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Regional warming at the Antarctic Peninsula as viewed against global changes

V. Tymofeyev

Ukrainian Research Hydrometeorological Institute Kiev Ukraine (tvvlad@mail.ru)

Recent climate warming in extratropics has peaked in both polar regions with such a great rate that exceeds global averages so these changes are often interpreted as rapid ones. It is important that time frames and many seasonal characteristics of warming are comparable in such remote regions as Alaska and Antarctic Peninsula. Although meteorological records on Antarctic Peninsula are significantly shorter than those in the Northern Hemisphere they cover period of relative cooling in mid-XX century (Period 1) and most progressive warming after mid-1980s (Period 2). Warming on stations at Antarctic Peninsula sector has peaked in late 1990s without further warming in the recent years although current temperatures are also significantly exceeding climatology. The main purpose of the large-scale tropospheric circulation analysis was to find out how weather patterns are changed between Periods 1 and 2 (data of ERA-40 reanalysis were used). Main features of circulation change consist of general decrease of barometric pressure and intensification of circumpolar flows up to lower stratosphere that also intensifies ozone depletion. In the lower troposphere, circulation became more homogenous and predictable during the recent warming episode, specifically because of dominant cyclogenesis in the western Antarctic sector; many traits of regional climate are found to be depended on ENSO conditions. In the regional scale of Antarctic Peninsula warmer and wetter westerlies or north-westerlies towards Graham Land are strengthened and intrusions of cold air from the interior of Antarctic continent became rare, if compared with coldest period. Both factors (warming, increased liquid precipitation) and stronger winds were responsible for growing instability of the regional glaciation with collapse of the Northern part of the Larsen ice shelf in 2002 as a clearest example. Decadal changes of tropospheric circulation are shown by means of so-called ‘etalon’ mean sea level or geopotential fields, calculated for individual seasons for each year and decade. Etalons are calculated on their probability accord-

ingly to statistical method of pattern recognition by Prof. V. F. Martazinova, that let us to describe large-scale circulation by means of small number of etalon fields (as a rule, 3-4). It was concluded that etalon fields are significantly differed for coldest and warmest decades, and important decadal changes can be caught: blocking episodes were more frequent and shifted ‘deeper’ south during coldest decade and individual cold years, whereas blocking in 1990s predominantly develops north of 60S, depression at Ross Sea expands its area eastward as well as climatic wedge at Antarctic Peninsula longitudes. This is similar to behavior of main climate-making tropospheric sytems in the Northern extratropics we found early. It is thought that above-described etalons could be a good tool for analysis of multi-years’ change of large-scale atmospheric circulation in any region, as well as for studying teleconnections, and could also serve as basis for weather forecasts on different ranges.