time period and for $M_w \geq 6.0$ the probability is 42%. Moreover for the time period of 50-years and for the corresponding magnitudes the probabilities are 97% and 74%, respectively.

Earthquakes - Volcanoes (Causes and Forecast)

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The earthquakes are caused by large quantities of liquids (e.g. H_2O, H_2S, SO_2, ect.) moving through lithosphere and pyrosphere (MOHO discontinuity) till they meet ledges (mountain roots or sinking lithospheric plate fronts). West of the ledges the pressure is great due to the differential movement of the crust and the pyrosphere, while east of the ledges sub-pressure prevails. The liquids are moved from West Eastward carried away by the pyrosphere because of differential speed of rotation of the pyrosphere by the lithosphere. With the concentration of liquids on the western side of a ledge, the pyrosphere is displaced and the liquids occupy this space up to its full capacity and then they reach the lowest part of the ledge. That is when their escape to the east begins. Because of the sub-pressure on the eastern side of the ledge, the movement of these liquids is accelerated, they vaporize and in the form of an explosion their whole mass passes through to the east of the ledge (BERNOULLI Principle). Several phenomena are caused at the moment of their escape such us powerful sound wave, the gasses are overheated because of the internal frictions and they are ionized, resulting to the creation of a powerful electric field that causes flashes in the atmosphere (discharges) over the specific area, sub-pressure in the area west of the ledge. The area where the aforementioned components were before is now occupied by a violent liquid mass of pyrosphere, which tends to follow the flow of the gasses. However, because it has a highest viscosity than them, it hits the ledge and causes the earthquake, cracks in the lithosphere and damages to the surface, mostly to the east of the epicenter. The power of an earthquake depends on the quantity of fluids, the capacity and the angle of the ledge. In case the earthquake takes place underneath the oceanic crust, the energy from the collision of the pyrosphere on the crust is conveyed to the sea water, causing the displacement of large bodies of water (TSUNAMI). In several cases, when a large quantity of fluids is concentrated west of a ledge, a few hours before the big earthquake small quantities of fluids escape causing small tremors (Foreshocks). When a powerful earthquake takes place west of a negative ledge (mountain root or lithospheric sinking front), this ledge partially breaks and many other small ledges are created, with angles that allow any quantity of fluid components that pass underneath them to cause a number of smaller earthquakes, due to their smaller capacity than the previous ledge (Aftershocks). With starting point an earthquake which was noticed at an area and from statistical studies, we know when, where and what rate an earthquake may be, which earthquake is caused by the same quantity of liquids, at the next east region. The forecast of an earthquake ceases to be valid if these components meet a crack in the lithosphere (e.g. limits of lithosphere plates) or a volcano crater. In this case the liquids come out into the atmosphere by the form of gasses carrying small quantities of lava with them (volcano explosion). In order to determine the epicenter, we use the most reliable preceding phenomenon, which is the rise of the crust's temperature that is spotted with a cone, its top being the hypocenter and its base center being the epicenter of the expected earthquake. Using a network of thermometers, we monitor the rise of temperature, which is easily detectable in the underground waters, especially a few days before the manifestation of an earthquake. Therefore we know precisely where a large quantity of fluids is trapped, the escape of which to the east will cause an earthquake. The combination of these two methods allows us to foresee an earthquake accurately. When a big earthquake takes place in an area, a part of the ledge breaks off and its angle is dulled, thus within a short period of time no other equal or bigger earthquake takes place in this area. The time necessary to restore this ledge (either by coagulation or by tectonic plate sinking, is statistically estimated. In certain places the oceanic crust is particularly thin and has many cavities. This is due mainly to the constant ruptures of the lithosphere, e.g. in the area of the "Bermuda triangle". When a big quantity of fluids is found under such a cavity, the phenomena described above take place. In this case however

Ψηφιακή Βιβλιοθήκη Θεόφραστος - Τμήμα Γεωλογίας. Α.Π.Θ.

no earthquake takes place, because the fluids and gasses escape to the east and a sub-pressure is created in this space, and at the same time the crust is thin and the pressure the overlying oceanic water exerts on it is big, so the crust breaks and the space the pyrosphere would occupy causing an earthquake, is now occupied by water. Over this area, we notice a momentary drop of the water level, a sub-pressure in the atmosphere and descending air currents. Also, the contact of water with the exposed pyrosphere causes some of it to vaporize and a thick fog is formed locally. The time span of these phenomena is small, because the contact of the water with the pyrosphere causes the crack of the crust to reconnect quickly and calmness is restored.

Spatial and temporal variations in the geochemistry of suspended particulate matter in the shallow deltaic embayment of Northern Thermaikos Gulf, Greece

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The chemical composition of Suspended Particulate Matter (SPM) in the northern Thermaikos Gulf was studied during a six month experiment, carried out from June 2004 to November 2004. Water samples were collected from three different depths (1 m bellow sea-surface, 10 m depth, 2 m above sea-bottom) and filtered to obtain SPM elemental and Particulate Organic Carbon (POC) concentrations. The geochemical properties of SPM were determined by thin-film X-ray Fluorescence spectrometry.

SPM and POC concentrations exhibited strong spatial and temporal variations, related to the different environmental characteristics such as river discharge, wind/wave-induced resuspension of bottom sediment, biological productivity and anthropogenic interference.

Correlation analysis showed that the elements Al, Si, Fe, Ti, K, Mg, V and Ba, have terrigenous origin, i.e. detrital aluminosilicates minerals. Chromium, Ni and Co are of natural origin; they are derived from Axios and Aliakmon watersheds as mafic and ultramafic detrital material. Sulphur, Zn and Cu are derived from partly treated domestic and industrial effluents. The vertical distribution of POC implies higher biological activity at the upper layer of the water column. A part of Ca represents the autocthonous biogenic fraction i.e. biogenic carbonates. Phosphorus is mainly in the form of organic phosphate.

Synthesizing carbonates with added value for industrial use from the former industrial waste applying methodology of CO_2 mineral sequestration

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The sequestration (liquidation) of CO_2 is defined as catching, deposition and storing of CO_2. Industrial CO_2 can be deposited in the exhausted oil and gas deposits, in unexploitable coal seams or in the aquifers. Different methodology is represented by the binding of CO_2 in minerals (rocks) by the methodology of mineral sequestration (carbonatization). The first group of methods is accompanied with the risks of CO_2 deliberation during transport and deposition of CO_2. Moreover, the storage sites must be located away of the seismo-active zones and expensive monitoring is necessary during hundreds of years.

Ψηφιακή Βιβλιοθήκη Θεόφραστος - Τμήμα Γεωλογίας. Α.Π.Θ.