Study of the atmospheric processes effect on the chemical composition of atmospheric precipitation o

T. Smirnova and G. Tolkacheva

Hydrometeorological Research Institute (NIGMI)
72, K. Makhsumov str., Tashkent, 700052, Uzbekistan,
E-mail: sanigmi@albatros.uz
Phone/fax: (99871)1331150

Regarding the natural water of Republic of Uzbekistan – the atmospheric precipitation are less studied relation to their chemical composition. This is caused by their spatial and temporal variability. Neverthe precipitation composition is in general typical for this location and presents the type of geographical la Mineralization and ionic composition are zonal characteristics.

In general, the formation of chemical composition of atmospheric precipitation is determined by the i of the marine aquatory, of soil-and-geological, cosmic, orographic, climatic, physical-and-chemical, b and local anthropogenic factors. The investigation of the trends of changes in the chemical compo precipitation falling out on the territory of Uzbekistan presents a significant practical interest.

The peculiar features of the atmospheric circulation in Central Asia depend to a large extent on the p and-geographical conditions of the territory. The western part of Central Asia is occupied with deserts t of which are higher than 200-250 m. The eastern part is occupied with the highest (in CIS countries) m systems the separate peaks of which are higher than 7000 m a.s.l.

Turan Lowland is open for the cold air masses intrusions which come without any obstruction from the n north-west during the whole year intensifying at the same time the extremely continental climate pecu It is also open for the western air masses fronts from the moderate latitudes of the Atlantic Ocean wall of Himalayas, Hindukush, mountain ranges of Pamir and Tien Shan almost isolate Central Asia moisture inflow from the south and south-east from the part of Indian Ocean though this reservoir of th air masses is the nearest to the region.

Tashkent province was selected as the object for study because it is peculiar for its arid climate, com relief, and high urbanization rate. In such urbanized zone the content of the sulfur and nitrogen con in the atmospheric air is almost completely determined by the anthropogenic emission. In the indust regional zone the anthropogenic contribution exceeds the input of the natural sources while the natur turns to be the determinative one in the geochemically clean zone.

The aim of our studies was the investigation of the possible influence of the synoptic processes' typ chemical composition of atmospheric precipitation in the urbanized regions. We calculated the percen quency of types of synoptic processes over the territory of Tashkent province. The frequency of syno cesses' types varies from year to year. The highest percentage is registered for the 10^{th} type – (the ai intrusion from the west), then the 7^{th} type is – wave activity in the cold front), then the 1^{st} type is Caspian cyclone) and the 2^{nd} one (Murgab cyclone). The rest processes are observed rarely and n year.

The methodology of studies has included the statistic data processing by the types of synoptic proce comparison of the resulted data with the chemical composition of the one-time taken precipitation which characterize specific meteorological situations.

At the same time, the percentage correlation between the maximum sulfate concentrations in the taken atmospheric precipitation samples and their relationships with synoptic processes were investiga calculation of correlation factors has shown the homogeneity of the processes over the whole studied t High frequency of the maximum values of sulfate concentrations in these processes is observed durin when the maximum precipitation amount falls out on the studied territory. This proves the possibili pollutants' washing out from the atmosphere as in winter the accumulation of products of the sulphur transformation to sulfates in atmosphere at the expense of the pollutants' emissions from the local e sources to atmosphere takes place.

Thus, at the background of the typical synoptic process in precipitation samples taken in the differ points of the investigated territory the inhomogeneity of ionic composition is observed.