We have revised our preliminary slip model of July 17, 2006 Java earthquakes by combined inverting teleseismic body wave and long period surface waves. Our preferred solution has a steeper dip angle (> 60 deg.) and larger moment magnitude (7.8) than that of (Global CMT). The earthquake initiated at a depth around 12 km and ruptured southward for 160 sec with a speed of 1.0-1.2 km/sec, consistent with our first motion data. We have used the source model of a reverse fault rupture to estimate the slip distribution and utilized moment tensor decomposition with variations (white dots, Engdahl et al., 1998).

Conclusions

We have analyzed the rupture processes of 2006 Java earthquake as well as 1992 Nicaragua, 1994 Java, and recent 2006 Kuril Island earthquakes. We find:

1. Inverted scalar moments of all these earthquakes are larger than corresponding solutions of Harvard CMT, probably due to the difference in dip angle, centroid depth, and fault duration. The resulting moment rate functions are generally consistent with previous results, e.g., (Kikuchi & Kanamori, 1995; Aber
2. In many aspects, the 2006 Java and 1992 Nicaragua earthquakes belong to the same category though their centroid depths are quite different. In contrast, the 1994 Java earthquake, which had excited large local Tsunamis, is closer to the category of the 2006 Kuril Island and 1996 Java (Biak) earthquakes.

3. All earthquakes, particularly 2006 Kuril Island earthquake, are apparently bounded in along strike directions by sea floor heterogeneities. The rupture of 1994 Java and 1992 Nicaragua earthquakes may associate with subducted oceanic plate (Abemine et al., 2001) or high land (in figure) in the north but there is no obvious evidence for 2006 Java earthquake.

4. Similar to other subduction zone earthquakes, the earthquakes occurred near high slip patches during intertineous or post-seismic periods. Three of four earthquakes showed here initiated at the seismicity zone at the down dip side of high slip patches. 2006 Java earthquake is the only exception.

References


Acknowledgement

This study is supported by USGS grants and UCSD startup fund. All figures are made using Generic Mapping Tools (GMT, Wessel & Smith, 1993).