

MODERNIZATION OF GEOPHYSICAL COMPLEX OF ISTP RAS SB FOR MONITORING OF ELECTROMAGNETIC FIELDS AT HIGH AND MIDDLE LATITUDES

RAVIL A RAKHMATULIN

Institute of Solar-Terrestrial Physics RAS SB, rav@iszf.irk.ru

The Institute of Solar-Terrestrial Physics RAS SB (Russia, Irkutsk) has got a hardware-software complex for monitoring of electromagnetic fields at high and middle latitudes. This complex includes the following observation stations:

1. Magnetic Observatory “Irkutsk”, founded in 1886, is dedicated to experimental investigation into the Earth’s magnetic field by continuous three-component registration of both absolute values and variations of the geomagnetic field in the frequency range between 0 and 5 Hz. The observatory is equipped with the following magnetometric instruments: the flux-gate declinometer-inclinometer for measurement of declination and inclination, the proton magnetometer for measurement of the total vector, and the three-component flux-gate magnetometer for registration of H, D, and Z component variations.

2. Norilsk Complex Magneto-Ionospheric Station is situated on the north of Krasnoyarsk Region, and it has worked since 1962. At this station, there is a vast complex of geophysical instruments for absolute and variational observations of the Earth’s magnetic field. This complex includes a declinometer-inclinometer, a three-component flux-gate magnetometer, and a proton magnetometer. Registration of geomagnetic pulsations is carried out using the induction nanoteslameter with 10 Hz sampling frequency of three channel scanning.

Moreover, at this station there is a digital ionosonde, an oblique sounding station, an LFM sonde, a riometric station, and a cosmic ray station.

3. Baikal Magneto-Telluric Observatory “Uzur” located on island Olkhon (lake Baikal, 350 km from Irkutsk) has worked since 1962. Continuous twenty-four-hour all-the-year-round observations of low-frequency horizontal electric fields (telluric current, 0.001–10.0 Hz frequency range) and three-component measurements of magnetic components of geomagnetic pulsations (induction nanoteslameter, 0.001–10.0 Hz frequency range), are performed at this station. Furthermore, measurements of vertical component of electric field of geomagnetic pulsations are realized under special programs (vertical measuring line is in Baikal waters).

In 2008 on this observatory magnetotelluric station LEMI-418 was established. This universal geophysical station makes registration under the general program of a variation eight component of an electromagnetic field of the Earth in a range of frequencies 0 - 200 Гц: three components - flux-gate magnetometers, three components - geomagnetic pulsations induction magnetometers and two component of terrestrial currents.

In this report, some scientific results, obtained from observational materials at these observatories, are presented. In this part, the reconstructed secular variation is described of H, D, Z components of the Earth’s magnetic field according to the data of the oldest Siberian Magnetic Observatory “Irkutsk”.

The results are shown of the unique experiment with Baikal observatory Uzur on synchronous registration 8 component of an electromagnetic field of the Earth at station LEMI-418 and absolute values of a magnetic field of the Earth in a zone Baikal рифтов are resulted.

Besides, some extraordinary scientific results of synchronous registration of geomagnetic pulsations and variations of ionosphere parameters in auroral latitudes are stated here (Norilsk station).

Magnetic Observatory, flux-gate magnetometer, induction nanoteslameter, measurement of declination and inclination, Baikal observatory Uzur, geomagnetic pulsations, secular variation

Rakhmatulin R.A, Institute of Solar-Terrestrial Physics RAS SB,
rav@iszf.irk.ru