

Aftershock Distribution and the Mainshock's Fault Plane by the MJHD Method: Application to December 21, 2010 Bonin Islands (Chichi Jima), Japan Earthquake

2010/12/22

HURUKAWA Nobuo

Building Research Institute (BRI), Japan

Bonin Islands (Chichi Jima), Japan

Origin Time (USGS): December 21, 2010 at 17:19:40 UTC

Hypocenter (USGS): 26.892°N, 143.726, 14 km (depth)

Magnitude (Global CMT): $M_w = 7.4$

Data: 'Latest Earthquakes in the World - Past 7 days' by the US Geological Survey

Events Relocated: Mainshock and aftershocks until December 22, 1h57m

Method: Modified Joint Hypocenter Determination (MJHD) by Hurukawa and Imoto

Results: Size of aftershock area: 30 km x 60 km

Fault plane: Nodal plane striking NNE-SSW dipping WNW

Comments: This is an intraplate earthquake in the Pacific Plate. The rupture started at a shallowest point and propagated westward and southward. Aftershocks concentrated a plane dipping NW or westward.

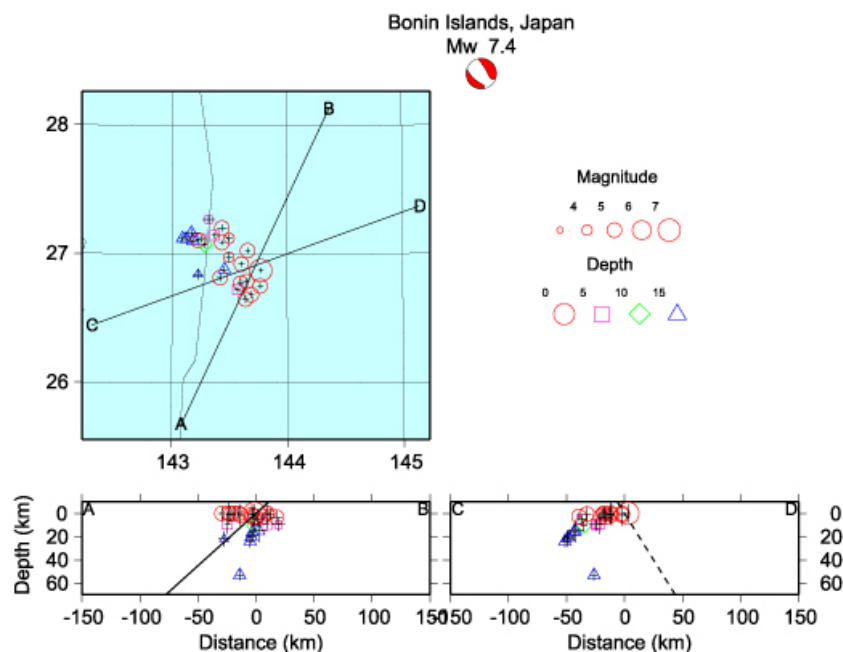


Figure 1. Hypocenters relocated by the MJHD method. Global CMT solutions are also shown. Epicentral distribution and two vertical cross sections along A-B and C-D lines, which are perpendicular to strikes of the two nodal planes, are shown. Two nodal planes are shown by lines in cross sections. The nodal plane corresponding to the fault plane is shown by a thick solid line in the A-B cross section.

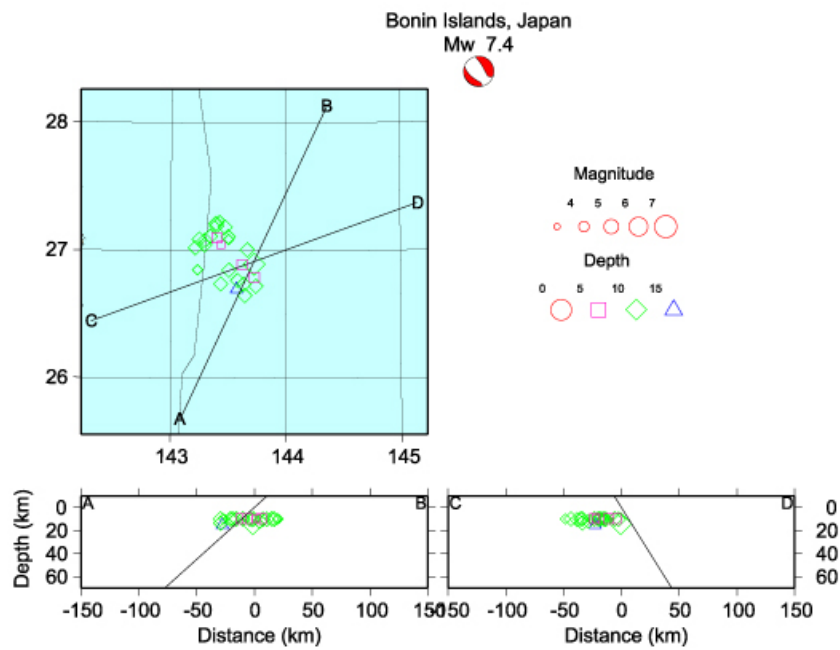


Figure 2. Hypocenters located by the USGS. Two nodal planes are also shown by solid lines in cross sections.

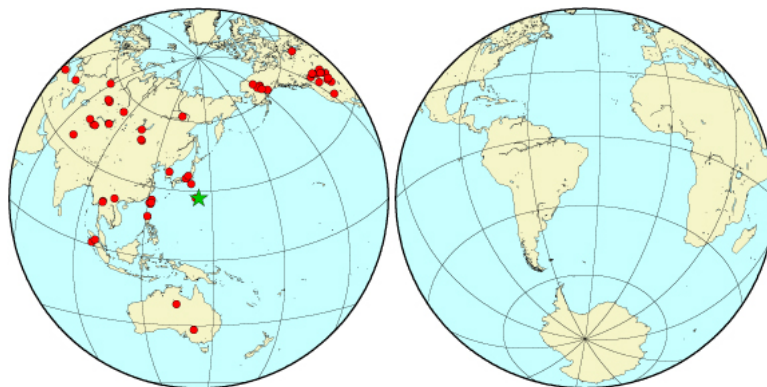


Figure 3. Stations used in relocation.

References

- Hurukawa, N., Quick aftershock relocation of the 1994 Shikotan earthquake and its fault planes, *Geophys. Res. Lett.*, 22, 3159-3162, 1995.
- Hurukawa, N. and M. Imoto, Subducting oceanic crusts of the Philippine Sea and Pacific plates and weak-zone-normal compression in the Kanto district, Japan, *Geophys. J. Int.*, 109, 639-652, 1992.