

CGD Seminar Series

Seasonal to Interannual Controls on Warm Water Volume in the Tropical Pacific

Anna-Lena Deppenmeier

NCAR

Date: Tuesday, 18 May 2021

Time: 11am – 12pm MT

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

For live stream information, visit the [CGD Seminar Webpage](#)

ABSTRACT

The tropical Pacific cold tongue plays a major role in the global climate system. The strength of the cold tongue sets the zonal temperature gradient in the Pacific, coupling the ocean with the atmospheric Walker circulation. Interannual variability on the coupled circulation is known as the El Niño Southern Oscillation, which asserts influence all over the globe.

The cold tongue is supplied with cold water by the equatorial undercurrent that follows the thermocline to the east, transporting cold water towards the surface. As the thermocline shoals, its water is transformed through diabatic processes of water mass transformation (WMT) which allow water to cross mean isotherms. Here, we examine WMT in the cold tongue region from a global high-resolution ocean simulation with saved budget terms that close the heat budget. We quantify each individual component of WMT (vertical mixing, horizontal mixing, eddy fluxes, solar penetration), and find that vertical mixing is the single most important contribution in the thermocline, while solar heating dominates close to the surface. We investigate how WMT changes on different time scales, (sub)-seasonal to interannual. During El Niño events, for example, vertical mixing, and hence cross-isothermal flow as a whole, is much reduced, while during La Niña periods strong vertical mixing leads to strong WMT, thereby cooling the surface. This analysis demonstrates the enhancement of diabatic processes during cold events, which in turn enhances cooling of the cold tongue from below the surface

For more information, contact Tracy Baker | tbaker@ucar.edu | x1366