Recently the Kuroshio-Oyashio transition region (KOTR) is called "climate hotspot", because of extremely large heat release from sea surface. Therefore, to elucidate processes of the air-sea interaction in KOTR is crucially important for understanding the role of the mid-latitude oceans for climate change. The air-sea interaction processes in KOTR, however, are not necessarily clear, because of a lack of in-situ simultaneous observations of the upper ocean and lower atmosphere. In particular, energy transfer between the ocean and atmosphere, and the vertical structure of turbulent energy dissipation rate, epsilon, in the ocean mixed layer (ML) are almost unclear.

In this study, we focus on a daily cycle of epsilon in the ML and the surface buoyancy flux in KOTR. Over five-day period from 18th to 24th October 2009, the R/V Tansei-Maru was on station at 34.20N, 143.23E north of the Kuroshio Extension where water masses with various characteristics are intricately distributed. Epsilon was determined by the ensemble average of four velocity vertical-profiles observed at 3-hour intervals from surface to 500db by TurboMAP (Alec Co., Ltd.). Time-series of surface buoyancy flux is also derived based on in-situ atmosphere observations using radiosondes and shipboard meteorological sensors.

Our observation results showed that the ML depth hardly change throughout this observation period, whereas temperature and salinity in the ML considerably change. This suggests that energy input from the sea surface external force do not necessarily lead to deepening of the ML depth, and that the horizontal advection effect is quite large in KOTR.