[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

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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-P03]Effects of the Australian monsoon on the duration of La Niña longer than that of El Niño

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In general, La Niña has longer duration than El Niño. That is, La Niña tends to remain for one year or longer, while El Niño decays within a year. The Australian monsoon plays an essential role for this long duration of La Niña. In spring after the mature phase of La Niña, the precipitation anomaly around the Indonesian maritime continent (IMC) is positive with the upward branch of Walker circulation. The positive precipitation anomalies further remain due to the temperature difference between IMC and northern Australia (NA). When La Niña occurs, the sea surface temperature (SST) is barely high around IMC, while land cooling is strong over NA due to the positive precipitation anomalies there, both of which make the large temperature difference between IMC and NA (IMC >NA). From boreal spring to summer, i.e., from austral fall to winter, the temperature of NA seasonally decreases. Such seasonal and anomalous temperature decreases over NA give rise to the substantial large-scale land breeze from NA to IMC, i.e., the stronger-than-normal Australian “winter” monsoon forcing positively large precipitation anomalies over IMC and to the south through the activation of vertical instability near the surface. The positive precipitation anomalies retain the upward branch of Walker circulation around IMC and overcome the effects of Kelvin wave from the tropical Indian Ocean and others inducing the transition from La Niña to El Niño. Thus, La Niña continues until boreal fall or winter, while El Niño decays by boreal spring or summer without such self-maintenance mechanism.