Paleomagnetic and rock magnetic approach to the analyzing seismo-turbidite in the Tohoku-oki earthquake rupture zone

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In order to understand the paleo-earthquake record induced by seismo events around the rupture zones of the 2011 and past earthquakes off Tohoku, sediments were collected from the slope and trench in Japan Trench. To reconstruct the earthquake history from deep-sea sediments, it is crucially important to obtain a detailed chronological record. Although dating of deep-sea marine sediments below the calcium compensation depth (CCD) such as those around the Japan Trench is particularly challenging, we found the high potential of paleomagnetic data to obtain detailed ages from the samples. Inclination and declination variations in paleomagnetic records obtained show systematic changes and good correlations to the reference geomagnetic secular variation curve. Those data are very excellent to establish age models with scale of secular variation, and can contribute insights into the earthquake history of the region.

Other than the chronological information, rock magnetic properties of the sequences such as magnetic mineral granulometry provide the information of sediment depositional processes. Particularly monotone fining upward in magnetic grain size, which is observed in the intervals of event deposits with a few meter scales, is one of unique characteristics in the sediment core from the Japan Trench axis. Analysis in detail can categorize the fining mode into a few patterns. This discrimination is probably useful to understand the sedimentation and discern the intervals of the event deposits. They are necessary information to understand the spatio distribution of seismo-event deposits in the wider area, Japan Trench.