Assessment of the Black Sea observing systems. A focus on 2005-2012 Argo campains.

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An observing system in the Black Sea combining remote sensing data such as sea level anomalies from altimetry, sea surface temperature from satellite radiometer and data from Argo floats has been analyzed with the aim to quantify the contribution of different information sources when reconstructing the ocean state. Numerical model output and statistical analysis were used for this purpose. It has been demonstrated that the statistical method performs in a consistent way reproducing known geophysical patterns. Maximum footprints of sea level, salinity and temperature were illustrated most of them clearly connected with specific thermohaline conditions and the general circulation. Reduced analysis capabilities were identified as associated with a low level of dynamical coupling between the shelf and open ocean, mesoscale dynamics and representation of diapycnic processes in the models. The accuracy of Argo pressure measurements appeared not sufficient to resolve the extremely sharp stratification in the upper layers and this is considered as the weakest point of the Argo observation network in the Black Sea. The present-day number of Argo floats operating in the Black Sea of about 10 seems optimal for operational purposes.