The study of the aerosol impurities seasonal accumulation in a snow cover by scanning µXRF-SR.

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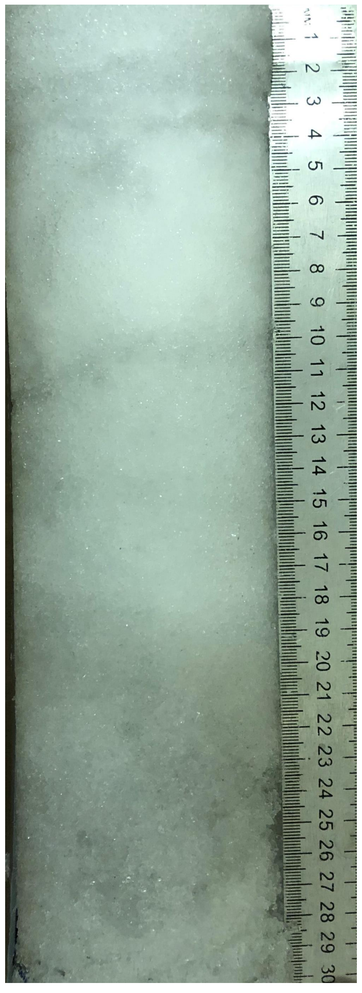
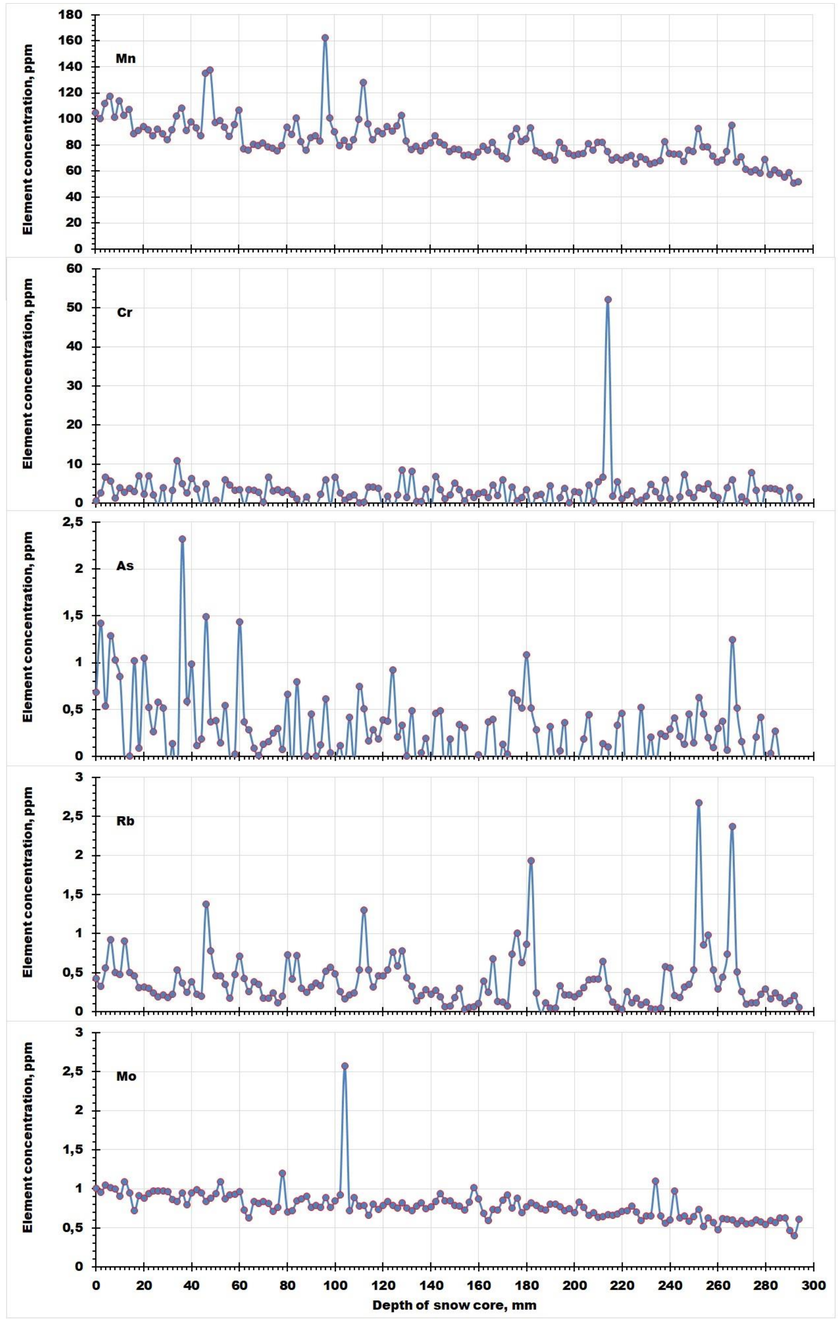


Source snow core

Snow cover is an ideal deposition medium in which aerosol particles of both natural and technogenic origin are fixed and accumulated during the winter period. As a rule, environmental studies analyze the total amount of aerosol accumulated. This paper presents a study of the aerosol accumulation dynamics in the vertical section of snow cover with high spatial (temporal) resolution.

Sampling over the entire height of the snow cover accumulated during November 2019 - March 2020 was carried out on the Novosibirsk region territory using polypropylene pipes with a diameter of 100 mm and a length of 1 m. The cores were selected to the entire depth of the snow cover to the base.



After that, the pipe was shut up from below by a tight stopper, and from above the snow was pressed by the top stopper to a total core height of 40 cm. This was done to achieve a uniform snow density over the entire core height. Mixing of snow layers did not occur. Samples were transported to the laboratory of the IGM SB RAS in a frozen state. The pipes were opened along the sampling axis and placed horizontally in a plastic box, cooled with liquid nitrogen. Snow sublimated during the day without the formation of a liquid phase. The solid components remaining in the pipe were transferred onto a conductive adhesive tape without disturbing their vertical distribution.

The analysis was carried out using the µXRF-SR according to the standard certified method at the experimental station "Elemental analysis" in the shared research center SSTRC. Experimental conditions: excitation energy 23 keV, dimensions of the exciting radiation beam 1.0 mm in height and 10 mm in width of the sample. The scanning step was 1 mm in height of the sample. The distributions of more than 20 rock-forming and trace elements over the sample depth were obtained. The data obtained make it possible to calculate the dynamics of aerosol accumulation. Analysis of individual particles is used to identify their sources.