

## Seismic structural changes in the incoming oceanic plate beneath the well-developed horst and grabens

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Recent seismic, electromagnetic, and thermal structure studies in the trench-outer rise region have revealed the structural changes of the incoming plate in the trench-outer rise region. These structural changes are considered to be caused by the plate bending-related faulting and water penetration. However, there are many unresolved questions such as the maximum depth of the structural changes, the mechanisms of the water penetration, and the source of the water.

The northwestern Pacific margin, where extremely old (more than 120Ma) oceanic plate is subducting, is a good place to study structural changes in the incoming plate prior to subduction, because the horst and graben structure, which is caused by the bending-related faulting, is well developed in this region. However, the former seismic survey could not revealed the seismic structure around the trench axis, where seismic structure is expected to be significantly changed, because of the large water depth in the vicinity of the trench axis.

In 2013, we conducted extensive wide-angle seismic reflection and refraction surveys across the Japan trench with use of ultra-deep Ocean Bottom Seismometers (OBSs). Our obtained data enabled us to reveal the seismic structure in the vicinity of the trench axis, and we confirmed that the bending-related structural changes reach to the top of the oceanic crust. In addition, in the record sections obtained at the deep grabens, we observed seismic waves that laterally propagate within the sedimentary layer as well as the phases vertically propagate within the sedimentary layer. These two phases provided us new insights to the sedimentary structure, which implies that the bottom of the sedimentary layer can be the water source to the oceanic crust in the trench-outer rise region.

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