



## **The March 11, 2011 (Mw=9.1) Japan interplate earthquake: What happened and what is next?**

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A great earthquake is in fact the last stage of an earthquake cycle. Preparatory processes which precede great earthquakes generate large-scale preparatory phenomena; however, such phenomena should be viewed in a right domain to be interpreted correctly. Almost all such preparatory phenomena take place out of the asperity areas.

The March 11, 2011 Tohoku earthquake is widely studied by different research groups using different methods. However, like all other earthquakes, no conclusive model is presented for the event. This roots in factors such as non-uniqueness of inversion processes, insufficient constraints, different Green functions and different methodologies with different sensitivities.

Here we try to link the asperities of the 2011 Tohoku earthquake to a gravity derived measure, Trench Parallel Bouguer Anomaly (TPBA), which seems to delimit the asperities in the forearc settings. We used teleseismic body-waveform inversion to derive slip distribution of the event and its major foreshock of March 9, 2011 (Mw=7.5). We demonstrate the positive correlation between the TPBA-derived asperities and the asperities found from the waveform inversion. The slip distribution of the foreshock and its associated minor tsunami were important but ignored clues on the looming main earthquake. We present a likely developing scenario for these two earthquakes.

Stress transfer, TPBA distribution and the seismicity with respect to the location of TPBA-derived asperities are used to discuss the characters of the likely future tsunami-generating earthquakes in the neighboring area.