high uplift of Eastern Carpathians which occurred in the Late Miocene-Pliocene (about 4 km uplift and continues to the present day) and higher Upper Badenian-Pliocene sedimentation rates (recorded in the Eastern and Central parts of basin) combined with the Pliocene-Quaternary uplift of the Apuseni Mountains and the presence of the some strike-slip faults developed a pushing pressure of the Salt Formation toward the center and southwestern parts (salt sliding) of basin with the initiation of these reverse faults. Coevally with the Pliocene uplift of the South Carpathians (considerate as rigid fix block for the Miocene-Pliocene sediments of the Transylvanian Basin - after this uplift) were developed normal faults in the southern part of this basin, parallel to the orogen and evolution of the Cenade-Ruşi-Veseud reverse system faults don't stop, it is still activate.

Comparison of characteristic and Gutenberg–Richter models for time–dependent M≥6.0 earthquake hazard in the Corinth gulf, Greece

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Earthquake forecasts have always been a difficult task because they can be affected by uncertainty in terms of the most appropriate model and the involved parameter values. The application of two quite different models to the same seismogenic area was explored. The first belongs to the category of the renewal models, based on the characteristic earthquake hypothesis, the necessary ingredients of which being historical or paleoseismic recurrence times, and a fixed geometry for the faults. The hazard rate so obtained is then modified by the inclusion of a permanent effect due to the Coulomb static stress change caused by failure of neighbouring faults that occurred since the latest characteristic earthquake on the concerned fault. The second model consists of a very simple earthquake simulator, which can be described by parameters taken from two data input classes, fault slip rates and adoption of a Gutenberg–Richter magnitude–frequency distribution. This information is commonly available even if historical and paleoseismic recurrence data are lacking. The intention is to develop and assess a simulator that has a very limited parameter set, which has the benefit of reducing and quantifying uncertainty. We apply both methods along the Corinth gulf extension zone, a place that is rich with observations of strong–earthquake recurrence behaviour, to assess their relative forecast applicability. We find that use of slip rate as a primary constraint allows the simulator to replicate the pattern of observed segmented rupture rates along the Corinth seismogenic zones. As they evolve through time, our rupture simulations preferentially fill slip gaps, enabling estimates of time–dependent segment recurrence. We conclude that very simple earthquake rupture simulations based on empirical data and fundamental earthquake laws can be useful forecast tools.

Along arc geochemical variations in hydrothermal activity in the South Aegean Volcanic Arc: ancient and modern

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Submarine hydrothermal mineralization occurs in at least five locations in the South Aegean (Hellenic) Volcanic Arc; from west to east of Methana, Milos, Santorini, Kos and Nisseros/Yali. Manganese and iron enrichments in seawater and marine sediments are sensitive indicators of the presence of this hydrothermal activity and are sometimes the only

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obvious indication of it. Comparison of the Mn and Fe contents of hydrothermal waters from the five locations listed above show that those from the inner parts of the hydrothermal embayments of Santorini are more enriched in Mn and Fe than are those from almost all of the other hydrothermal locations studied, more than 400 ug/l Mn and 5000 ug/l Fe. Hydrothermal waters from the Santorini outer exhalative zone are much depleted in Mn and Fe (17 & 149 ug/l respectively) and fall within the range of values in hydrothermal waters found of Yali (4.5-28 ug/l Mn & 9-221ug/l Fe). Kephalos Bay, Kos contains hydrothermal waters averaging only 14 ug/l Fe while Mn there was beneath detection (0.5 ug/l). Milos offshore hydrothermal waters range from 21-522 ug /l Mn and 35-322 ug/l Fe, more similar to each other than at all of the other locations except Methana. Hydrothermal waters in Thiafi Bay, Methana, contain a relatively low 1-12 ug/l Mn & 7.5 -24.4 ug/l Fe. Fe/Mn ratios also vary in hydrothermal waters along the arc. Those from Santorini vary between 11 & 16 in the inner exhalative zones of the embayments, 8.7 in the outer exhalative zones (probably reflecting the selective precipitation of Fe over Mn with increasing distance from the vents), and 2.5 in the caldera. Off Yali, Fe/Mn ratios vary from 6-13. By contrast, of Milos and Methana they are much lower, varying from only 0.37 to 1.66 at the former and 2.4 at the latter. Clearly therefore, Mn is enriched relative to Fe in the hydrothermal waters of Milos and Methana compared with other hydrothermal locations along the arc. There are variable hydrothermal enrichments of other elements such as Zn, Cu and As along the arc too, highest of Santorini. Thus it appears to be an increase in hydrothermal inputs in waters from the ends of the arc towards the centre. Along arc comparisons of the composition of metalliferous sediments from near the hydrothermal vents is complicated by their variable detrital and volcaniclastic content. In order to eliminate this, all comparisons below are made on the basis of analysis of the sediment fine fraction in which the hydrothermal precipitates are concentrated. The greatest concentrations of Fe and Mn oxides in sediments along the arc occur at Santorini, where Fe/Mn ratios decrease away from the vents due to the selective precipitation of Fe relative to Mn. Lesser enrichments in both elements occur off Yali where the average Fe/Mn ratio falls within the range of that between the Santorini inner and outer exhalative zones. At Kos, Fe is less and Mn more than at Yali,while at Milos Fe is less and Mn mostly close to(with the exception of Mn in the Voudia Bay sediments) their Aegean Sea sediment average. This could be due both to the sub-surface precipitation of hydrothermal minerals and to the metal rich hydrothermal waters that emerge on the seafloor being dispersed over a wider area at Milos than at either Santorini and Yali due to the more topographically restricted settings of the latter relative to that of the former. Fe/Mn ratios in sediments of Milos are amongst the lowest encountered in the South Aegean Volcanic Arc, except at Voudia Bay, where the ratio is elevated principally due to very low Mn there. In Thiafi Bay, Methana, Mn varies from 578-1360 ppm and Fe from 5-8.6%. The former values are similar to those found in the Santorini exhalative zones and some locations at Milos, and the latter are between those occurring at Milos and Yali. There appears, therefore, to be no clear increase in Fe and Mn values in sediments from the ends of the arc towards its centre, although they are highest at Santorini. Much of the variation in the Fe/Mn ratio in the sediment fine fraction between the different hydrothermal locations along the arc can probably be attributed to where the waters from which the oxides precipitate lie in the Fe-Mn hydrothermal fractionation sequence. As far as the writers are aware, ancient hydrothermal mineral deposits have only been described from two of the South Aegean Volcanic Arc islands, Milos and Santorini. At Milos, there are several hydrothermal mineral deposits including the Vani manganese deposit. Santorini has a much more limited known fossil hydrothermal mineral assemblage, consisting of iron oxides and other minerals impregnating basement rocks in bands up to several cm thick at the base of the caldera wall near Thermia. The enrichment of Fe in the Santorini waters and sediments would be in keeping with the only known fossil hydrothermal mineral deposits there also being iron rich, suggesting that the Santorini hydrothermal system may be richer in Fe than those of the other islands. The large variability in the composition of the ancient hydrothermal deposits on Milos precludes detailed comparison with the hydrothermal waters and sediments there at the present time, but is a worthwhile subject for future research.

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