

# Aftershock Distribution and the Mainshock's Fault Plane by the MJHD Method: Application to the Queen Charlotte Islands Region Earthquake, Canada, on October 28, 2012

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## Earthquake Information (USGS)

Origin Time: October 28, 2012 at 03:04:09 UTC

Hypocenter: 52.742°N, 132.131°W 20.1km (depth)

Magnitude:  $M_w = 7.7$

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

**Events Relocated:** Mainshock and aftershocks until November 1, 3h16m

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

**Results:** Size of concentrated aftershock area: 100 km x 80 km

Fault plane: Nodal plane striking NW-SE dipping NE gently

**Comments:** This seems to be an interplate thrust earthquake between the North America and Pacific Plates. However, the source area was located SW of the trench. The rupture started at a deepest point of the fault plane. Aftershocks with normal faulting occurred. Note that absolute locations are not reliable.

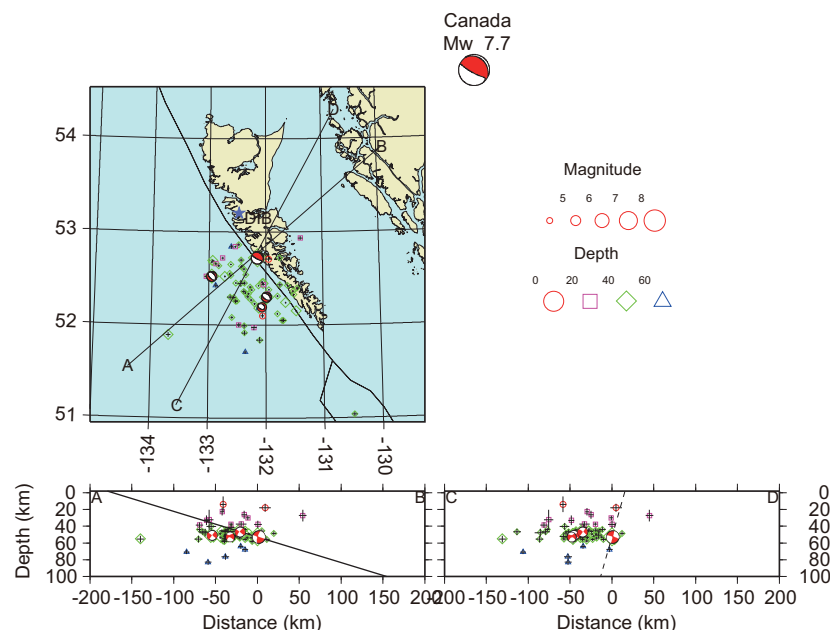


Figure 1. Hypocenters relocated by the MJHD method. USGS W-phase MT for the mainshock and global CMT solutions for aftershock are also shown. Epicentral distribution and two vertical cross sections along A-B and C-D lines, which are perpendicular to strikes of the two nodal planes of the mainshock, are 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.

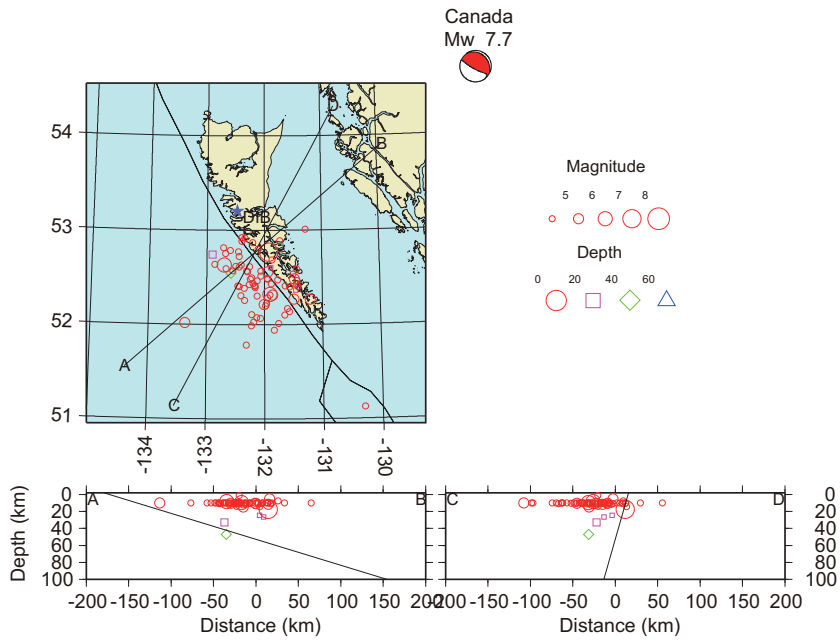


Figure 2. Hypocenters located by the USGS. Two nodal planes of the mainshock are also shown by solid lines in cross sections.

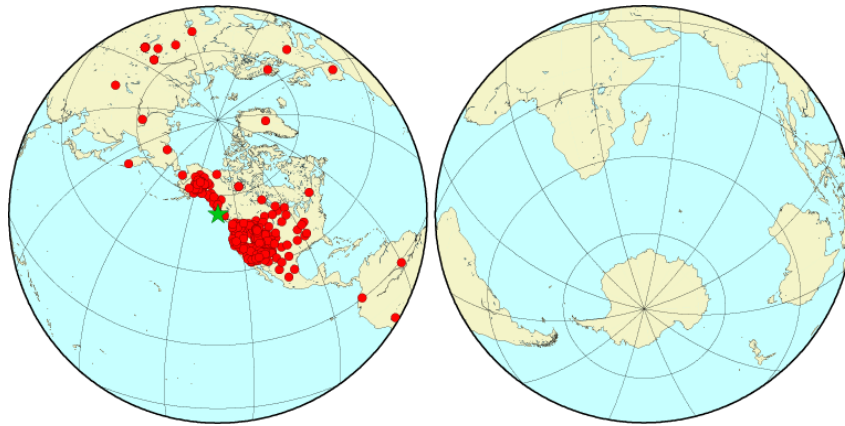


Figure 3. Stations used in relocation.

#### 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.