

Structural discontinuities inside the Pacific plate offshore the Tohoku region, revealed by seismic reflection imaging

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We have investigated the material properties and the tectonic processes that govern the Pacific plate just before it is subducted in the Japan Trench Subduction zone. We reprocessed the 500 km long data retrieved by the summer 1991 seismic survey offshore of the Boso peninsula and Tohoku regions and produced a high resolution image of the Pacific plate crust and Mantle lithosphere beneath it. We have conducted a CMP gather analysis combining 18828 traces and applied a first arrival mute at almost every 4 shots. Consecutively we applied NMO corrections after determining stacking velocity values every 30 CMP gathers, which is equivalent to every 800 m along the profile. The corrected traces enabled us to retrieve a high resolution image of the sediments deposited on the Pacific plate. The upper part of the plate is characterized by a thick sequence of sediments offshore of the Boso peninsula that becomes progressively thinner towards the north in the region offshore the Tohoku region. This could be due to the geometry of the profile, since the southern part is further away from the trench than the north. Offshore Tohoku the sediments are possibly eroded and redeposit inside the trench by down going currents. Our profile intersects with a seamount range that is currently subducting under the Japan Trench. The sedimentary sequence on the Pacific plate around this range is disturbed by a thick sequence of possibly volcanic origin sediments derived from the seamount range. The sedimentary units offshore Boso peninsula display an uplift of several hundred meters. This could suggest that the area of the Pacific plate behind the triple junction point with the Japanese Arc and Philippine Sea plate is under a compressive regime.

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