Seismic reflection imagery of oceanic finestructure near the Kuroshio axis

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Oceanic fine structures, especially in a layered form, is a common feature in frontal regions. So far our observational knowledge on

these structures has principally relied upon series of CTD profiles with sparse horizontal resolution, which often requires risky interpolation between adjacent profiles. Recent developments in the seismic imagery and the expendable instrumentation enabled the visualization of the layered structures with surprisingly high resolution (˜10m) both vertically and horizontally, which is high enough to track a single layer for horizontal distance over tens of km.

First we reanalysed seismic reflection data acquired in the Kuroshio off the Shikoku Island. The seismic data clearly show that finestructures extend over 50km perpendicular to the current in almost all of the profiles.

Next we conducted a survey in the region of the Kuroshio extension front, along which cold and fresh Oyashio water subducts into warm and salty Kuroshio current and thus exhibits strong thermohaline contrast. In the survey we acquired seismic reflection data simultaneously with CTD measurements. The seismic sections across the Kuroshio axis all show distinct reflection surfaces at the depth of 200-700 m, which are well consistent with the observed salinity and temperature profiles.