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The El Niño-Southern Oscillation (ENSO) exerts a strong influence on tropical Atlantic variability, but it is also affected by Atlantic forcing. Previous research has proposed three Atlantic precursors for ENSO: the North tropical Atlantic, the equatorial Atlantic, and the entire tropical Atlantic. However, the relative importance of these Atlantic precursors for ENSO remains unclear. Here, we present evidence from a set of multi-model partial ocean assimilation experiments that equatorial Atlantic cooling is the main contributor for weakening equatorial zonal winds in the Indo-Pacific sector and subsequent ocean warming in the tropical Pacific. Opposite tendencies occur for a warmer equatorial Atlantic. The equatorial Atlantic affects the inter-basin climate seesaw between the Atlantic and Pacific through an atmospheric zonal Wavenumber 1 pattern. However, model mean state biases and systematic errors prevent a precise assessment of the response times for the equatorial Pacific trade winds to Atlantic forcing. Our results indicate that the accurate estimate of tropical Atlantic ocean observation could contribute to improving ENSO predictability.
Presentation file
chikamoto-presentation.pdf
Meeting name
PIRATA-24/TAV Meeting
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