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We studied marine magnetic anomaly and magnetization of the subducting Pacific Plate seaward of the Japan Trench. Magnetization is one of the indicators to understand physical and chemical conditions of the oceanic plate, and also tectonic processes the plate has experienced. The Pacific Plate on the seaward slope of the Japan Trench is characterized by a series of parallel magnetic anomalies (Japanese Lineation) during M14-M7 (140-132 Ma). Half spreading rates when the plate was formed were estimated to be 4-6 cm/yr which is categorized as fast-spreading. It was considered that the plate was situated at low latitudes in the southern hemisphere, and was drifted to the present place. We made the magnetic anomaly dataset by compiling our JAMSTEC data, as well as data from Japan Oceanographic Data Center (JODC), National Geophysical Data Center (NGDC), and Geological Survey of Japan (GSJ). The magnetic anomalies are well lineated and have high-amplitudes. Meanwhile, the Pacific Plate is being subducted beneath the Tohoku Arc at the Japan Trench. The amplitudes of the anomalies gradually decrease toward the land from the trench axis. The decrease of amplitudes is mainly caused by increasing depth of the oceanic plate associated with subduction. In order to correct the effects caused by increasing depth of the subducting plate, we calculated magnetization from the magnetic anomaly. We used a three-dimensional inversion method for the calculation of magnetization. Upper surface of the magnetic layer was assumed to be the surface of oceanic crust. In the seaward slope, the surface was defined by subtracting 500 m as the thickness of sedimentary layer from the bathymetry. The surface of the subducting oceanic crust in the landward of the trench was determined using seismic refraction and reflection profiles. Densely distributed profiles of seismic survey in the study area enabled us to constrain the depth of the plate. The declination and inclination of magnetization were set to be several directions around -30° to +30°, -20° to +20°, respectively, in reference to ocean drilling rock magnetic measurements, skewness of the magnetic anomaly, and seamount's magnetization. On the seaward slope of the Japan Trench, fracture zones, which are originated from transform faults and are large offsets in the oceanic plate, are not identified. However, the existence of non-transform discontinuities (NTD) is probable. The NTDs are important to better understand the physical conditions of the oceanic plate, because they may act as some kind of weak zones. However, the NTDs are difficult to be identified, because sedimentary layers cover the old seafloor and conceal the abyssal hill fabrics. In this situation, the magnetization is useful for identifying the NTDs. Magnetic lineations located in 37°-39°N adjacent to the trench show highly oblique and largely discontinuous. This disorganized structure was implicated in the past ridge propagation. In other places, higher magnetization or small dislocation linearly aligned sub-perpendicular to the strike of magnetic lineations could suggest small offset NTDs. Low magnetization appears on the seaward slope near the trench, and the magnetization intensity gradually decreased as the plate subduction proceeded. On the seaward slope, horst-graben structure has been developed and large steps have

grown associated with plate bending and normal faulting. Tectonic phenomena such as formation of the horst-graben structure and subsequent plate subduction would cause destruction and disorganization of the magnetic layer by faulting, which implies mechanical demagnetization. Possible cause of chemical demagnetization in the oceanic crust is low-temperature oxidation due to hydrothermal circulation along the faults. Serpentinization of the uppermost mantle may modify the magnetization.

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