320

CURRENT UPPER-AIR PARAMETERS TRENDS OVER ANTARCTICA

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The troposphere and stratosphere over Antarctica is characterised by specific features in comparison with the conditions of other climatic zones. These features include extreme climatic events, powerful spring stratospheric warming, a unique dynamic regime of a strong circumpolar vortex, special conditions of the radiation energy exchange and physical-chemical transformations in the atmosphere related to ozone dynamics. Significant experience of upper-air sounding carried out at Russian (Soviet) Antarctic stations is presently summarised in the atmospheric module of Geographic Information System “The Antarctic”, which is aimed at a numerical analysis of the current and historic climate conditions of Antarctica and based on available observation data over the total period of instrumental measurements. Due to initial data control, the gaps in operational information were filled and random and systematic errors leading to inhomogeneity of the initial data sets were removed on the basis of information about the statistical structure of the upper-air parameter fields and metadata. Joint analysis of temperature, geopotential, humidity, wind speed and cloudiness is based on following upper-air datasets: CARDS, AARI database and SCAR information resources. Surface warming over Antarctic Peninsula is accompanied by changes in sea ice extent, changes in main atmospheric parameters in troposphere (warming in the troposphere, increasing of water vapour amount observed in middle troposphere), and also by increasing of cyclone frequency and changes of cloudiness vertical macrostructure. The coincidence of the tendencies of the interannual variability of the dynamic Antarctic Oscillation index and the thermal regime parameters of the atmosphere above the Antarctic Peninsula indicates that the pronounced regional warming can be related to the prevailing changes in the circulation conditions of the Southern Hemisphere. Estimates of upper-air trends for different Antarctic areas are presented. The creation of comprehensive Russian Antarctic stations upper-air dataset was supported by SCAR READER Project, RFBR Project 01-05-65285 and Russian Program “Study and Investigation of Antarctica”.