Comments on "Spatial scales of temperature and salinity variability estimated from Argo observations"

This is a very interesting paper presenting the detailed estimates of temperature and salinity length scales through the ocean depth obtained from a large archive of Argo observations. We especially appreciate the simulation based (bootstrap-like) technique used to assess the estimation-error magnitudes.

A general comment

We are pleased to note that the results reported in the paper are consistent with the findings of our earlier paper "Statistical Structure of Spatial Variability of the Ocean Thermohaline Fields from Argo Profiling Data, 2005–2007" by Yu.Resnyanskii, M.Tsyrulnikov, B.Strukov, and A.Zelenko. -- Oceanology, 2010, vol. 50, issue 2, 149-165. This paper (its English translation from the original Russian version) is accessible from http://link.springer.com/article/10.1134/S0001437010020013. It is also attached to this comment.

Specifically, in both (Ninove et al. al 2015) and (Resnyanskii et al. 2010):

1) The largest length scales are found at the surface.
2) The length scales decrease with depth from the surface to an intermediate depth of about 500-800 m.
3) Below this depth, the length scales, generally, increase down to 1300-1400 m.
4) The anisotropy of scales is found to be significant only in the tropics and is most pronounced in the upper layer.
5) In the surface layer, the salinity length scales are, generally, shorter than those for temperature.

On the other hand, there are some quantitative differences in the estimated length scales between the two papers, probably caused by different estimation techniques and different data archives (a bigger archive in (Ninove et. al 2015)).

We would appreciate if Ninove et. al (2015) could mention our earlier research.

A specific comment

It is not quite clear how the fields on the sphere are simulated using the plane-geometry covariance model by Arhan and Colin de Verdiere (1985). The simulation technique could also be outlined.

Minor comments

1) P. 1798, the 1st equation. The term (1/1 +E) looks ambiguous.
2) The “magical number” 3.337 can be found in Arhan and Colin de Verdiere (1985) (actually, a bit different number 3.336). According to Arhan and Colin de Verdiere (1985), the correlation between two observations defined on p.1798 in (Ninove et. al 2015) crosses the zero correlation line at r=1, where r is defined in the 2nd equation on p.1798.

Sincerely,
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2 October 2015