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Global Comparison of Argo dynamic height with Altimeter sea level anomalies

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Our ability in describing and understanding the ocean vertical structure strongly depends upon the availability of ocean observations. On the one hand, temperature (T) and salinity (S) profiles measurements from Argo profiling floats provide sparse in-situ data but with precise estimations of the ocean vertical structure every 10 days and for large part of the world ocean. On the other hand, satellite altimetry provides synoptic observations of sea level every 7 days and over the world ocean. Despite sea level being a surface signal, it reflects the state of the ocean at depths and makes satellite altimetry a powerful tool for studying global ocean dynamics and thermodynamics.

The aim of the study is to analyze the differences and complementarities between altimeter and Argo profiling float T/S data at different time-scale - from seasonal to interannual - and space-scale - from basin-scale to global-scale. It is performed to analyze the physical content of altimeter measurements (e.g. barotropic/baroclinic signals), to better understand the vertical structure of the ocean, to quantify the respective roles of contributions from temperature and salinity to sea level and to detect systematic errors from one data type or the other.

Argo profiling floats datasets for the years 2001-2007 are used as well as AVISO altimeter combined maps.

The first part of this study is dedicated to the quantification of the respective roles of contributions from temperature and salinity to sea level. The impact of the salinity correction applied to the Argo data set in delayed mode will be also quantified. The second part of the study is to investigate the impact of the wind at low frequencies in

the altimeter products. A new Inverse Barometer correction is tested and better correlations with Argo dynamic height are expected in areas of strong wind-induced oceanic circulation. Finally, the circulation at 1000-meter depth deduced from the comparison between the in-situ and altimeter heights will be compared to the independent estimates given by the YoMaHa'07 deep velocity dataset.