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Poster
Lagrangian lateral advection with altimetric geostrophic velocities can be used to stir large scale tracer fields at the ocean surface, and reconstruct mesoscale fronts and eddies. Dencausse et al, (2013) have tested this technique in the energetic Southern Ocean region south of Tasmania. Here we apply and evaluate the technique's performance in three different regions of the tropical and subtropical Pacific Ocean.
The technique is based on the passive horizontal stirring of a tracer field with altimetric velocities. The tracer field we use is based on large scale gridded Coriolis SST and SSS fields, produced from an objective analysis of in-situ data. Independent high resolution satellite SST and underway in-situ thermosalinograph data are used to evaluate our advected fields. One parameter that must be set is the advection time. While the study south of Tasmania concluded on an optimal advection time of ~2 weeks to best represent the finer scales, different values seem to apply in these new regions. These differences are mainly explained by the specific dynamics of each region. Also, physical processes other than geostrophic stirring that can affect the tracer evolution are neglected with this technique. These biases introduced in the advected fields can vary depending on the region and time of year. This is particularly true in areas experiencing heavy rainfall or warming/cooling periods.
To limit the biases owing to the physics neglected by the method, it is possible to introduce corrections (Ekman, diffusion, air-sea flux…). But another approach is to exclude the contribution of physics other than geostrophic stirring using a “backward and forward” advection technique. We find a significant bias reduction when using this latter technique.
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