VARIATIONS OF THE AEROSOL CONCENTRATION AND CHEMICAL COMPOSITION OVER THE ARID STEPPE ZONE OF SOUTHERN RUSSIA IN SUMMER

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Abstract. Variations of the surface aerosol over the arid steppe zone of Southern Russia have been measured. The parameters of atmospheric aerosol (mass concentration, both dispersed and elemental compositions) and meteorological parameters were measured in the Tsimlaynsk region (Rostov-on-Don oblast). The chemical composition of aerosol particles in the atmospheric surface layer has been determined, and the coefficients of enrichment of elements with respect to clarkes in the Earth's crust have been calculated. It is shown that, in summer, arid aerosols are transported from both alkaline and sandy soils in Kalmykia to the air basin over the observation zone. Aerosol particles in the surface air layer over this region have been found to contain the products of combustion of oil, coal, and ethylized fuel. These combustion products make a small contribution to the total mass concentration of atmospheric aerosol; however, they are most hazardous to the health of people because of their sizes and heavy-metal contents. A high concentration of submicron sulfur-containing aerosol particles of chemocondensation nature has been recorded. The sources of aerosol of both natural and anthropogenic origins in southern Russia are discussed.

Keywords: aerosol pollution, mass concentration, dispersed and elemental compositions, transport, steppe zone.