VERSITA

Acta Geophysica
vol. 59, no. 3, Jun. 2011, pp. 483-501
DOI: 10.2478/s11600-011-0010-8

Frequency Analysis of the 2004 Sumatra–Andaman Earthquake Using Spectral Seismograms

Monika WILDE-PIÓRKO[1], Seweryn J. DUDA[2], and Marek GRAD[1]

[1]Faculty of Physics, Institute of Geophysics, University of Warsaw, Warszawa, Poland
e-mails: mwilde@igf.fuw.edu.pl (corresponding author), mgrad@mimuw.edu.pl

[2]Institute of Geophysics, University of Hamburg, Hamburg, Germany
e-mail: seweryn.duda@zmaw.de

Abstract

Frequency analysis of the Sumatra–Andaman earthquake of 2004, one of the most significant and best-recorded earthquakes, is based on spectral seismograms obtained from their broadband seismograms. The Sumatra–Andaman earthquake is found to have a wide-range frequency content of P-wave radiation during the rupturing process. On the basis of stacking spectral seismograms we distinguished four time events of the rupturing process of a total length of about 540 s. The frequency, $f_{\max}$, is the highest for the first event (0.163 Hz in time interval 0-88 s), lowest for the second – which is the strongest (0.075 Hz in time interval 88-204 s). For third and fourth events frequencies are similar (0.089 and 0.082 Hz in time intervals 204-452 and 452-537 s, respectively). The frequency also shows an azimuthal dependence ($\pm$0.02 Hz). Azimuths for which the frequency, $f_{\max}$, has maximum and minimum values are 203-222° and 23-42°, respectively. These observations are discussed in relation to previously published papers on this topic.

Key words: Sumatra–Andaman earthquake, spectral seismograms, Butterworth filter.

© 2011 Institute of Geophysics, Polish Academy of Sciences