Geophysical Research Abstracts, Vol. 7, 08944, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08944

Analysis of infrasonic waves generated by the rupture of the Sumatra Mw=9.0 in the Indian ocean

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Several infrasound stations part of the global infrasonic network of the International Monitoring System (IMS) recorded coherent waves originating from the rupture of the Sumatra earthquake. Thorough analyses of the infrasound recordings allow the evaluation of the relative contributions of the different source mechanisms involved in this event. Distinct mechanisms of pressure wave generation have been identified. The local conversion from seismic to pressure waves has been observed on several infrasound stations at teleseismic distances. Examples of recordings of ground-coupled air waves will be presented. At thousands of kilometers from the epicenter, infrasonic waves propagating through the atmosphere from distant source regions were also detected. Clear variations of direction of arrivals were noted during more than four hours. The large variations in azimuth and the expansion of the signal duration suggest that a wide region acted as sources of infrasonic waves. Using a precise determination of the arrival times and direction of arrival of the infrasonic waves, and appropriate velocity models, the radiating zone is reconstructed over the Indian Ocean. The predominant source of infrasound is likely reradiated pressure waves by the tsunami during its propagation. Such an event offers an opportunity to improve our understanding of hydro-acoustic coupling induced by tsunamigenic earthquakes.