These are preliminary results that are going to be further documented and reinterpreted by data collected in three more cross-sections in the areas of Ravanica, Kučevo and Despotovac.

The Gornjak area represents Serbian part of the larger Saska-Gornjak unit that is considered a part of the Getic nappe. It is mostly composed of Triassic and Jurassic limestone which provide abundant evidence of Alpine ductile and brittle deformation stages. Kilometer-scale folds have uniform geometry trending from north to south, which provide general trends of tectonics shortening during the oldest deformation stage. Ductile tectonic event in the Gornjak unit predominantly produced gentle to mostly open cylindrical and planar folds. Upright linear folds have almost gently plunged axis towards the N and NW.

Well developed fault planes, often with multiple striations were observed and later statistically analysed by direct inversion method, and to a lesser extent by NDA method (where applicable). The paleostress analysis is based on high quality data of 175 faults and striation datasets and they were processed in specialized software - Tectronics FP. Relative ages of these events were mainly indicated by superimposing fault surface kinematics indicators.

According to preliminary analysis, four main brittle deformation phases, composed of six unique kinematics events were determined. The oldest kinematic event (D_1) indicates predominant NW-SE compression. The shape of stress ellipsoid, orientation of σ_1, σ_2, σ_3 axes (sub-vertical σ_3 axes) and stress ratio R=0.9 suggest a stress regime close to radial compression. This stress regime resulted with formation of ductile structures with axes dipping gently to N-NE. The continuation of this tectonic phase in brittle deformation conditions caused mostly reverse movements along NE-SW to ENE-WSW fault systems. During the same tectonic phase, this compressional kinematics was followed by strike-slip kinematic events. The stress ellipsoid ratio indicates increasing intensity difference acting along maximal and medium stress directions. This change caused a transition from almost radial compression to strike-slip tension. During this tectonic phase NNW-SSE to NNE-SSW sinistral faults were activated. During D_2 phase an E-W compression was exerted. A stress ratio of R=0,3 implies a pure strike-slip regime. It probably resulted in activation of dextral movements along ENE-WSW to ESE-WNW striking fault systems. The D_3 tectonic phase started with pure strike-slip events having a NE-SW oriented maximal compression axis. This kinematic act gave rise to a NE-SW striking fault system. Initially sinistral-normal oblique-slip movements were slightly changed resulting in pure sinistral strike-slip movements along the same fault system. Changes of magnitude in minimal (σ_3) and medium (σ_2) main stress directions while retaining the maximal (σ_1) compression direction caused a change in stress regime to pure compression. The D_4 tectonic phase comprises of single kinematic event with maximal compression in N-S direction. Stress ratio and main stress axes orientations indicate a pure strike-slip regime resulting with activation of predominantly dextral movement along NNW-SSE to ENE-WSW striking fault systems.

Probabilities of earthquake occurrence in the Corinth Gulf and its vicinity inferred from combined information

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Earthquakes hazard probabilities were performed for the broader area of the gulf of Corinth. Related parameters, characteristic of the seismic history of the examined area, were obtained. The probabilities of strong and catastrophic earthquakes with magnitudes $M_w \geq 5.5$ and $M_w \geq 6.0$, within 20- and 50- year period were also determined. For this purpose the whole area is divided in cells $0.2^o X 0.1^o$. The obtained results show that there is a very dangerous zone (high probabilities), which starts from the city of Patras and ends to the gulf of Itea, where the estimated probabilities are either very high or high. The highest values observed in cell 39, where for 20-years period and for $M_w \geq 5.5$ the probability is 77%, while for the same 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