

Paper Number: 4828

**Foreshocks as a component of the seismic early warning**

Papadopoulos, G.A.<sup>1</sup>, Di Fiore, B.<sup>2</sup> and Minadakis, G.<sup>3</sup>

<sup>1</sup>Institute of Geodynamics, National Observatory of Athens, Greece, papadop@noa.gr

<sup>2</sup>Institute of Geodynamics, National Observatory of Athens, Greece, boris@noa.gr

<sup>3</sup>Institute of Geodynamics, National Observatory of Athens, Greece, g.minadakis@gmail.com

---

Foreshocks is the most promising precursory seismicity patterns for the prediction of the main shock. In very well monitored areas characteristic foreshock activities have been recognized in Chile, Japan, South America, Greece, Italy and elsewhere. In all these examples the 3D (space-time-size) distributions of the foreshock activity deviated significantly from the respective distributions of the background seismicity as it comes out from statistical tests. The 3D foreshock patterns included move of activity towards the main shock epicenter and increase of the activity rate in a power-law mode. At the same time, the b-value dropped and the mean magnitude increased significantly, while the level of seismic energy released also increased. These foreshock patterns are quite different from the swarm features which are characterized by b-value increase and of no particular move towards a particular spatial spot. The identification of such significant foreshock patterns before individual seismic sequences in different tectonic environments around the globe is of particular importance to develop probabilistic early warning protocols exceeding from a few days to some weeks before the main shock occurrence. This is a contribution to the EU DG-ECHO Project ARISTOTLE, contract n. ECHO/SER/2015/722144.

