Nonlinear Processes in Geophysics Discussions

Nonlin. Processes Geophys. Discuss., community comment CC1
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Comment on npg-2021-19

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Community comment on "How many modes are needed to predict climate bifurcations? Lessons from an experiment" by Bérengère Dubrulle et al., Nonlin. Processes Geophys. Discuss., https://doi.org/10.5194/npg-2021-19-CC1, 2021

Along the topologically-constrained eqatorial region, the dimensionality is much reduced and the number of degrees of freedom is lower than any other region. This equatorial region is also the source of the greatest climate variability via ENSO dynamics. The number of modes required to describe ENSO is likely a large-scale standing-wave mode corresponding to the fundemantal Darwin-Tahiti dipole, and a higher wavenumber mode corresponding to tropical instability waves. It seems that the absolute stability of these modes in spatial terms (not the erratic temporal cycling as you mention below) must warrant further consideration?

- *"In the ocean, while ENSO is reproduced by most models, correctly reproducing the magnitude and frequency of its occurrence is still challenging"*

What if the temporal dynamics was a result of a non-linear response via Laplace's Tidal Equations to a tidal forcing?