



Foreshocks and the Prediction of Strong Earthquakes

E. Daskalaki, K. Orfanogiannaki, and G. A. Papadopoulos

Institute of Geodynamics, National Observatory of Athens, 11810 Athens, Greece
(edaskal@gein.noa.gr / Fax: +30 210-3490165 / Phone: +30 210-3490123)

Foreshock sequences are characterized by some common properties which are of great interest for the mainshock prediction. The first is that the activity rate, r , increases as the inverse of time in a time interval from hours to a few months before mainshock, and the second is that usually the b -value of the magnitude/frequency relationship is lower than in background seismicity and aftershocks. However, foreshocks precede only some mainshocks and not others. Understanding better why this “preferential” incidence of foreshocks happens would imply a significant step towards the achievement of the mainshocks prediction. In this paper we examine the incidence of foreshock activity before mainshocks in Greece. We investigated foreshock activity for mainshocks of $M_s \geq 5.5$ occurring in the Greek region from 1986 up to December 2006 inclusive. It appears that about 50% of the mainshocks are preceded by foreshocks. However, due to constraints related to the seismic monitoring capabilities some foreshocks pass without notice in the standard earthquake catalogues, such as the sequence of East Aegean Sea, October 2005. Therefore, the real percentage of foreshock sequences should be higher. We indicate how empirical probability approaches along with the variation of the parameters b and r could be utilized for the short-term prediction of the mainshock.