Mw9 Tohoku, Japan Earthquake and Tsunami, 11 March 2011, 05:46 UTC

Mainshock location, magnitude and tsunami potential determinations in real-time at INGV

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Selected realtime screenshots in the first 20 min after the earthquake origin from the INGV Earthquake Monitor are shown in the following slides.

This work was supported by the 2007-2009 Dipartimento della Protezione Civile S3 project at INGV and by INGV-CNT institutional funds. The facilities of GFZ-GEOFON and the IRIS Data Management Center were used for access to waveform (SeedLink server) and metadata used here. Plate boundaries from Bird, P. (2003) An updated digital model of plate boundaries. Plots made with GMT (http://gmt.soest.hawaii.edu).

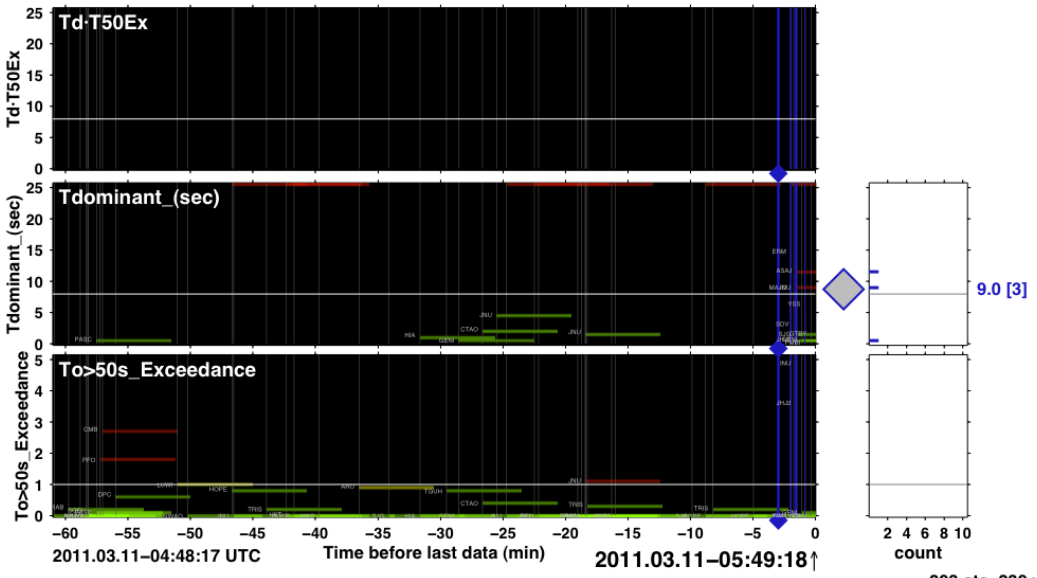
References:

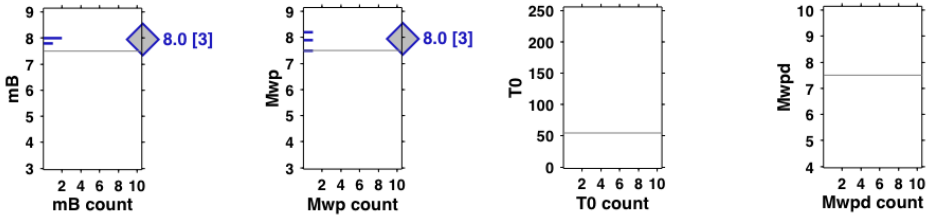
Lomax, A. and A. Michelini, 2011, **Tsunami early warning using earthquake rupture duration and P-wave dominant period: the importance of length and depth of faulting**, *Geophys. Journal Int.*, first published on-line Jan. 20, 2011, DOI: 10.1111/j.1365-246X.2010.04916.x. (further information)

Lomax, A. and A. Michelini, 2009, **Tsunami early warning using earthquake rupture duration**, *Geophys. Res. Lett.*, **36**, L09306, doi:10.1029/2009GL037223. (further information)

Lomax, A. and A. Michelini (2009), **Mwpd: A Duration-Amplitude Procedure for Rapid Determination of Earthquake Magnitude and Tsunamigenic Potential from P Waveforms**, *Geophys. J. Int.*,**176**, 200-214. (further information)

Honshu, Japan 2011.03.11 - INGV Realtime Monitor
OT+3min: first located: mB=8.0 Mwp=8.0

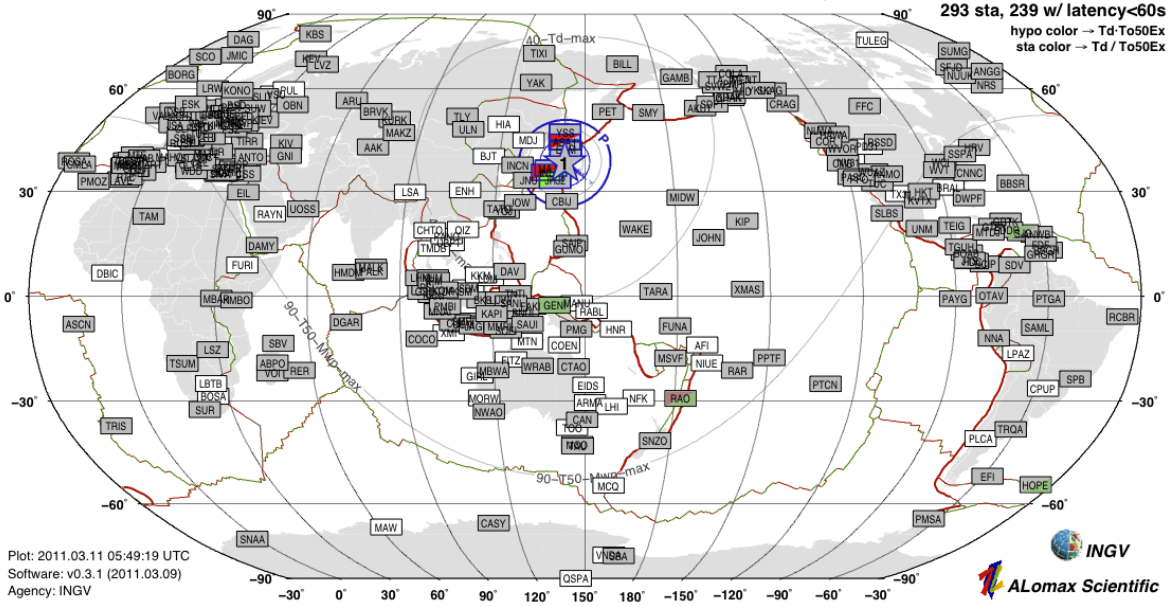


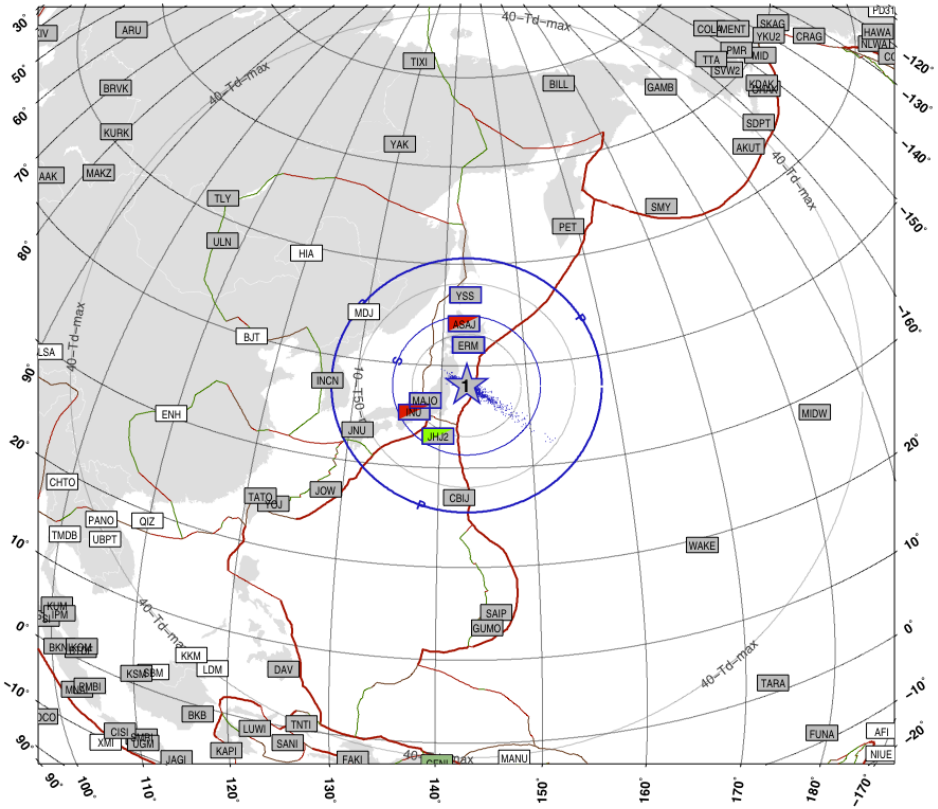


Earthquake Location · Td·T50Ex Level · mB · Mwp · T0 · Mwpd Monitor

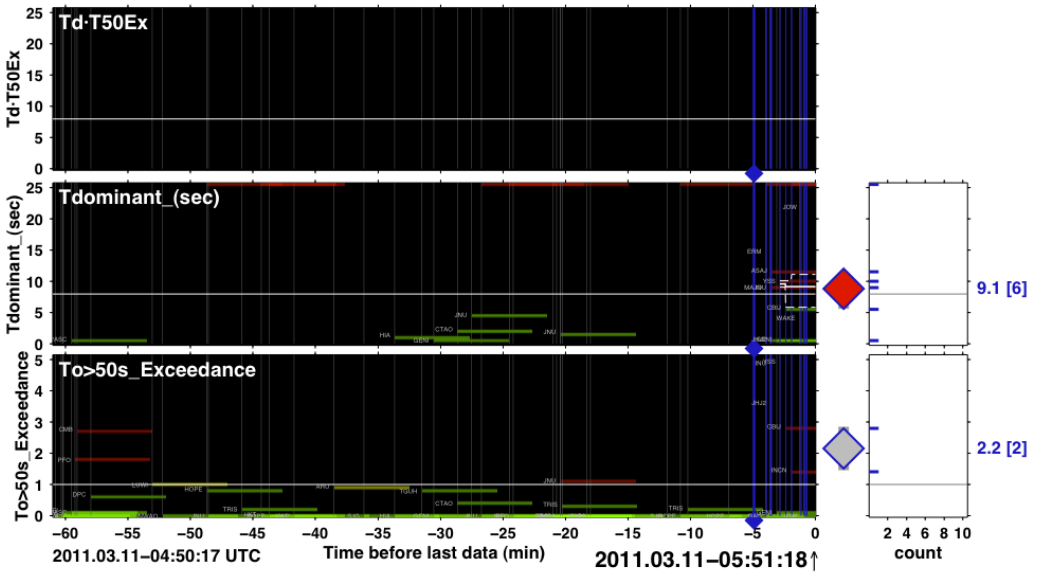
Earthquake details (automatic solutions):

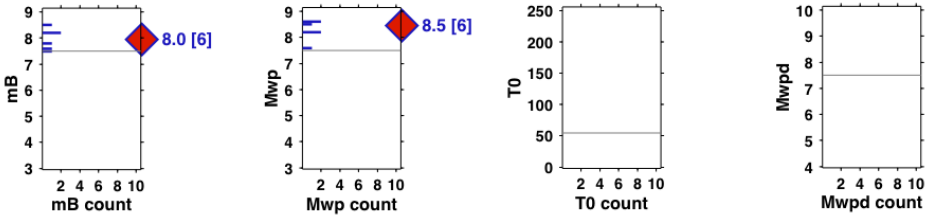
n	pha	Δmin°	σot	origin–time–UTC	lat°	lon°	errH	depth	errZ	T50Ex [n]	Td [n]	TdT50	WL	mB [n]	Mwp [n]	T0 [n]	Mwpd [n]
1	6	3.9	0.5	2011.03.11–05:46:20	38.1	142.9	28	14	40	0.0 0	9.0 3	0.0		n/a 3	n/a 3	n/a 0	n/a 0





Honshu, Japan 2011.03.11 - INGV Realtime Monitor
OT+5min: mB=8.0 Mwp=8.5

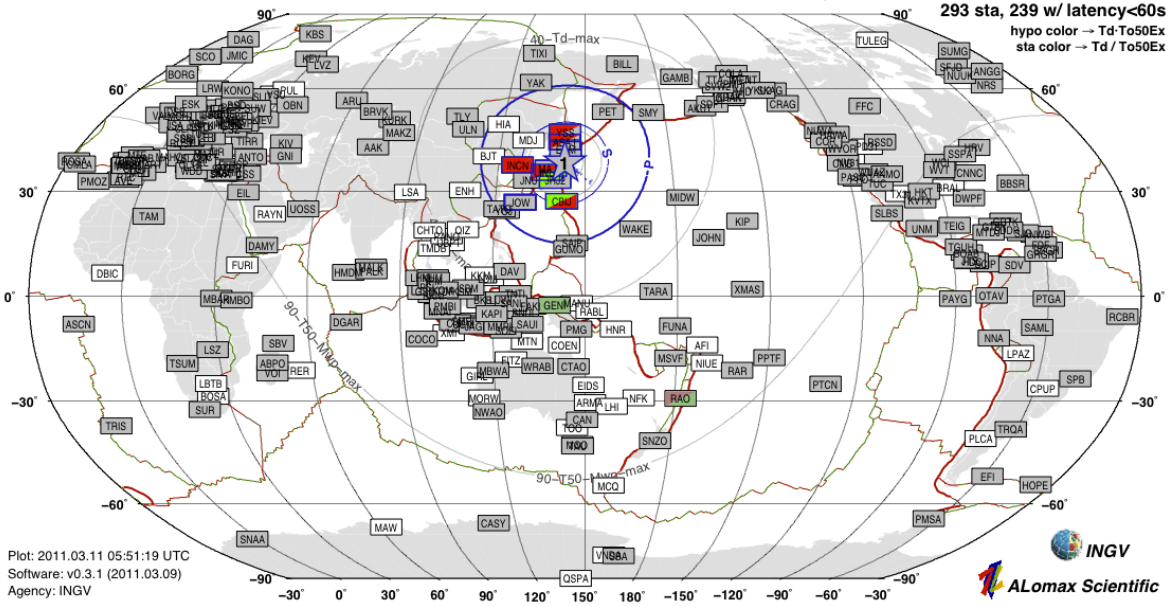


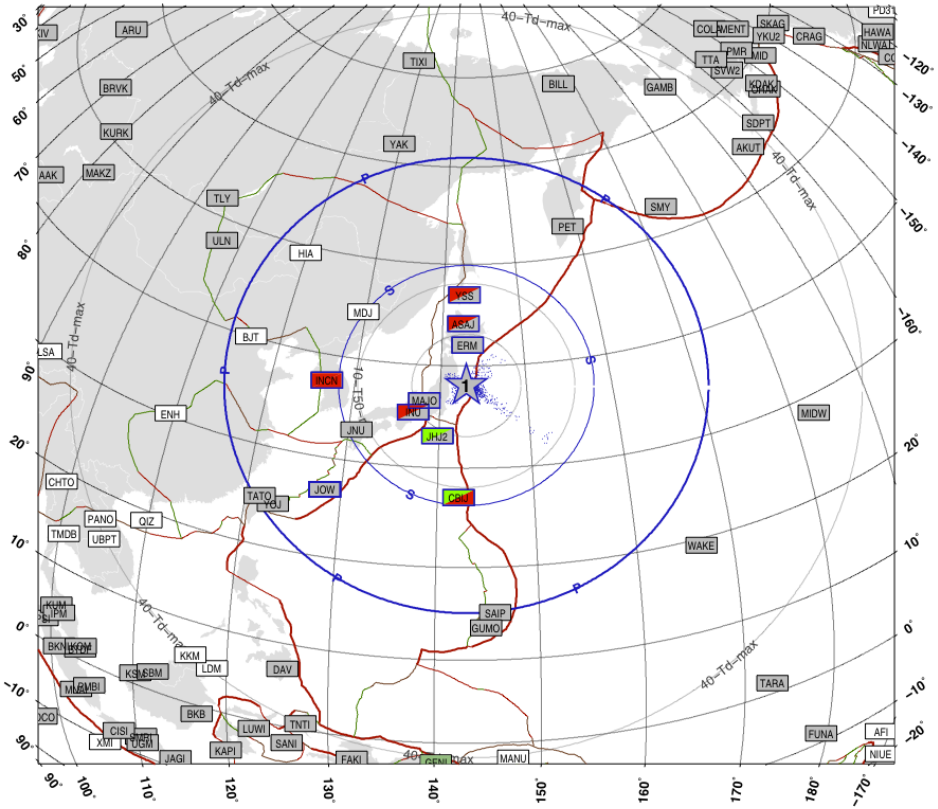


Earthquake Location · Td·T50Ex Level · mB · Mwp · T0 · Mwpd Monitor

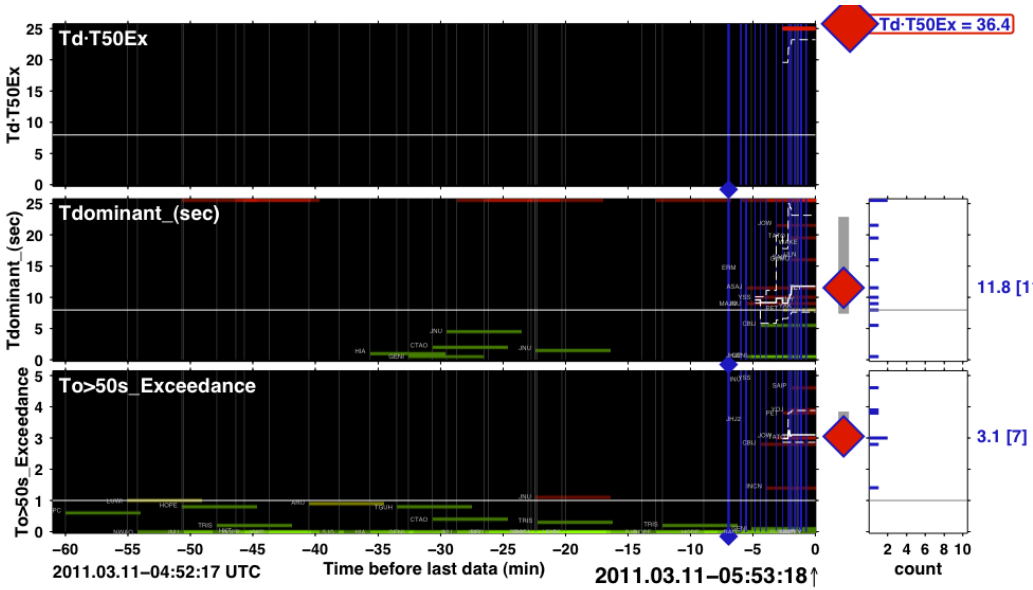
Earthquake details (automatic solutions):

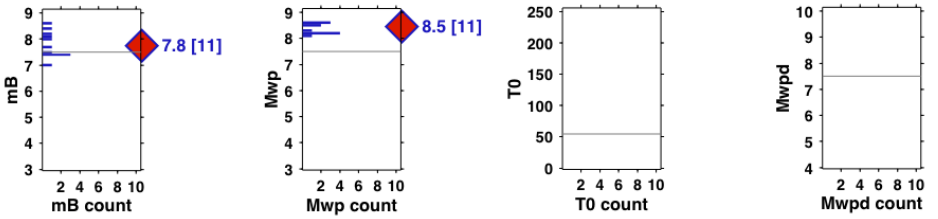
n	pha	Δmin°	σot	origin–time–UTC	lat°	lon°	errH	depth	errZ	T50Ex [n]	Td [n]	TdT50	WL	mB [n]	Mwp [n]	T0 [n]	Mwpd [n]
1	9	3.9	0.7	2011.03.11–05:46:22	38.1	143.0	17	95	49	2.2 2	9.1 6	0.0		8.0 6	8.5 6	n/a 0	n/a 0





Honshu, Japan 2011.03.11 - INGV Realtime Monitor
OT+8min: mB=7.8 Mwp=8.5 TsunamiWL=36RED

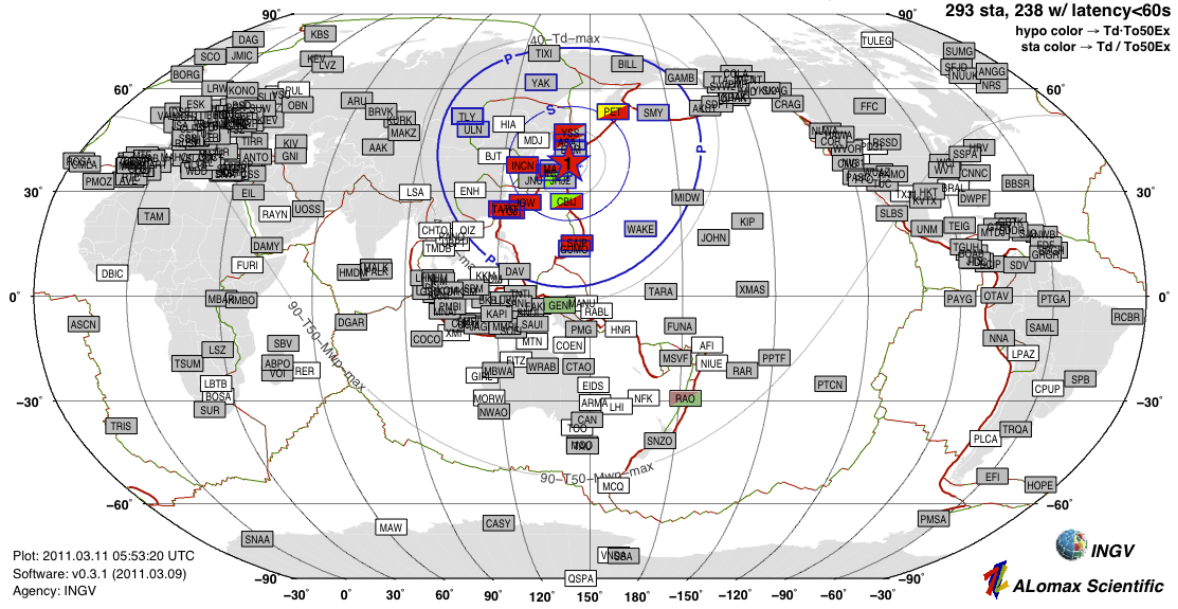


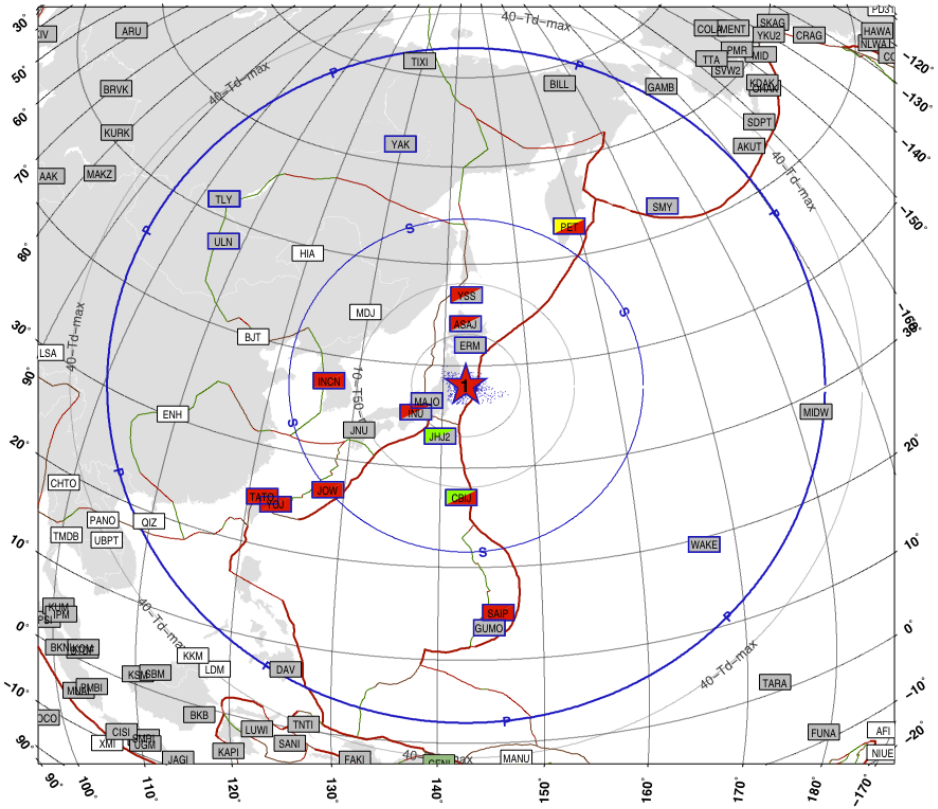


Earthquake Location · Td·T50Ex Level · mB · Mwp · T0 · Mwpd Monitor

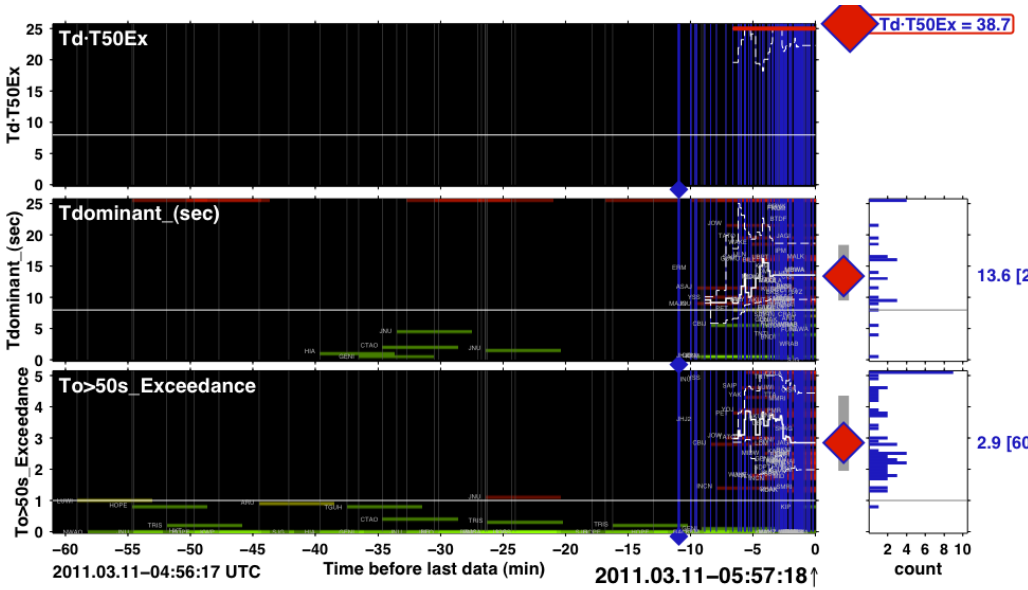
Earthquake details (automatic solutions):

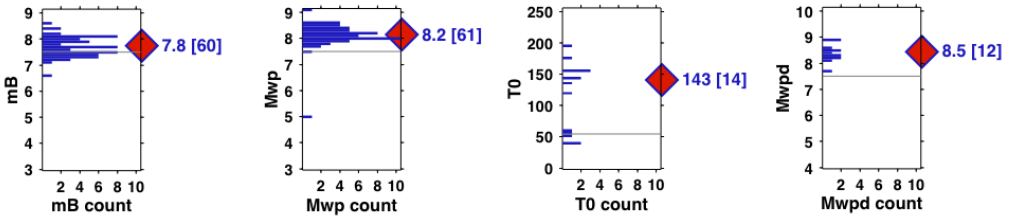
n	pha	Δmin°	σot	origin–time–UTC	lat°	lon°	errH	depth	errZ	T50Ex [n]	Td [n]	TdT50	WL	mB [n]	Mwp [n]	T0 [n]	Mwpd [n]
1	19	3.9	2.1	2011.03.11–05:46:21	38.1	142.7	24	14	15	3.1 7	11.8 11	36.4		7.8 11	8.5 11	n/a 0	n/a 0





Honshu, Japan 2011.03.11 - INGV Realtime Monitor
OT+12min: mB=7.8 Mwp=8.2 TsunamiWL=39RED Mwpd=8.5

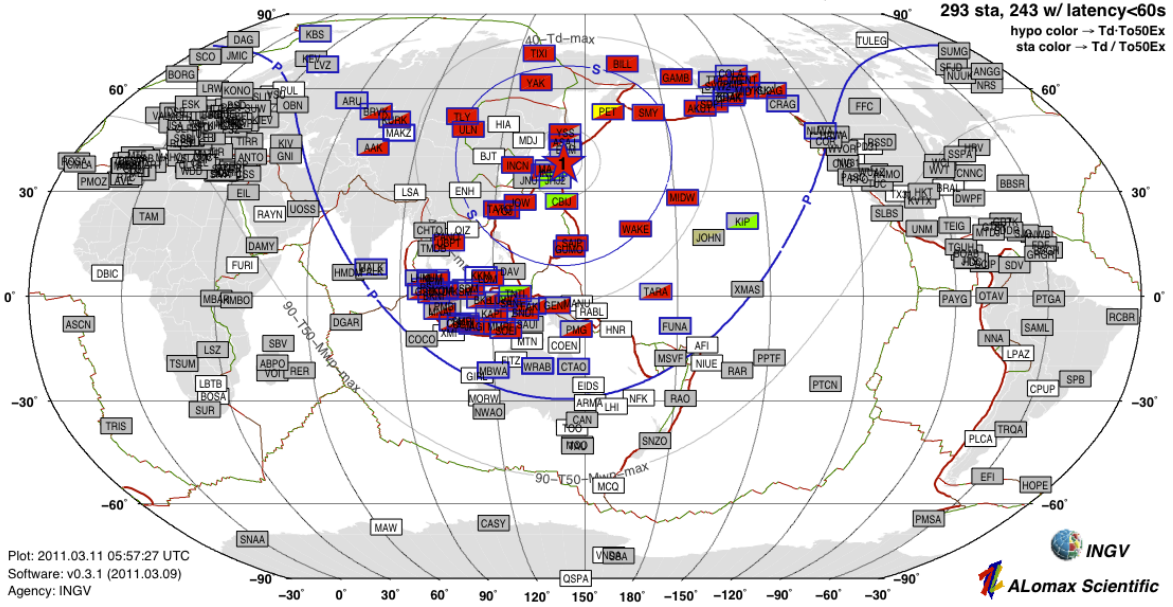


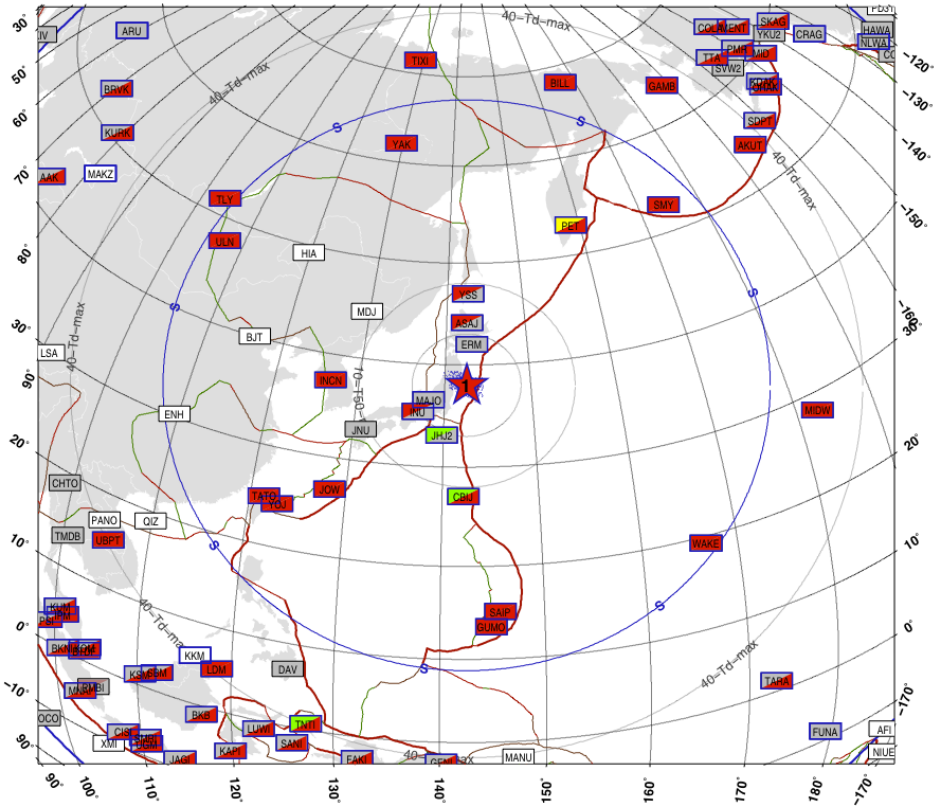


Earthquake Location · Td·T50Ex Level · mB · Mwp · T0 · Mwpd Monitor

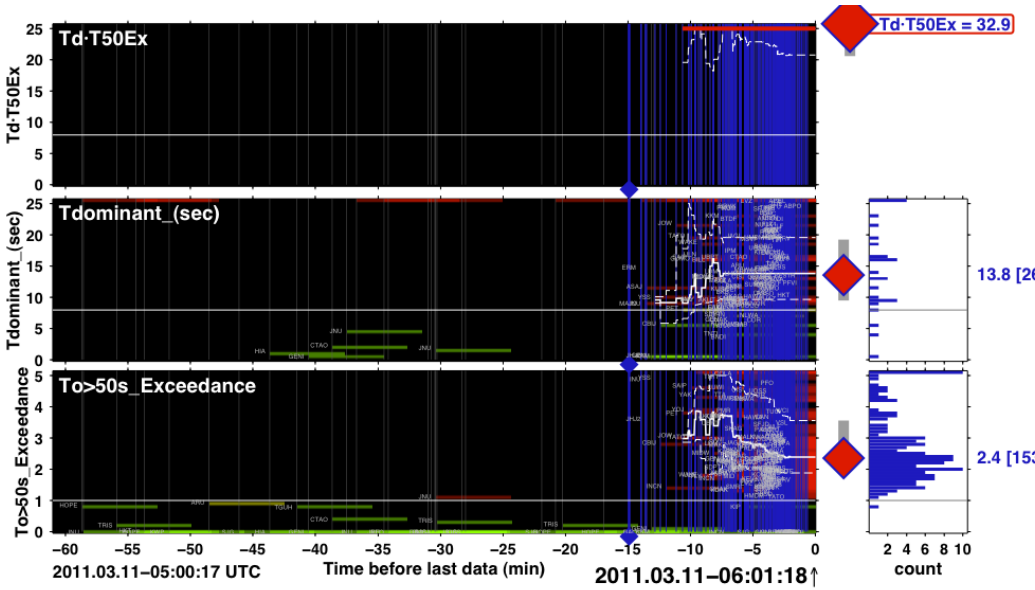
Earthquake details (automatic solutions):

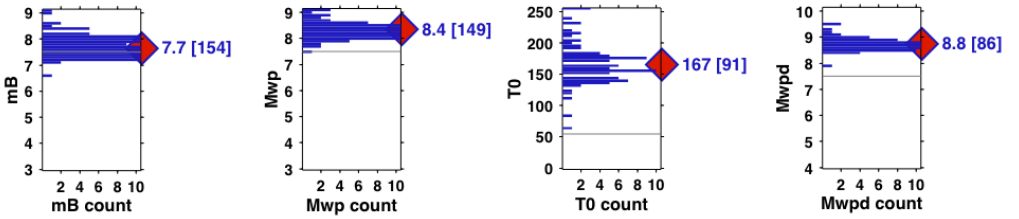
n	pha	Δmin°	σot	origin–time–UTC	lat°	lon°	errH	depth	errZ	T50Ex [n]	Td [n]	TdT50	WL	mB [n]	Mwp [n]	T0 [n]	Mwpd [n]
1	77	3.8	2.1	2011.03.11–05:46:22	38.0	142.5	27	14	11	2.9 60	13.6 25	38.7		7.8 60	8.2 61	143 14	8.5 12





Honshu, Japan 2011.03.11 - INGV Realtime Monitor
OT+15min: mB=7.7 Mwp=8.4 TsunamiWL=33RED Mwpd=8.8

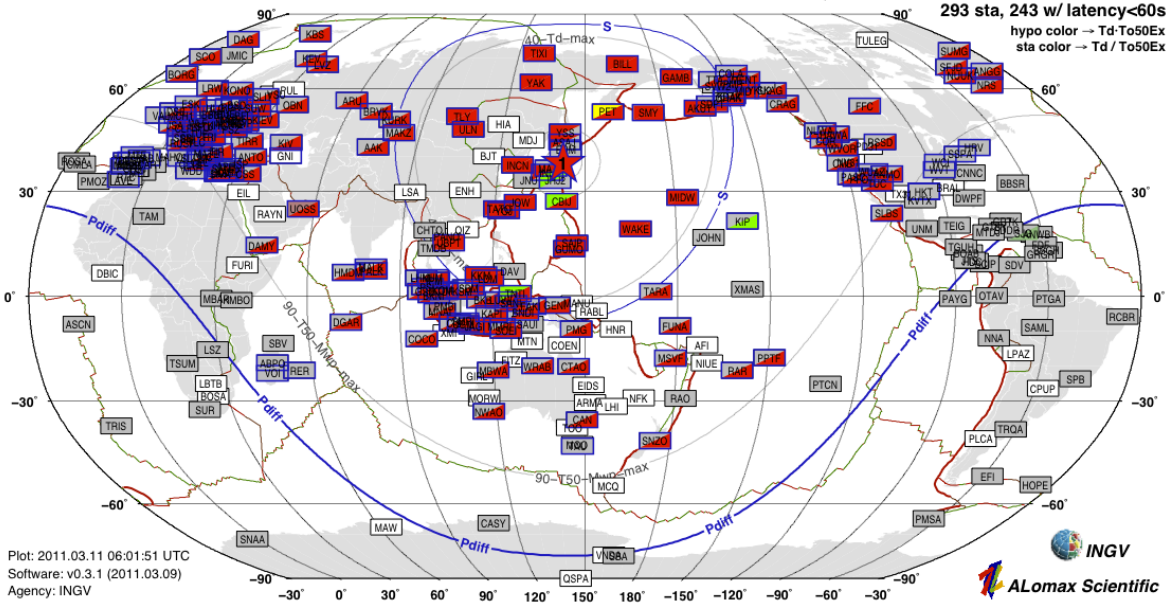


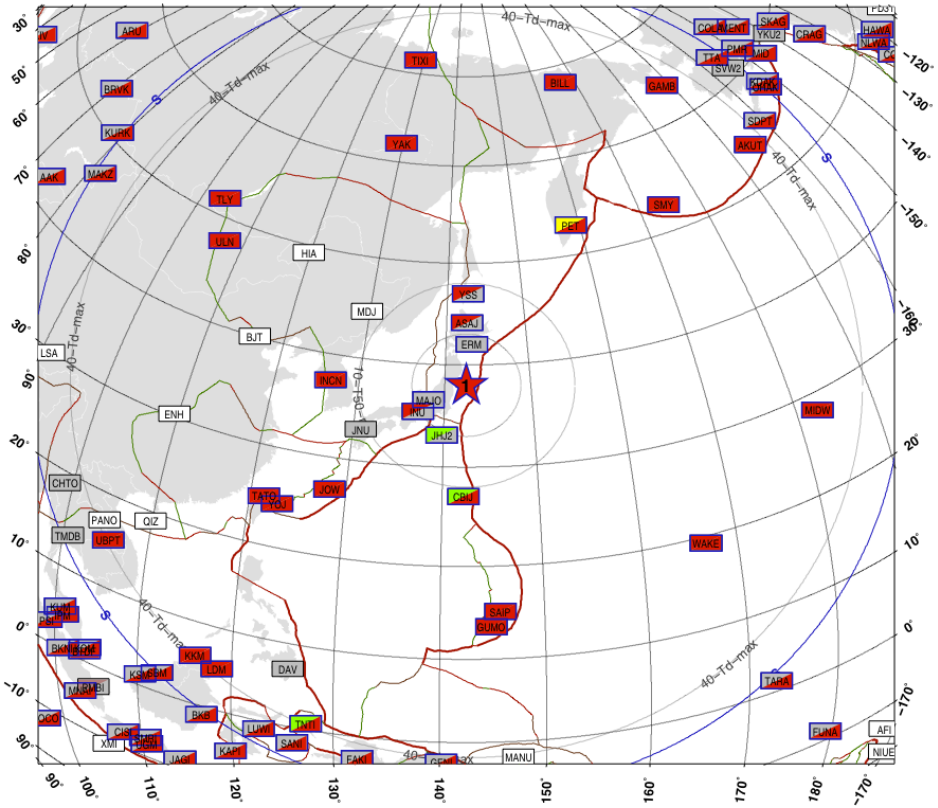


Earthquake Location · Td·T50Ex Level · mB · Mwp · T0 · Mwpd Monitor

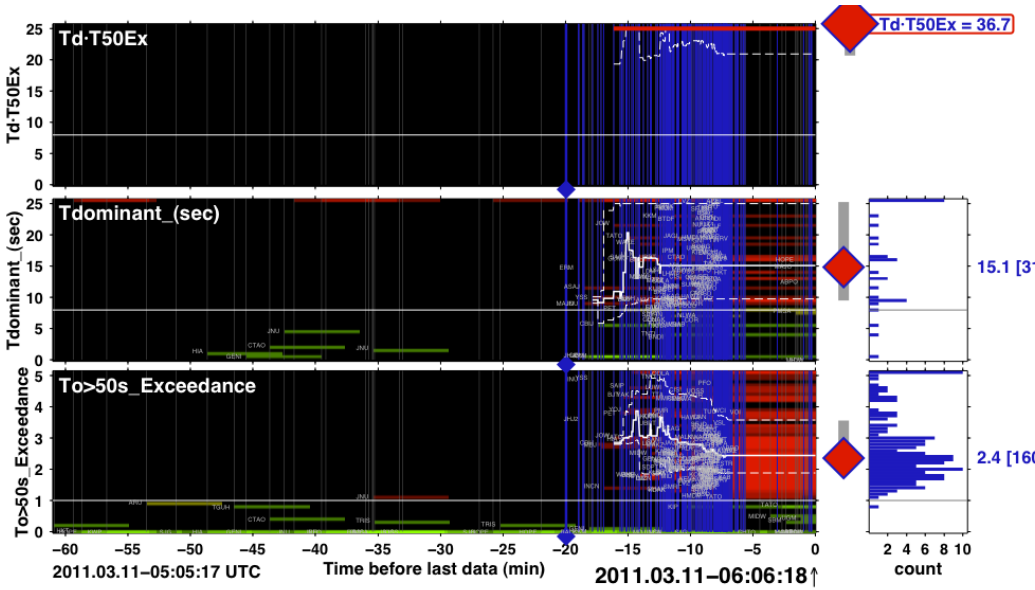
Earthquake details (automatic solutions):

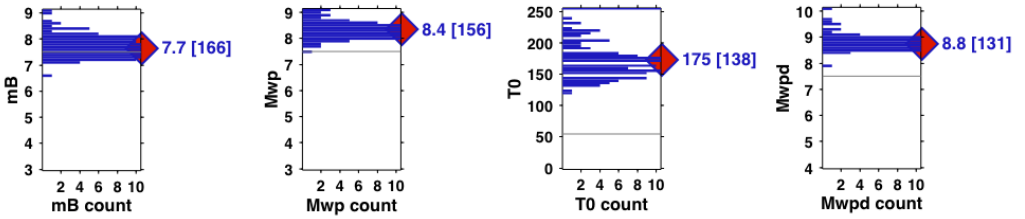
n	pha	Δmin°	σot	origin–time–UTC	lat°	lon°	errH	depth	errZ	T50Ex [n]	Td [n]	TdT50	WL	mB [n]	Mwp [n]	T0 [n]	Mwpd [n]
1	165	3.7	1.9	2011.03.11–05:46:22	38.0	142.5	24	14	14	2.4 153	13.8 26	32.9		7.7 154	8.4 149	167 91	8.8 86



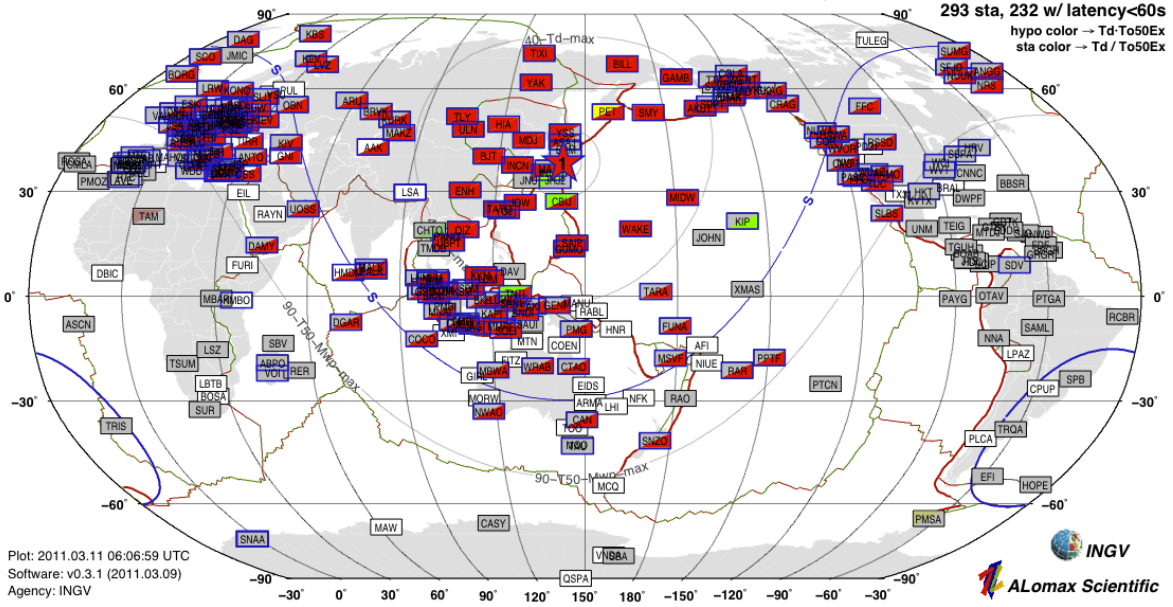
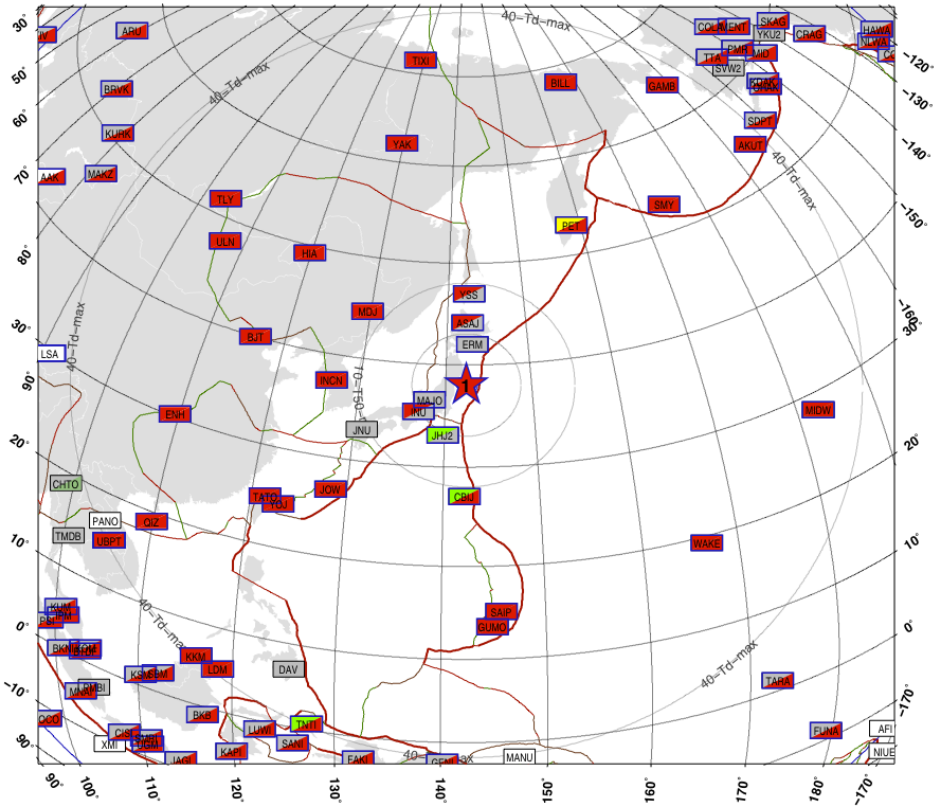


Honshu, Japan 2011.03.11 - INGV Realtime Monitor
OT+20min: mB=7.7 Mwp=8.4 TsunamiWL=37RED Mwpd=8.8





Earthquake Location · Td·T50Ex Level · mB · Mwp · T0 · Mwpd Monitor

Earthquake details (automatic solutions):

n	pha	Δmin°	σot	origin–time–UTC	lat°	lon°	errH	depth	errZ	T50Ex [n]	Td [n]	TdT50 WL	mB [n]	Mwp [n]	T0 [n]	Mwpd [n]
1	177	3.7	1.9	2011.03.11–05:46:22	38.0	142.4	23	14	15	2.4160	15.1 31	36.7	7.7166	8.4156	175138	8.8131