
[EJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

[A-CG39]Multi-scale ocean-atmosphere interaction in the tropical Indo-Pacific region

convener:Yukiko Imada(Meteorological Research Institute, Japan Meteorological Agency), Tomoki Tozuka(Department of Earth and Planetary Science, Graduate School of Science, The University of Tokyo), Hiroki Tokinaga(京都大学防災研究所, 共同), Yu Kosaka(Research Center for Advanced Science and Technology, University of Tokyo)

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Multi-scale ocean-atmosphere interaction in the tropics exerts a significant imprint on the global climate via atmospheric teleconnection. Since the 1980s, anchored by in-situ and satellite observations, improvements in modeling and theoretical understanding, various aspects of dominant modes of interannual (e.g., ENSO and IOD), intraseasonal (e.g., MJO) variabilities and their impacts on tropical (e.g., monsoons) and extra-tropical (e.g., North America) climate variations have received wide attention. Recent satellite-based salinity measurements indicate for an active role of salinity in the tropical ocean-atmosphere interaction. While recent studies suggest a possible link between interdecadal Pacific oscillation and global warming hiatus in 2000s, changes (if any) in the tropical ocean-atmosphere interaction are yet to be understood. Due to interactions between different time scales, between different ocean basins, and with the extratropics, the tropical ocean and atmosphere play a key role in shaping climate, its variability and change. To better understand and examine these challenging issues from various perspectives, this session offers a forum to discuss recent progress in observational, modeling and theoretical studies of multi-scale tropical ocean-atmosphere interaction.

[ACG39-P04]Patterns of basin-wide warming in the Indian Ocean and their possible mechanisms

*Natsumi Tanji¹, Hiroaki Ueda² (1.College of Geoscience, School of Life and Environmental Sciences, University of Tsukuba, 2.Faculty of Life and Environmental Sciences, University of Tsukuba)

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After the peak phase of El Niño, usually emerges in the boreal winter, positive sea surface temperature (SST) anomaly appears in the entire Indian Ocean (IO) toward the succeeding summer. This basin-wide warming induces anomalous anticyclone (AAC) over the northwest Pacific through the Kelvin wave-induced Ekman divergence, which has a great impact on the Asian climate including rainfall and tropical cyclone frequency. In the present study, we examine the physical processes involved in the individual coherent events, specifically its seasonal evolution and spatial pattern in terms of the heat flux changes at the ocean surface and zonally propagating ocean waves in the thermocline. Region of the strongest warming in the IO usually seen in the boreal winter moves across the equator toward the summer season. Statistically, major factors for the eastern IO warming can be ascribed to increased solar radiation together with decreased evaporative cooling. In addition to this, we confirmed that the ocean processes such as the downwelling Rossby wave and Kelvin wave contributes to the warming in the tropical IO. The diagnosis for the 1991-92 ENSO event shows absence of the basin-wide warming. Meanwhile, SST anomaly in the Atlantic Ocean exhibits unique feature in comparison with the statistically derived relationship. It is conceivable that the IO SST could be regulated by the Pacific Ocean as well as the Atlantic Ocean, implicating presence of trans-basin interactions.