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CGD Seminar Series

The role of interannual ENSO events in decadal timescale transitions of the Interdecadal Pacific Oscillation

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Time: 11am – 12pm

For Zoom information, please contact Tracy Baker tbaker@ucar.edu

For live stream information, visit the CGD Seminar Webpage

ABSTRACT

The build-up of decadal timescale upper ocean heat content in the off-equatorial western tropical Pacific can provide necessary conditions for interannual El Niño/Southern Oscillation (ENSO) events to contribute to decadal timescale transitions of tropical Pacific SSTs to the opposite phase of the Interdecadal Pacific Oscillation (IPO), a corollary to sub seasonal westerly wind burst events contributing to El Niño interannual timescale transitions. A long pre-industrial control run with CESM1 is analyzed to show that there is a greater chance of ENSO activity to contribute to an IPO transition when off-equatorial western Pacific Ocean heat content reaches either a maximum (for El Niño to contribute to a transition to positive IPO) or minimum (for La Niña to contribute to a transition to negative IPO) as seen in observations. If above a necessary ocean heat content threshold, the convergence associated with westerly anomaly near-equatorial surface winds associated with El Niño activity can draw that heat content equatorward to sustain anomalously warm western and central Pacific SSTs. These are associated with positive precipitation and convective heating anomalies, a Gill-type response and wind stress curl anomalies that continue to feed warm water into the near-equatorial western Pacific. These conditions then sustain the decadal-timescale transition to positive IPO (with the opposite sign for transition to negative IPO). Associated central equatorial Pacific convective heating anomalies produce SLP and wind stress anomalies in the North and South Pacific that can excite westward-propagating off-equatorial oceanic Rossby waves to contribute to the western Pacific thermocline depth and consequent heat content anomalies.