

STRESS RELEASE DURING EARTHQUAKE SEQUENCES

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Abstract

The average stress drop and apparent stress released during 65 complex earthquake sequences from all over the world are estimated separately for foreshocks, main shocks and aftershocks. All of them but one occurred between 1977 and 1997. The Harvard CMT solutions are available for 60 main shocks, 38 foreshocks and 218 aftershocks. The stress drop is estimated using the values of seismic moment and source half duration and the scaling relations between various source parameters: seismic moment, source half duration, fault surface and fault length, taken from Harvard catalogues and other publications. The average stress drop is the highest during foreshocks (1.8 MPa), middle during main shocks (1.1 MPa) and the lowest during aftershocks (0.4 MPa). Similarly, the apparent stress, estimated from seismic moment and radiated energy taken from PDE-NEIC bulletins and other publications, is also the highest for foreshocks (0.6 MPa), middle for main shocks (0.4 MPa) and the lowest for aftershocks (0.2 MPa).

Key words: earthquake sequences, foreshocks, aftershocks, source parameters, seismic moment, source half duration, stress drop, apparent stress.