

Team MIROC: Multidecadal modulation of tropical instability wave activity during the last few decades

Yoshimitsu Chikamoto[†]; Yukiko Imada; Hiroaki Tatebe; Yoshiki Komuro; Masahide Kimoto

[†] University of Tokyo, Japan

Leading author: chika44@aori.u-tokyo.ac.jp

Long-term modulation of tropical instability waves (TIWs) is investigated both in the Pacific and Atlantic Oceans using a high-resolution ocean assimilation dataset. TIWs have a potential to affect a large-scale oceanic heat balance. However, it is difficult to figure out the changes in TIWs for a multi-decadal time scale because of the lack of fine observational network. In this study, we analyze results of a high-resolution coupled general circulation model assimilation in which observed anomalies of ocean temperature and salinity are assimilated but TIW-scale eddies are resolved by the model. It tells us the possible process of TIW changes due to the background low-frequent variability. The results indicate that TIW activity increased rapidly after 1980s in the tropical Pacific, while it was moderately weakened in the Atlantic Ocean. In the tropical Pacific, an intensified temperature front north of the cold tongue provided increase of baroclinic source for TIWs. On the other hand, in the Atlantic Ocean, a weakened meridional temperature gradient and zonal current shears connected to the reduction of barotropic and baroclinic sources for TIWs. These differences between two oceans came from the different pattern of background surface temperature shift.