

## Surface aerosol and rehabilitation properties of ground-level atmosphere in the mountains of the North Caucasus

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The rehabilitative properties (RP) of ground-level atmosphere (GA) of Russian resorts are considered as natural healing resources and received state legal protection [1]. Due to global urbanization the chemical composition and particle size distribution of the surface aerosol are changing rapidly. However, the influence of surface aerosol on the RP of GA has been insufficiently studied.

At the resort region of the North Caucasus complex monitoring (aerosol, trace gases  $\text{NO}_x$ , CO,  $\text{O}_3$ , CH<sub>4</sub>; periodically – heavy metals) is performed at two high levels (860 masl - a park zone of a large mountain resort, 2070 masl - alpine grassland, the net station). The results of the measurements are used in programs of bioclimatic, landscape and medical monitoring to specify the influence of aerosol on rehabilitation properties of the environment and human adaptative reserves. The aerosol particles of size range 500-1000 nm are used as a marker of the pathogenic effect of aerosol [2].

In the conditions of regional urbanization and complicated mountain atmospheric circulation the influence of aerosol on RP of GA and the variability of heart rhythm with the volunteers at different heights were investigated. At the height of 860 masl (urbanized resort) there have been noticed aerosol variations in the range of 0,04-0,35 particles/cm<sup>3</sup> (slightly aerosol polluted), in mountain conditions - background pollution aerosol level. The difference of bioclimatic conditions at the specified high-rise levels has been referred to the category of contrasts. The natural aero ionization  $\sum(N^+)+(N^-)$  varied from 960 ion/cm<sup>3</sup> to 1460 ion/cm<sup>3</sup> in the resort park (860 m); from 1295 ion/cm<sup>3</sup> to 4850 ion/cm<sup>3</sup> on the Alpine meadow (2070 m); from 1128 ion/cm<sup>3</sup> to 3420 ion/cm<sup>3</sup> – on the tested site near the edge of the pinewood (1720 m). In the group of volunteers the trip from low-hill terrain zone (860 m) to the lower zone of highlands (2070 m) caused the activation of neuro and humoral regulation, vegetative and central parts of nervous system, psychoemotional status, normalization of frequency spectrum of brain activity and organism adaptation level. The researches are still being conducted.

### References:

1. The federal law "About Natural Medical Resources, Medical and Improving Areas and Resorts" from 23.02.1995 № 26-fl.
2. The technique of balneological assessment of forest-park landscapes of mountain territories for the purposes of climate-landscape therapy in case of resort treatment of the contingent subject to FMBA of Russia: Handbook for doctors//Registration number 82-15 from 17.12.2015 – Pyatigorsk:MHRF:FMBA of Russia, 2015. –26 p.