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Real-time monitoring of precursory phenomena in the Corinth Gulf, Greece

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In the Corinth Gulf, Central Greece, foreshock sequences occur as a rule within a time interval no longer than four months before the mainshock. If these precursory phenomena could be detected, then it would be utilized for the prediction of the mainshock. Of special importance to this goal are some particular properties of the foreshocks: the increase of their number with the inverse of time and the low b-value with respect to the background seismicity. However, frequent swarms also characterize the Gulf of Corinth. Therefore, in a real-time evaluation, the discrimination between swarms and foreshock sequences is of great significance. In this study we focus on establishing seismicity criteria to achieve such a discrimination. The different statistical properties of swarms and foreshock sequences in the Corinth Gulf make a good basis for the development of an algorithm towards the real-time discrimination between the two types of seismic activity. In particular, the b-value of the magnitude-frequency relation is significantly high in swarms (b Ż 1.2) with respect to that in background seismicity (b ∼1) which is higher than the b-value (Ń 1) in foreshocks. In addition, the total duration of a swarm usually exceeds that of the foreshock sequences while the number of events contained in a swarm as a rule is larger by a factor of 2 than that of foreshocks. On the other hand, the time distribution of the events in swarms do not follow the power-law as events do in foreshocks sequences. These criteria of discrimination provide possibilities for a probabilistic desicion making as regards the real-time identification of foreshock sequences. In this prospect we developed a computerized procedure for automatic updating of characteristic earthquake parameters in the Corinth Gulf. Values of the parameters are renewed daily by inserting data produced by the daily seismicity analysis utilizing the national seismograph system.