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1 Notes For Cross-equatorial winds control El Niño Diversity and change

1.1 Introduction

- Relatively weak El Ninos lately, up until the very strong 2015-2016 event
- 2015 event was quite unusual because it was a mix of EP and CP characteristics
- Also there were strange winds blowing northward across the equator which were not caused by pacific processes

1.2 Methods and Results

- Weak correlation between equatorial winds and ENSO amplitude
- Strongly correlated with sea temperature gradient across different latitudes
- Medium correlation between equatorial winds and Atlantic Multidecadal Oscillation index.
- More data needed to verify
- Ran experimental simulations to further examine cross-equatorial winds
- Had to add some additional corrections to get rid of model bias/inaccuracy
- Forced experimental simulation with records of cross equatorial winds
- Measured ENSO amplitude in each simulation
- Additional winds lead to heat imbalance between north and south sides of the equator
- Temperature and wind disruptions affect ITCZ (Intertropical Convergence Zone) just like in the observed data
- significantly reduced ENSO amplitude in data
- Increased frequency of CP events compared to EP events
- Mixed layer heat budget confirms weakening

1.3 Conclusion

- Cross equatorial winds are important because they likely weaken ENSO.
- Global warming may weaken these winds, possibly strengthening ENSO
- Necessary next to consider role of cross equatorial winds on shorter time scales (years, not decades)
- Not sure what will happen to cross-equatorial winds in the future because it is unclear what complex processes control them.