

Hypothesis

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*Hypothesis*

# New Earthquake Theory: Abrupt Electromagnetic Wave Release via Crust Break

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**Abstract:** Earthquake is thought to be due to plate tectonic movement. However, this theory has several fetal defects. First, sudden outset of earthquake in a certain point cannot be due to slow movement of large scale chronic continental drift. Second, plate movement theory cannot explain huge intraplate earthquakes. Third, plate movement cannot explain earthquake light, electromagnetic anomaly, and ionospheric anomalies accompanying earthquakes. Fourth, plate tectonic movement cannot explain the earthquakes on Mars, Venus, or Moon which don't have plate tectonic structures. Here, I propose that earthquakes are the abrupt release of electromagnetic radiation from the faults or troughs. Light is thought to be weak before the invention of laser. The earth structure is like a laser resonator. High temperature earth core can generate electromagnetic radiation. The emitted light from inner earth can touch the crust and reflect back and forth to enhance huge energy to accumulate for decades until it reaches a crust break to release out. This theory can explain why earthquakes likely happen in crust breaks like faults and troughs. This theory can explain huge intra-plate earthquakes. This mechanism can also explain earthquake light and ionosphere anomaly as well as EM field anomaly. It could lead successful earthquake predictions for the detrimental earthquakes to save people's lives.

**Keywords:** earthquake; light; electromagnetic wave

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## Main Texts

Professor Alfred Wegener proposed continental drift theory in 1912. He suggested that all the continents were joined together in old times and they separated by some unknown forces. In the beginning, his idea was thought to be absurd and was difficult to be accepted by people. However, further researches on ocean crust revealed that the ocean crust is actually expanding. This phenomenon happens in the mid-Atlantic ridge. Ocean crust is generated from the mid-Atlantic ridge and spread to both east and west side. We can find the symmetrical alternative geomagnetism reversal pattern in the two sides from mid-Atlantic ridge. The continental coasts of west Africa and east South America can match perfectly. In addition, fossils of the same species can be found in both South America and Africa. Thus, it suggested that South America and Africa was joined together in old era. Thus, continental drift theory was accepted, and then plate tectonics theory was developed to explain the happening of earthquakes and volcano eruptions. Plate tectonics theory says that earth crust can be divided into several "plates", and these "plates" crush each other to induce earthquakes. The plate crush movement is caused by ocean crust expansion and continental drift. Currently, it is a well-accepted theory for earthquake happening.

However, plate tectonics theory has several fetal defects. First of all, the sudden happening of earthquake in certain point should not be due to the slow process of continental drift. The continental drift is at a speed around 1cm per year. Thus, it only accumulates 30cm per 30 years. It is a very slow process and it cannot account for the huge energy release during a major earthquake. How can a 30cm plate movement per 30 year cause an energy release which is greater than 100x atom bomb energy? The slow continental drift cannot explain the sudden movement of rocks of plates during a major earthquake. In addition, plate tectonics movement or continental drift is a large scale

movement and it cannot be accounted for earthquake happening in a single point. Why won't earthquake happen in the whole line of plate boundary concurrently? Thus, plate tectonics theory cannot well explain the great force of earthquake.

Second, plate tectonics theory cannot explain intraplate earthquakes including the May 2008 Mw7.9 Wenchuan earthquake. There are some "hotspots" which have frequent earthquake. For example, Hawaii suffers from a lot of earthquakes per year. However, Hawaii is not located in the boundary of plates. In addition, there are several detrimental intraplate earthquakes. For example, the Sichuan earthquake currently is a huge intraplate earthquake. Plate tectonics theory cannot explain this. How can an earthquake happen when the location is not in the boundary of plates? Based on the plate tectonics theory, the intraplate earthquakes should be small or trivial. How can it cause such a huge and detrimental earthquake such as Sichuan, Tan-Shan, East America, or Myanmar-Thailand earthquakes?

Third, there are observations about seismic waves. In earthquake, there is longitudinal P wave and transverse S wave. During earthquake, we can experience a first upward-downward movement (P wave) then a rightward-leftward movement (S wave). If plate tectonic theory is correct, there should a first horizontal force by plate crushing. Only when earthquake is transferred from underground to ground, we can experience upward-downward shaking first.

Fourth, plate movement cannot explain earthquake light, electromagnetic anomaly, and ionospheric anomalies accompanying earthquakes [1-8]. These phenomena have been profoundly observed during the earthquakes. And, plate movement theory cannot explain why these phenomena are related to the happening of earthquake. In addition, these phenomena are greater if the earthquake is greater. The plate tectonic theory cannot well explain the possible dose-response relationship. Fifth, plate tectonic movement cannot explain the earthquakes on Mars, Venus, or Moon which don't have plate tectonic structures. A successful earthquake theory should explain the phenomena of quakes in other planets or satellites universally. If there are no plate tectonic structures on these planets or satellites, how can we accept this theory is the true mechanism of earthquake happening on earth?

Here, we propose a new mechanism for earthquake. Earthquake is actually a radiation release from the inside earth. Radiation energy acting on faults causes earthquake. Radiation energy is important in our earth. The earth core and mantle has an estimated temperature around 4000 to 5000 absolute temperature. Radiation needs to be released from inside earth to outside space because it needs to diffuse out to outer space to gain maximal entropy. We can view these heat particles are photons with momentum, and they will collide each other to expel each other to diffuse out. The formula for Stefan-Boltzmann's law is:

$$\text{Power}=\sigma AT^4 (A=4\pi R^2)$$

The unit of radiation power is joule per second. Earth is covered by crusts to prevent radiation release. It means that radiation will reflex if it touches the inside crust. Thus, it means that in every second, radiation energy is accumulating when radiation is not released to outside space. After 30 years, we can see huge amount of radiation energy achieves. Because the earth core and mantle have very high temperature, we can see that the accumulated radiation energy can cause very detrimental effect. Normally, the radiation energy of inside earth is under the suppression of outer earth crust. After accumulation for decades, the accumulated radiation becomes greater and greater and it finally needs to be released.

It is also possible that the radiation is released from mantle with average temperature 1000K. We assume the radiation is from a 1meter\*1meter area in mantle. When it is emitted and touched the inner side of crust, it will go back and accumulate. However, when it reflected back, it may change its direction a little bit. After 30 years, the group of reflected radiation beam can have a lot of energy. If it finds a direction (with a refraction angle) which can emit out from the crust fissure and hole. Then, the radiation can be released out and cause earthquake. Light energy can do mechanical work via the concept of mechanical equivalent of heat.

Light beam is thought as a weak force before the invention of laser. Now, laser can be used as a surgical knife or even a weapon to destroy missiles. The generation of laser needs to have a laser resonator to let the light beams to go back and forth to accumulate their intensity. After several rounds of intensity accumulation, laser beam will be released out with great force. Our inner earth is like a natural laser resonator. The electromagnetic radiation emitted from earth core will touch the inner side of earth crust to reflect and to go back and forth. These light beams may change the angle a little bit. Finally, the light beams with huge power can meet a crust break like trough or fault to release out. Thus, earthquake is likely to be induced by a natural laser which has great impact to shake the earth crust.

Frequently, the radiation is released from crust fissures and holes. Earth crust fissures include mid-Atlantic ridge and peri-Pacific troughs. Crust holes are the hot spots such as Hawaii. Molten lava from mantle also can be released from these fissures and holes. That is why "Pacific ring of fire" (peri-Pacific troughs) is both for volcano eruptions and earthquakes. That is why the Hawaii "Hotspot" is both for volcano eruptions and earthquakes. Radiation theory can explain why volcano happens in the same places as earthquake happens. When the radiation is released from inside earth and is passing through the earth crust, radiation energy can cause physical movement of faults of crust. When radiation pushes the crust to move upward, then the crust can move downward to return due to gravity. However, another radiation flush pushes the crust to move upward again. The back and forth phenomenon causes the shock wave. Then, earthquake happens and seismic wave occurs.

The new theory can explain intraplate earthquakes. If there is fault in the earth crust, there is possibility that radiation pressure can be released via these faults. They are naturally gaps which allow radiation pressure to pass through. Thus, it can explain why some intraplate earthquakes are also very huge and detrimental. For examples, Sichuan or Tangshan earthquakes are both huge and detrimental intraplate earthquakes. Plate tectonic theory cannot well explain this.

We can see similar effect on the quakes of the other planets of our solar system. Quakes can also be recorded in Venus, Mars, and Moon. There is no tectonic plate on Mars, Moon or Venus. There are only volcanos which can be the crust holes for radiation release. If there is no plate on Mars, Venus or Moon, how can we use plate tectonic theory to explain their quakes?

During 1950-1965, there was a strong earthquake period with seven times larger than scale 8.5 earthquakes happening in the world. Then, there was a relative peaceful period for 40 years. In 2004 South Asia earthquake, another strong earthquake period began. There are five larger than scale 8.5 earthquakes happened after 2004. In addition, an active volcano eruption period also started after 2000. The concurrent active earthquake and volcano period suggested that the radiation energy inside earth has been accumulated exceeding its limit and needs to be released out. Plate tectonic theory cannot explain this phenomenon.

In this new theory, we can also explain many earthquake phenomenon which cannot be explained by traditional plate tectonics theory. Earthquake light before or during earthquake is an important phenomenon related to earthquake happening [1-4]. For example, many people observed white to blue light shining in the sky for all night during the Peru earthquake. Plate tectonics theory says that it is caused by suddenly transformation of rocks into a semi-conductor (p-hole) like substance. Thus, rocks can emit light. This mechanism explained by plate tectonics theory is very strange and cannot be accepted. Rocks are electrically neutral and are simply mass not charge. Even the rock mass is accelerated, it cannot emit electromagnetic radiation based on fundamental Maxwell's classical electromagnetism. Why can an earthquake transform rocks into semi-conductors? Another explanation is there is piezoelectricity effect of quartz crystals during earthquake. Compression of quartz can induce electric dipole moment. However, the arrangement of quartz is in random in rocks. Thus, the net electric dipole moment should be canceling each other out if there is earthquake induced compression. Besides, piezoelectricity effect is supposed to happen inside the crust. How can it cause the sky to shine with earthquake light? The second explanation is also wrong. In addition, radio disturbance and ionosphere anomaly are usually observed during or before earthquake happening [5-12]. Electromagnetism field anomaly or infrared light anomaly is also

observed by satellite or other instruments during a major earthquake [13–20]. Some researchers also noted some changes of animal behaviors. If the earthquake is the release of radiation pressure, we can easily explain visible earthquake light, radio disturbance, EMW/ionosphere anomaly, and infrared light anomaly. Animal behavior change may be due to that some animals can detect the change of radiation wave [21].

In majority of earthquake observations, infrared light and radio frequency disturbance are frequently seen before earthquake. However, UV abnormal signals are seldom seen. We will deduct the reason here. When a radiation beam is emitted from earth mantle or inner core to outside space, it must suffer from a phenomenon called refraction. It is like light is emitted from water to air. Because the radiation energy is accumulated, it is not going straight from the mantle just below the crust fissure or hole. There is a refraction angle. The refraction index is:

$$\text{Snell's law: } N=C/v$$

(C: light speed in air or vacuum; v: light speed in medium such as mantle)

During the refraction, there is a physical phenomenon called dispersion. That is different wave lengths have different refraction indices. Red light which has longer wavelength has less refraction indices; blue light which has shorter wavelength has larger refraction indices. According to the above formula, red light has smaller N and faster v. (lightspeed C is constant). Thus, it means that radiation with longer wavelength transmit faster in the medium such as earth mantle. We assume that the radiations from earth compose a wide spectrum of radiation wavelengths since the radiation substances inside earth is complicated and varied. Thus, radiations with longer wavelength will be released out from inner earth faster. That is why infrared or radio signal which have longer wavelengths are seen before the main phase of earthquakes. This situation is important for earthquake prediction. Because radiations with shorter wavelengths are associated with higher energy, the short wavelength radiations are more possible to cause earthquake detrimental effects. ( $E=hf$ ). However, it radiations with longer wavelengths and smaller energy are emitted out faster, we can use them as warning signals. Besides, we might expect to see a radiation spectrum change during earthquake. It should be infrared signal first, then visible light such as earthquake light, and finally UV spectrum light. This serial change of radiation spectrum can also help us for earthquake prediction. A recent review study pointed out there is really EM frequency increase pattern before earthquakes [22].

Based on the cause-effect relationship, we can examine the following criteria for the link of earthquake and EM radiation [23–25]. First of all, we check the strength association. Stronger earthquakes are accompanied by strong EM radiation signals and more intense ionospheric anomalies. Second, we look at the consistency. All measured earthquakes can be detected the release of EM radiation. Third, we can see the temporality. Infrared light anomalies and earthquake light are detected before or during the onset of earthquakes. Fourth, we examine the plausibility. That earthquake caused by the release of electromagnetic radiation energy is more plausible than the current plate tectonic theory. There is no driving force for such an abrupt and vigorous movement in a single point for the current plate tectonic theory. Some say that tectonic plate movement is driven by mantle convection. However, how can this slowly and continuously creeping heat motion cause an abrupt and vigorous signal point disaster? Based on the Unruh-Hawking equation, heat radiation can be mutually transformed into acceleration. You may argue the heat radiation could be from the crust acceleration. However, the truth is the opposite. The heat radiation from the inside earth was transformed into crust acceleration during earthquakes. There is no plausible reason and driving force for the abrupt happened crust acceleration based on plate tectonic theory. Tectonic plates always move continuously and slowly, and we can find out the temporal association between the plate movement and the occurrence of earthquakes. In addition, there is a lack of strength association. We never observe, detect, or confirm that a more vigorous plate movement has a direct link to a more detrimental earthquake. Plate tectonics theory also has a defect in the consistency. In the detrimental and huge Sichuan earthquake, this earthquake didn't even happen in the boundary of plate-and-plate. How can plate tectonic movement cause such a huge earthquake? A->B is contradict with –

B<sup>A</sup>. We say A is plate movement and B is earthquake. If plate movement causes earthquake, then it is impossible to have no earthquake with plate movement happening concurrently. However, plate movement is a continuous process and earthquake is not happened every day. Thus, plate-earthquake theory is wrong.

## Conclusions

In summary, we think this new earthquake theory is the actual mechanism of earthquake happening. Plate tectonics theory fails to help to do earthquake prediction. This new theory can shed a light for earthquake prediction. If we can monitor or detect radiation anomaly (earthquake light, radio disturbance, EMW anomaly, infrared light anomaly) before earthquake, we might be able to know when and where the earthquake will happen. Earthquake can be very huge and detrimental. Around 100 thousand people might be killed in current Sichuan earthquake. Current continental drift/plate tectonics theory is wrong, and this wrong theory prevents us from doing earthquake prediction. This new hypothesis will need to be advocated to the whole world to let geoscientists to develop new instruments and technologies for possible successful earthquake prediction. We sincerely hope this new theory can be helpful in earthquake prediction to avoid huge amount of human life loss.

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