



Variations of the mixed layer and heat storage in the Southern Ocean based on recent hydrographic observations

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The Southern Ocean is probably the most inaccessible ocean on the planet, yet it plays a fundamental role in regulating the Earth climate because it is the main interchange of water, heat, salt and CO₂ between the three principal oceans.

In an effort to document and understand the variability of the upper Southern Ocean, we are engaged in mapping thermodynamic variables of the upper Southern Ocean from a wide base of in-situ observations. We use all public high vertical resolution data available from 1940 to present: WOCE (World Ocean Circulation Experiment) and WOD01 (World Ocean Database 2001) data, combined with the most recent AMD (Atlantic Meridional Transect), Mirounga04 (Elephant seals), GTSP (Global Temperature-Salinity Profile Program) and ARGO databases. The last three allow a better spatial coverage in the southern latitudes and cover many totally unsampled regions. Particular efforts are spent in quality check and data mapping.

We examine the seasonal variability of mixed layer depth, temperature and salinity, together with heat and salt content of the upper ocean. Interannual variations can only be analyzed in specific regions with better data coverage (e.g. south-west Atlantic). We compare our results with satellite observations, in particular we examine to what extent sea surface height from Topex/Poseidon can be considered as a proxy for heat content. Finally causes of observed variations are investigated using simple heat budgets.