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Anomalous variations of geomagnetic intensity possibly induced by the 2011 off the Pacific coast of Tohoku Earthquake

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Anomalous variations of geomagnetic field possibly induced by the 2011 off the Pacific coast of Tohoku Earthquake (M9.0) are obtained from one-minute total intensity data at sites operated by Kakioka Magnetic Observatory, Japan Meteorological Agency (JMA).

Differences between the geomagnetic total intensity obtained at Iwaki (IWK), which located approximately 210 km from the epicenter and that at the reference point, Memambetsu (MMB), located approximately 650 km from the epicenter, decreased in 7.2 nT from 14:39 JST to 15:01 JST, and increased in 6.4 nT from 15:01 JST to 15:14 JST. As occurrence time of the earthquake is 14:46 JST after JMA, the decrease at IWK is preceding the earthquake.

On the other hand, at Kakioka (KAK) and Kitaura (KTR), both are located approximately 300 km from the epicenter, variations of the total intensity at these sites with reference to MMB decreased in 2.2 nT and 2.9 nT respectively from 14:52 JST to 14:55 JST, and recovered by about 15:00 JST. However, the preceding variation detected at IWK was not observed at KTR and KAK.

Keywords: 2011 off the Pacific coast of Tohoku Earthquake, geomagnetic, total intensity