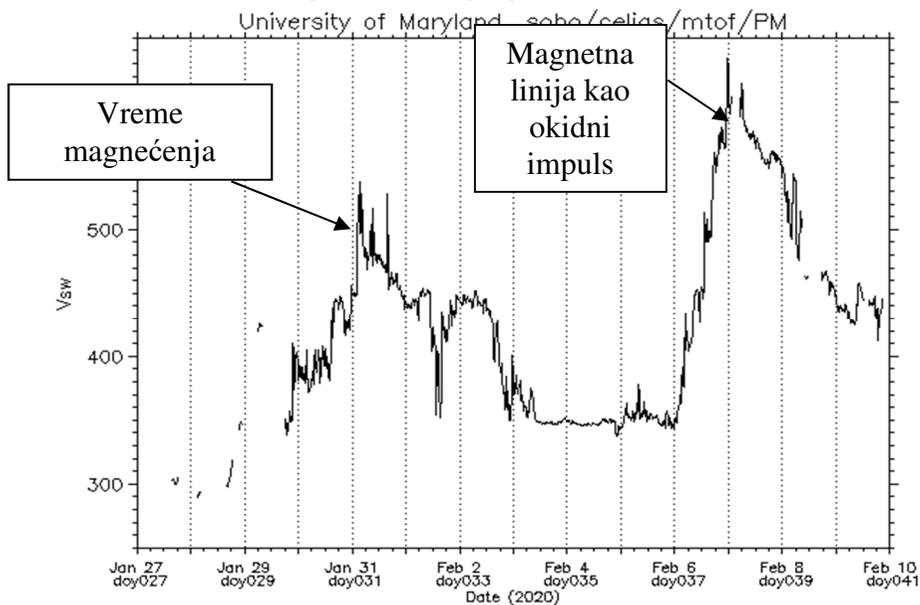
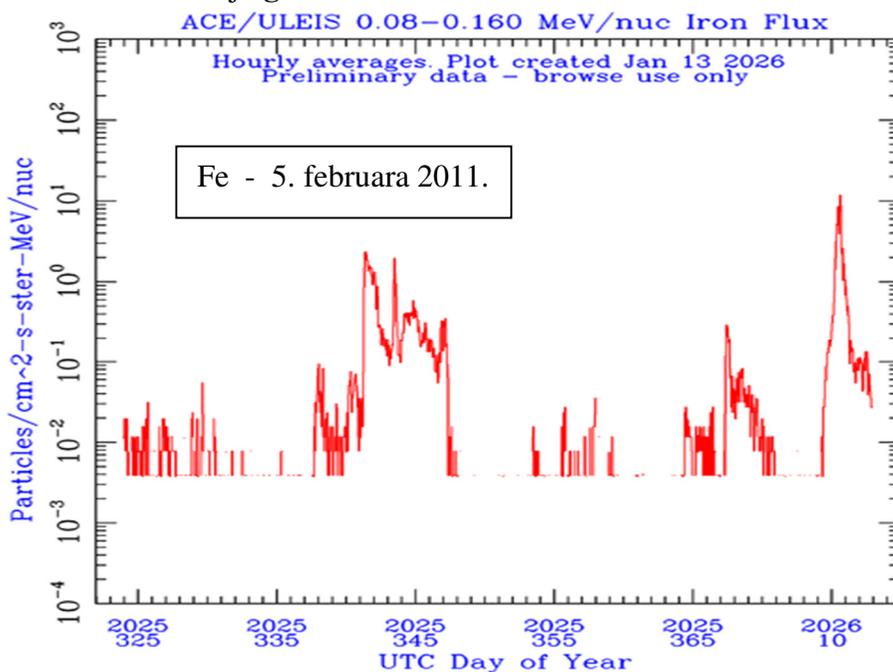


Diagram 2.35

Brzina čestica Sunčevog vetra dostigla je 617 kilometara u sekundi.



Prva magnetna linija kod svih zemljotresa na velikim dubinama nosi veliku koncentraciju **gvožđa**.



Dijagrami 2.35.

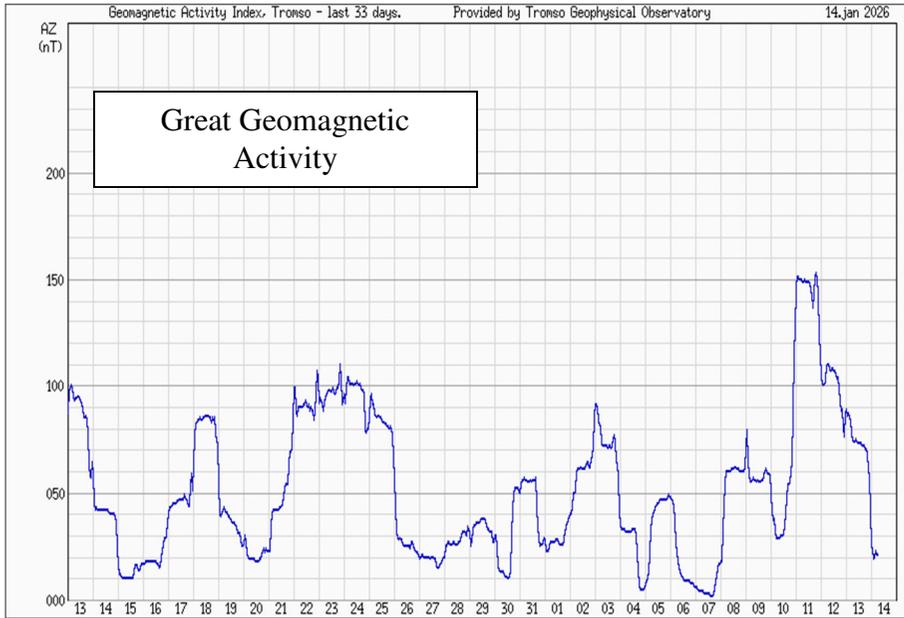


Diagram 2.36

Studies have shown that earthquakes at great depths have the longest Reverse time is about 5 days.

Epicenter	Magnitude	Depth in km	Date	Reverzibino time in days
CHINA	M6.9	573.8	18. feb 2010	5 days 2 hours
MOROGULF	M7.3	642.2	23. jul 2010	5 days 23 hours
FIJI	M7.3	585.1	9. nov 2009	5 days 4 hours
AFGHANISTAN	M6.2	205.6	29. okt 2009	4 days 5 hours
CELEBES SEA	M6.8	574.1	7. okt 2009	5 days 5 hours
KURIL	M7.3	507.2	17. nov 2003	5 days 1 hours

Table 2. 1.

In most earthquakes reversible time is about 3 to 4 days. However, a smaller number of earthquakes reversible time from several hours to 2 days.



Dijagram 2.36.

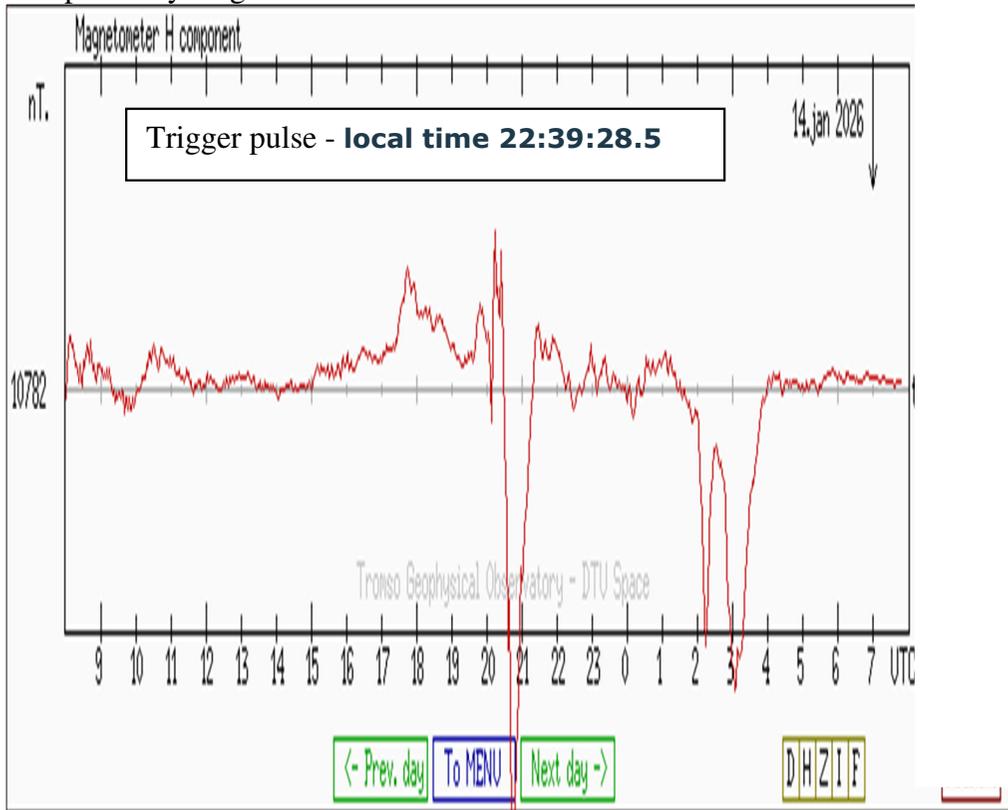
Istraživanja su pokazala da zemljotresi na velikim dubinama imaju najduže reverzibilno vreme koje je oko 5 dana.

Lokacija epicentra	Magnituda	Dubina u kilometrima	Datum	Reverzibilno vreme
CHINA	M6.9	573.8	18. feb 2010	5 dana 2 časa
MOROGULF	M7.3	642.2	23. jul 2010	5 dana 23 časa
FIJI	M7.3	585.1	9. novr 2009	5 dana 4 časa
AFGHANISTAN	M6.2	205.6	29. okt 2009	4 dana 5 časa
CELEBES SEA	M6.8	574.1	7 .okt 2009	5 dana 5 časa
KURIL	M7.3	507.2	17. nov 2003	5 dana 1 čas

Tabela 2.1

Kod većine zemljotresa reverzibilno vreme je oko 3 do 4 dana. Međutim, kod manjeg broja zemljotresa reverzibilno vreme je od nekoliko sati do 2 dana.

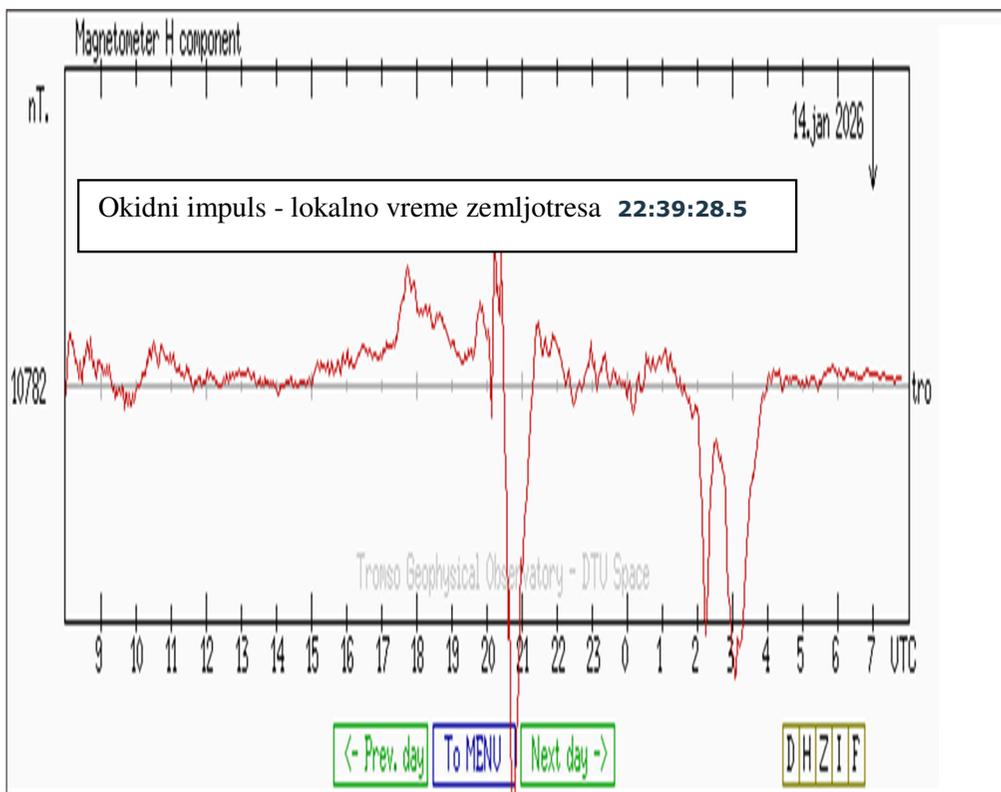
Trigger pulses of deep earthquakes is always the second line of the interplanetary magnetic field.



Diagrams 2. 37

Definition

An earthquake is caused by an external electromagnetic force discharging energy accumulated in the magnetic field of a fault or gap in the Earth's interior.



Dijagrami 2.37

Definicija

Zemljotres nastaje dejstvom spoljne elektromagnetske sile pražnjenjem energije akumulirane u magnetnom polju raseda ili procepa u unutrašnjosti Zemlje.

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