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Regional warming at the Antarctic Peninsula and tropospheric circulation change

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Recent and current processes in the climate system of the Antarctic Peninsula are under care look of climate scientists, first of all because of marked warming trend in the lower troposphere. In particular, the West coast of the Peninsula is warmed by the rate of about 2 faster than the global average, and at selected stations it exceeded 2degC per 50 years. In general, time limits of this regional warming are in correspondence to global warming, although some stabilization of air temperatures growth was registered for the latest 5-7 years. The warming is mainly caused by the growth of mean winter air temperatures along with decrease of year-to-the-next amplitudes, and growth of minimum temperatures over the recent decades, in comparison to much colder years in 1950s and 1960s. Summer warming is much smaller but potentially of greater significance for glaciers recession, because of exceeding a freezing point. Steady decrease of barometric pressure within the belt of lower pressure of the Southern Hemisphere with intensification of westerlies have been the most important features of circulation change during the last decades. Intensifying westerlies cut cold air advection from the Antarctic continent so climate at the Antarctic Peninsula became warmer. Most changes in circulation touched Western sector of the Southern Ocean, with deepening the climatic cyclone in the Ross Sea, and weakening of high pressure systems with more rare anticyclonic blocking episodes between the Antarctic continent and austral extratropics. It is concluded that such changes in tropospheric circulation are correlated to changes in the lower stratosphere. Long-lived anticyclonic blocking events lead to the intensifying of meridionality up to the stratosphere; the latter cause the strengthening of meridional transport with leveling out the total ozone in extratropics. During recent years much attention was paid to Southern Annular Mode (SAM) as a main indicator of climate variability in the Southern Hemisphere and integral index of the intensity of westerlies between 40 and 65 degS. We found that SAM does

not adequately reflect changes in large-scale and regional tropospheric circulation and suggested to use a set of additional indexes in regions of main climatic depressions around Antarctica.