

C-values Associated with Recent Moderate Earthquakes in Japan

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We investigate the early aftershock activity of four large earthquakes that occurred recently in Japan: (1) the 2000 Western Tottori ($M7.3$; $M_w 6.6$); (2) the 2005 Fukuoka ($M7.0$; $M_w 6.6$); (3) the 2007 Noto peninsula ($M6.9$; $M_w 6.7$) and (4) the 2007 Niigata-oki ($M6.8$; $M_w 6.6$), where M and M_w are the JMA magnitude and the moment-magnitude, respectively. For each aftershock sequence we examine continuous high-pass filtered seismograms, recorded at nearby Hi-Net (High Sensitivity Seismograph Network) borehole stations, to identify as many early events as possible. The magnitude of these events is calibrated using aftershocks that are listed in the earthquake catalog of JMA (Japan Meteorological Agency). The analysis of the aftershock decay rates reveals a power-law time dependence with a scaling exponent close to 1.0 that starts from about one minute from the mainshock. Our results demonstrate that the c value of the Omori-Utsu law is very small, however, a lower bound is difficult to establish due to completeness problems in the first minute after the mainshock and statistical fluctuations.