[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

# [A-OS11]What we have learned about ocean mixing in the last decade

convener:Toshiyuki Hibiya(Department of Earth and Planetary Science, Graduate School of Science, University of Tokyo), Louis St Laurent (Woods Hole Oceanographic Institution), Ren-Chieh Lien(None, 共同), Robin Ann Robertson (China-ASEAN College of Marine Science Xiamen University Malaysia)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The study of ocean mixing processes has made great strides in development of observation technology over the last decade. This includes the improvement of micro-scale and multi-scale profilers, innovation of ocean gliders, as well as identifying internal waves and turbulence through echo sounding from an underway research vessel. These new technologies enable field observations of ocean mixing processes to extend much deeper and wider than ever before. The accumulated knowledge of the observed features has stimulated theoretical and modeling studies related to ocean mixing processes such as internal wave-wave interactions, internal wave interactions with background shear, and associated energy cascade down to dissipation scales as well as assessment and reformulation of existing turbulent mixing parameterizations to be incorporated into the global circulation and climate models.

This session encompasses a wide variety of coastal and open ocean mixing processes; from the surface through the interior to the near boundary benthic mixing, including the roles of mixing in the biological processes and productivity of the ocean. Through detailed discussions, we would like to confirm how far our understanding of the ocean mixing processes has advanced over the last decade, defining the new frontier of ocean mixing research to be tackled in the next decade.

# [AOS11-P12]Seasonal variation of near-inertial internal wave energy and associated water masses modification in the Okinawa Trough

*Hirohiko Nakamura[1], Naoya Kudo, Ayako Nishina[1], Toshiya Nakano[2] (1.Kagoshima University, 2.Japan Meteorological Agency)

Keywords:North Pacific Intermediate Water,, Vertical mixing, Repeat hydrographic sections, Moored current-meter records

The Okinawa Trough, which is separated from the Philippine Sea by a submarine ridge associated with the Ryukyu Island chain, is a relatively shallow basin over the western boundary of the North Pacific subtropical gyre. This basin is characterized by the following aspects: the Kuroshio flows northeastward over complex bottom topography along the continental slope and across the straits, and baroclinic tidal energy is significantly stronger than that in the interior ocean. The observations, therefore, show the evidence that several types of topography-current and topography-wave interactions occur, and strong turbulent mixing is exited around the Okinawa Trough. Furthermore, the previous studies have revealed that the water masses, particularly the North Pacific Intermediate Water (NPIW) carried by the lower part of the Kuroshio, is strongly modified within the Okinawa Trough by strong turbulent mixing, which is estimated to be O ($10^{-4}$) $m^2$ $s^{-1}$ in average.

In this study, we examine the seasonal salinity variation for the NPIW around the Okinawa Trough, and its relation to the seasonal variation of vertical mixing there. For this purpose, we perform two kinds of data analyses: one is to describe the seasonal salinity variation of NPIW using data from two repeat hydrographic sections across the Kuroshio in the Okinawa Trough, and the other is to describe seasonal and spatial variations of near-inertial internal kinetic energy in the Okinawa Trough using historical moored velocity records. Based on these analyses, we suggest that the seasonal variation of vertical

mixing due to near-inertial internal wave breaking causes that of the NPIW in the Okinawa Trough. The discussion is devoted to inferring the mechanism for seasonal variation of near-inertial internal kinetic energy input, focusing on wind forced motion and Kuroshio meander motion.