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Diagnostics of Long-Range Atmospheric Transport of Ozone Basing on Measurements at Kislovodsk High-Mountain Scientific Station

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The influence of atmospheric regional transport on the surface ozone concentration at Kislovodsk High Mountain scientific Station (KHMS) has been studied on the base of ozone measurements for a period from 1989 to 2001. KHMS locates on the northern slopes of Caucasus Mountains (~2070m a.s.l.) 40 km north from Mt. Elbrus. Because of the unique location of the station (far away from the strong anthropogenic sources of pollutants), the obtained data can be used for monitoring of "background" lower tropospheric ozone and investigations of regional atmospheric transport processes as well as mid-latitude ozone climatology. 3D trajectories calculated by FLEXTRA model has been used for investigation of typical transport signatures in mid-latitude synoptic systems. The strong seasonal dependence of primary transport directions associated with enhanced and decreased ozone concentrations has been found. During the warm period decreased zone concentrations are primary connected to the air masses from near-Caspian deserts as well as Iran Highlands whereas enhanced ozone concentrations are primary attributed to air transport from the Near East and industrial regions of the Eastern Europe. The basic distinction of the cold period is a frequent advection of the ozone-reach air from the Southern Europe. The results were compared with observational data obtained at European high-mountain ozone monitoring stations. Some conclusions concerning long-range ozone trends were also done. The research was made under financial support of ISTC Projects 2770 and 2773.