



## **Biogeochemical modeling structure of Tropical Instability Vortices in the Pacific ocean.**

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Tropical Instability Vortices (TIV) associated to Tropical Instability Waves (TIW) are prominent features of the equatorial Atlantic and Pacific Oceans. They have been shown to induce profound modifications of the marine ecosystem. Here, we use a coupled dynamical-biogeochemical model of the tropical Pacific to document and understand how TIVs affect the structure of the ecosystem. The model is run over the 1992-2004 time period and show realistic TIW dynamical variability. The model is forced with a combination of ERS1-2 and TAO (Tropical Atmosphere Ocean project) stresses over 1992- 1998 period and by Quikscat winds over 1999-2004 period. The Ecosystem model includes, PO<sub>4</sub>, NO<sub>3</sub>, Si and Iron colimitations, 2 classes of phyto and zooplankton. The patterns of nutrients, phyto, and zooplankton resemble those observed during sea experiments. First, iron balance, light availability, biological interactions, advection and diffusion of nutrients are used to understand the mechanisms at work to produce such patterns at TIV scale. Second, the variability of the different biological model compartments is compared to produce the TIW patterns. Finally, sensitivity to the spatial resolution of the model is investigated.