

Seismicity Surrounding the Super-critical Fluid Distribution in the Crust: Some Cases in NE Japan

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We have been imaging electrical conductors underneath the volcanic regions in NE Japan using magnetotelluric method. These conductors are compared with seismicity in detail. High seismicity distributes above the crustal conductors beneath Onikobe Caldera, Naruko Caldera, and Sanzugawa Caldera. In these areas, the cutoff depths of the earthquakes almost coincide with the top of the crustal conductor. The high seismicity zones are above the conductors and are in the resistive zones. These links between the fluid and seismicity imply that the fluid distribute in the ductile region and capped by silica cap due to the low solubility around 400 degree C (Saishu et al., 2014, Ogawa et al., 2014). The episodic invasion of fluids into the resistive zones will trigger seismicity by abruptly increasing pore pressures (Sibson, 2007, 2009).

In the case of the Shirasawa Caldera, there was high seismicity after 2011 in the central part of the caldera (Okada, 2014). We have found that this seismicity is located at the western rim of the conductor, which implies that fluids may have invaded laterally.

References:

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Keywords: geofluids, seismicity, resistivity, magnetotellurics