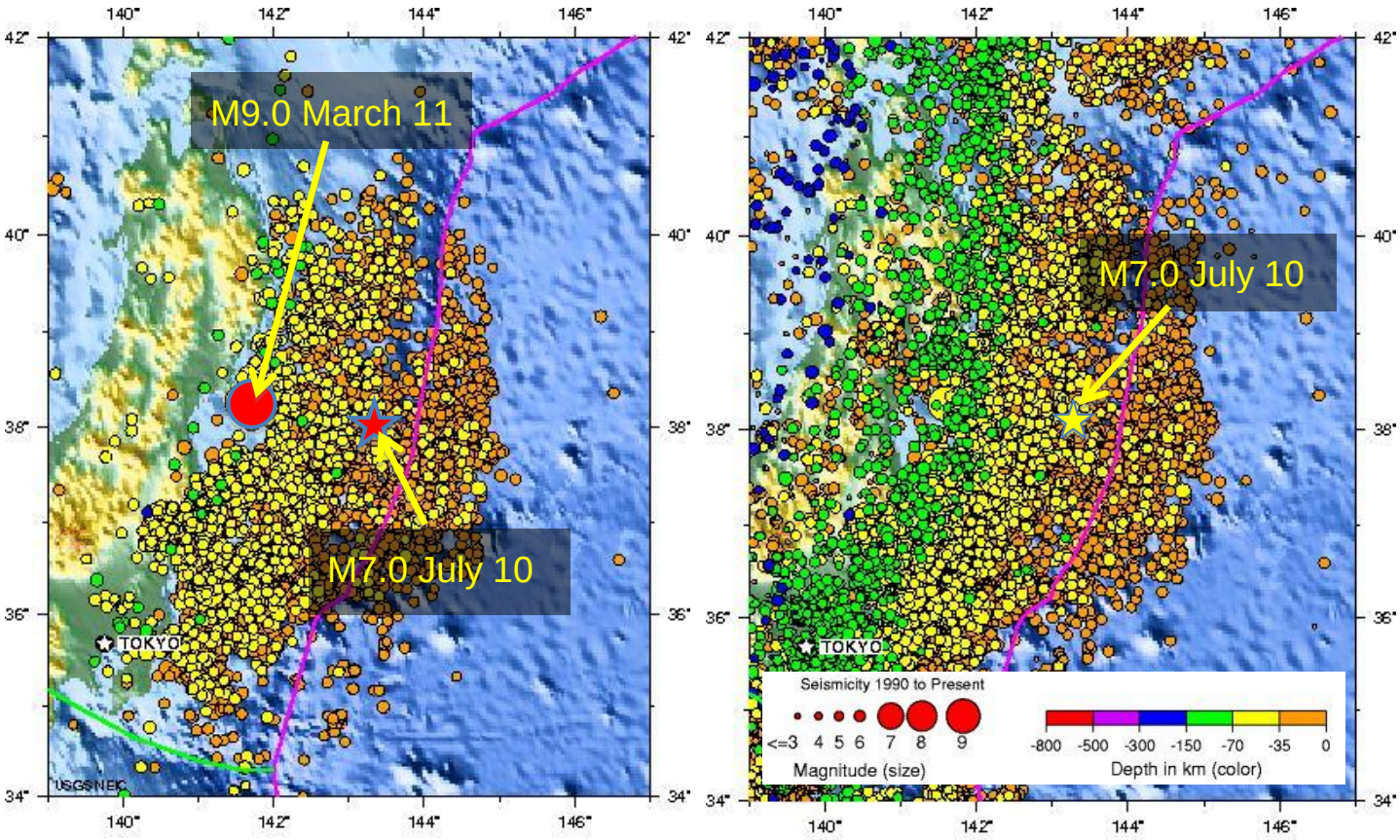
Magnitude 7.0 Major Aftershock Near East Coast of Honshu, Japan
Sunday, July 10, 2011 at 00:57:12 UTC (10:57:12 AM at epicenter)
Epicenter: Latitude 38.040°N, 143.287°E. Depth: 18 kilometers.

Earthquake Summary:

As reported by the US Geological Survey National Earthquake Information Center, a major earthquake occurred Sunday morning at 10:57:12 AM local time off the east coast of Honshu. The epicenter of the July 10 earthquake is located about 212 kilometers (131 miles) east of Sendai. This earthquake is within the distribution of aftershocks that have occurred since the M9.0 great earthquake of March 11. Although the July 10 earthquake is unusually large considering that it occurred four months after the main shock, it should probably be considered a major aftershock of the great earthquake. A M7.9 aftershock and a M7.7 aftershock occurred about 30 minutes and 40 minutes after the M9.0 main shock, respectively. The only subsequent magnitude 7 or larger aftershocks are the M7.1 earthquake of April 7 and this M7.0 “aftershock” on July 10.



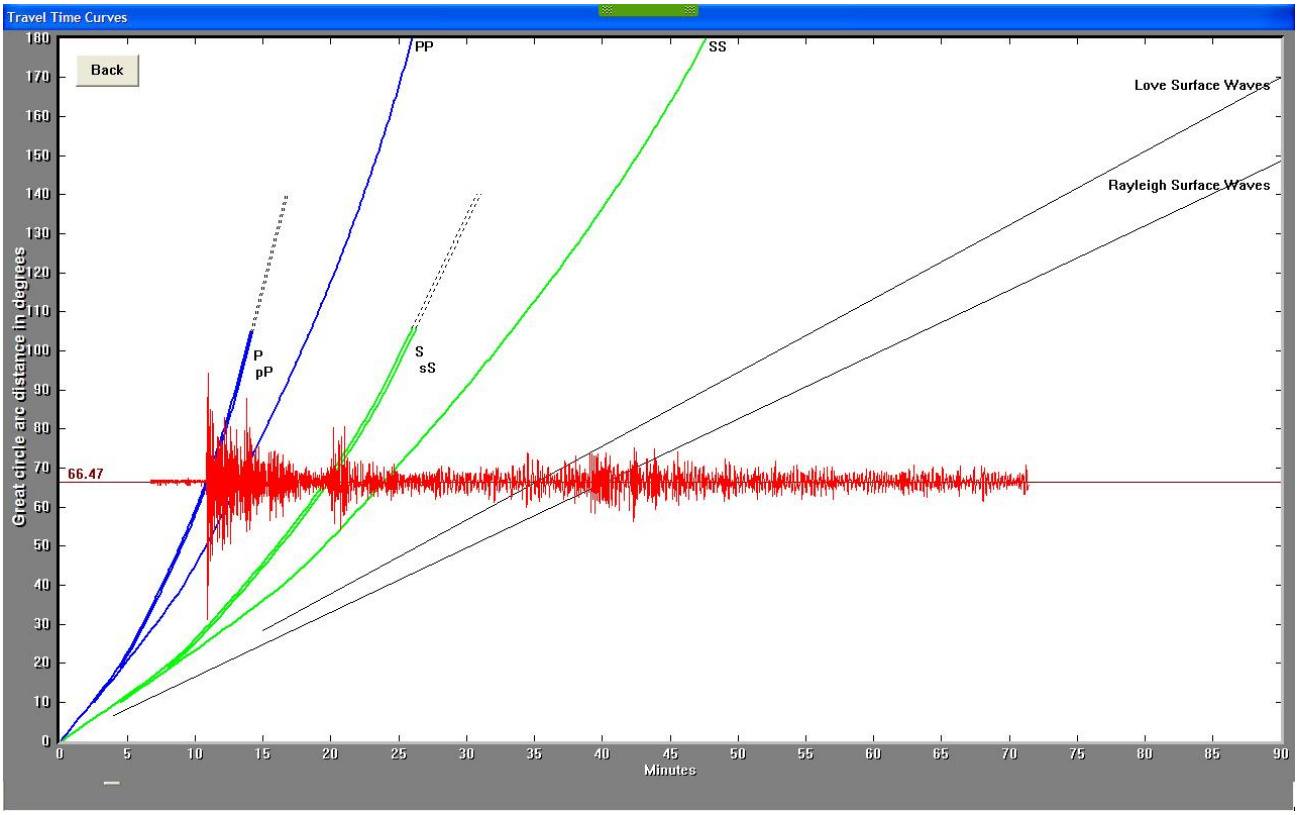
Images courtesy of the US Geological Survey

LEFT: Earthquakes in 2011 in the northern Honshu region as determined by the US Geological Survey National Earthquake Information Center. The red star indicates the epicenter of the M7.0 aftershock while the large red circle shows the epicenter of the March 11 M9.0 great earthquake that generated the tsunami that devastating northern Honshu and caused damage across the Pacific Ocean Basin.

RIGHT: Yellow star indicates the magnitude 7.0 July 10 earthquake along with all earthquakes in this region since 1900. This historic seismicity map shows that earthquakes occur at increasing depths from east to west as the Pacific Plate subducts beneath Japan.

Seismogram Description:

The record of the M 7.0 earthquake that occurred near the east coast of Honshu, Japan on the University of Portland seismometer (UPOR) is illustrated below. Portland is about 7385 km (4588 miles, 66.54°) from the location of this earthquake. Following the earthquake, it took 10 minutes and 48 seconds (648 seconds) for the compressional P waves to travel a curved path through the mantle from Japan to Portland. PP waves are compressional waves that bounce off the Earth's surface halfway between the earthquake and the station. PP energy arrived 13 minutes and 15 seconds (795 seconds) after the earthquake. S and SS are shear waves that follow the same path through the mantle as P and PP waves, respectively. The S waves arrived 19 minutes and 39 seconds (1179 seconds) and SS waves arrived 23 minutes and 57 seconds (1437 seconds) after the earthquake. Surface wave energy required approximately 28 minutes and 8 seconds (1688 seconds) to travel the 7385 km (4588 miles) around the perimeter of the Earth from Japan to Portland, Oregon.



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