



Focal mechanisms of large historical earthquakes in the Bonin-Mariana subduction zone

Emile Okal (1), Dominique Reymond (2), Sutatcha Hongsresawat (1,3)

(1) Northwestern University, Evanston, IL United States (emile@earth.northwestern.edu), (2) Laboratoire de Geophysique, Papeete, Tahiti, French Polynesia, (3) University of Florida, Gainesville, FL, USA

The Bonin-Mariana subduction zone is the end-member example of a decoupled system, as described by Uyeda and Kanamori [1979]. In particular no interplate thrust mechanism with moments greater than 8 E25 dyn*cm are known in the CMT catalog, and only two normal faulting events surpass the 1 E27 mark. Yet a number of earthquakes are reported with assigned magnitudes around or above 7, both during the WWSSN period and the historical pre-1962 era.

We present a systematic study of these events, including relocation and investigation of focal mechanisms using mantle magnitudes and when possible inversion by the PDFM algorithm.

Preliminary results indicate a wide variety of focal mechanisms including normal faulting (27 Oct 1966; 01 Sep 1970; 11 May 1974) and even strike-slip solutions (10 Feb 1966), but most importantly a shallow-dipping interplate thrust mechanism with a moment of 4 E27 dyn*cm for the event of 28 Dec 1940 at a location about 175 km East of Pagan. This result shows that the modern CMT catalog still undersamples the seismicity of the Mariana arc, which is thus not immune to relatively large, albeit rare, interplate thrust events, with moments 40 times that of the largest Global-CMT solution.