



What can we learn from 3D global thermohaline fields deduced from a combination of satellite and in-situ data: Impact studies and model validation?

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Satellite altimeter and SST measurements have been combined with in-situ temperature and salinity profiles data to produce global 3-D thermohaline observed fields from the surface down to 1500 m depth. The merging approach uses first, a multiple linear regression method to derive synthetic T and S profiles from the satellite measurements. These synthetic profiles are then combined with the in-situ T and S profiles using an optimal interpolation method that takes into account analyzed error on the different observations. Twelve years (1993-2004) of 3-D thermohaline fields have been produced with this method as part of the Armor system developed in the frame of the French Operational Oceanography Mercator project. The Armor fields have been first validated and compared with independent in-situ data sets in order to provide an estimation of the performances of the system over the whole ocean. Moreover, the impact of the different observing systems (ARGO, SST) has been analyzed. Finally, the Armor fields have been used as referenced fields within the Mercator project. They have been compared with the Levitus climatology and with the different Mercator model simulations in order to quantify the information provided by the model and its dynamic.