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The structure of temperature field in mesoscale eddies at the surface of the ocean in the Drake Passage.

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The study of mesoscale eddies of the Antarctic Circumpolar Current (ACC) were performed on the basis of satellite data on the Absolute Dynamic Topography (ADT) produced by Ssalto/Duacs and distributed by Aviso, with support from Cnes (http://www.aviso.altimetry.fr/duacs/), and data on the ocean surface temperature (SST) of the Australian Centre of Weather and Climate research CAWCR (The Centre for Australian Weather and Climate research), calculated in the framework of the GAMSSA project (Global Australian Multi-Sensor SST Analysis, http://data.nodc.noaa.gov/las/getUI .do?dsid = id-c80878d11f & varid = analysed_sst-id-c80878d11f & auto = true/).

We developed an algorithm and implemented a program for detection and mapping of cyclonic and anticyclonic mesoscale (synoptic) eddies in the ADT field for arbitrary day of the 19-year series of satellite observations. Preliminary results of the parameters and spatial distribution of mesoscale eddies in the region of the Drake Passage were obtained. The main part of eddies with different signs is associated with meandering jets and fronts of the ACC.

To study the structure of the eddy surface temperature the eddy contours in the ADT field were mapped in the field of satellite SST for the same dates as the ADT data. Isotherms in cyclones and anticyclones reveal asymmetrical distribution of temperature. In the eastern (usually front) part of the cyclonic eddy, where the water transfer is directed from the low latitudes (clockwise in the Southern Hemisphere) to the high latitudes, the temperature is higher, and in the west (usually rear) part, where the water transfer is directed from high to low latitudes, it is lower. At the same time, the isotherms in cyclonic eddies deflected up in the form of domes and oriented to the northern or north-eastern direction. In the anticyclones, on the contrary, the isotherms deflected down in the form of cups and oriented mainly to the south. It should be noted that many of natural processes at the ocean surface and in its depth can significantly modify this scheme.

We present a scheme of formation of the surface structure of the temperature field in the eddies of different sign. It was shown that large forms of bottom topography are steering factors in the dynamics of eddies, defining a trajectory of the motion of eddies and their internal structure. The interaction between eddies leads to complicated structures of temperature fields in the cyclonic and anticyclonic eddies.