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Seismicity and crustal structure in the focal area of the inland earthquakes induced by the 2011 Tohoku-Oki earthquake

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After the occurrence of the 2011 Tohoku earthquake with a magnitude of 9, the seismicity in the overriding plate has changed. The seismicity seems to form the seismic belts. The earthquakes after the 2011 Tohoku earthquakes tend to be located at the edge of these seismic belts.

From the time-latitude distribution, we can see the change of seismicity in the occurrence of the 2011 Tohoku earthquake. Most of the earthquake clusters have activated just the 2011 Tohoku earthquake and decreased, although some of them activated gently. In some earthquake swarms, we can observe temporal expansion of the focal area. This temporal expansion can be explained by the fluid diffusion.

In the lower crust, we found seismic low velocity zone, which seems to be elongated along N-S or NE-SW, the strike of the island arc. These seismic low-velocity zones are located not only beneath the volcanic front but also beneath the fore-arc region. Seismic activity in the upper crust tends to be high above these low-velocity zones in the lower crust. Most of the shallow earthquakes after the occurrence of the 2011 Tohoku earthquake are also located above the seismic low-velocity zone. Normal fault earthquakes in northern Ibaraki and southeastern Fukushima are also located just above the seismic low-velocity zone.

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