

## **Low-frequencies lightning detection network in Kazakhstan for atmosphere, lithosphere and ionosphere research support**

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In the frame of Government grant financing of the scientific research in 2015-2017 the project “To Develop Electromagnetic System for lightning location and atmosphere-lithosphere coupling research” was found. The project was start in January 2015 and should be done during 3 years.

The purpose is to create a system of electromagnetic measurements for lightning location and atmosphere, lithosphere and ionosphere research support. The system is a network of electric and magnetic sensors and dedicated complex for data processing and transfer to end user.

The main tasks are to set several points for electromagnetic measurements with 100-200 km distance between them, to develop equipment for these points, to develop the techniques and software for lightning location (Time-of-arrival and Direction Finding (TOA+DF)) and provide a lightning activity research in North Tien-Shan region with respect to seismicity and other natural and manmade activities. In addition, it is planned to use lightning data for Global Electric Circuit (GEC) investigation.

Currently, there are lightning detection networks in many countries. In Kazakhstan, we have only separate units in airports. Therefore, we do not have full lightning information for our region. It is planned, to setup 8-10 measurement points with magnetic and electric filed antennas for LF range. The final data set should be including each stroke location, time, type (CG+, CG-, CC+ or CC-) and waveform from each station. As the magnetic field, lightning antenna the ferrite rod antenna will be used. As the electric field antenna, the wide range antenna with specific frequencies filters will be used. For true event detection, signals from at least 4 stations should be detected. In this case, we can get location accuracy about 2-3 km and better.