

Relationship between half-graben and high-velocities area at depths of 10km 6

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Figure 1 indicates subducting and resurfacing of the hot plate and the ridge. This model may apply to Tanzawa area (Figure 1) and Central Hokkaido.

Figure 3 indicates high-velocities area at depths of 10km in Tohoku area along Pacific coast and off Tohoku. In the area above mentioned in Kitakami Mount, there is adakitic andesite.

Off Hachinohe, Miyako and Minamisanriku about 150km-200km, there are three high-velocities areas.

Under these high-velocities areas (intra Tohoku plate), beneath the boundary surface of upper and under plates, there is low velocities area that is about 50km deep from north to south about 100km wide from east to west. This low velocities area ranges to Ibaragi Prefecture through near the epicenter of M9 on 2011, 3, 11.

This huge **low velocities area's poisson's ratio is also low**. The similar area exists in Unzen in Nagasaki Prefecture from the ground to at the depths of about 30km and about 30km wide from east to west. That means the possibility of the existence of fluid magma or a mass of **partial melted rock or kind of cristobalite, tridymite, quartz** from Off Tohoku to off Ibaragi Prefecture. (Refer Nakamura 2008 tomography)

In the low velocities area above mentioned there exists high velocities area from north (off Kamaishi) to south (around the epicenter of M9 on 2011, 3, 11) about 250km long about 20km wide from east to west.

Deep blue oval indicates the high velocities area which stretches over Tohoku Plate (upper) and Pacific Plate (under), and red oval indicates the low velocities area which stretches over the upper and under plates.

Near the latter area, foreshock of M9 on 3, 11 swarm activities since 13 in February in 2011 (maximum 5.5M), M7.3 on 9, the main shock of M9 on 11th in March in 2011 occurred.

This ductile low velocities area pushed by following Pacific plate may be pressed flat and push up and stick to the upper plate (Tohoku plate). In addition to strong sticking, stretching over the upper and under plates of high and low velocities areas, **this flexibility of huge low velocities area may have made earthquake activities seldom before M9 of 3, 11 in 2011 and this may have had it difficult to find out the huge asperity of M9.**

