

MAGNETIC OBSERVATIONS IN THE ARCTIC AND ANTARCTIC

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The importance of magnetic observations in the polar regions is determined by the dipolar structure of the Earth's magnetic field. Study of the main (internal) field dynamics including the drift of the magnetic poles, is necessary for understanding the Earth's interior and for practical application for navigation and orientation. In the polar regions the geomagnetic field lines are open to the solar wind. The electric currents flown in the high-latitude ionosphere due to an interaction of the solar wind with the Earth's magnetosphere, cause sporadic deviations of the magnetic field from its quiet level. During magnetic storms, geomagnetic variations occur on time scales of minutes and can reach the amplitudes comparable with the internal field components. The information on the geomagnetic field is traditionally obtained by the ground-based observatories and variation stations. Nowadays the magnetic measurements are also made from space by the low-altitude polar-orbiting satellites. The report presents a history and current state of the ground- and satellite-based magnetic observations in the polar regions. The most significant scientific results based on the analysis of high-latitude geomagnetic data includes the development of the Earth's main magnetic field models, the ionospheric electric field and field-aligned current models, the geomagnetic indices, the reconstruction of solar activity. Operational tasks to be solved in the framework of various national and international projects include the acquisition, transfer, collection and analysis of geomagnetic data, the systems of monitoring and prevention of failures in high-tech equipment.