

RESEARCH OBJECTIVE

In the Low-Frequency Preseismic Changes of the Earth's Electric and Magnetic Field laboratory, research and development of know-how is carried out regarding the continuous recording and study of the physical properties of the Earth's solid crust, with an emphasis on the quantification of the changes in physical properties that precede "abrupt" tectonic movements. The laboratory's scientific activities are: a) Measurements of the changes in the Earth's electric field. Study of those changes that precede earthquakes (e.g., seismic electric signals). b) Measurements of the changes in the Earth's magnetic field. Correlation of the changes of the Earth's magnetic field with those of the electric field (magnetotelluric changes), and determination of the structure of the Earth in different regions and at different depths. Moreover, the electromagnetic and acoustic emission of crystalline materials is studied under uniaxial stress.

LAB INSTRUMENTATION

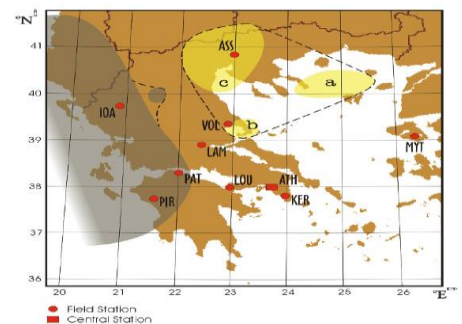
Laboratory experiments

Experimental setup for the study of electromagnetic and acoustic emission of crystalline materials under uniaxial stress



Field stations

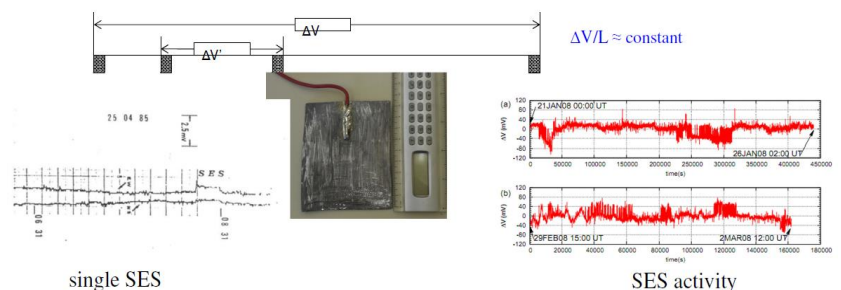
Measurements are carried out continuously at nine field stations where appropriate facilities have been made.



Seismic Electric Signals (SES)

Continuous measurements of the Earth's electric and magnetic field are made with an emphasis on frequencies lower than 1Hz.

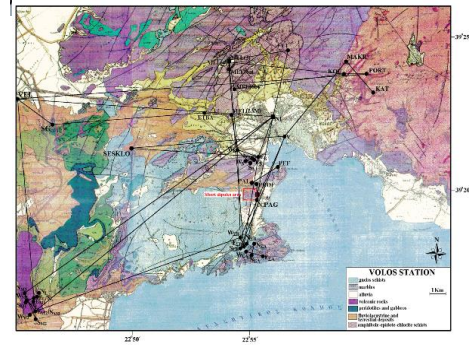
Measuring electrode dipoles ($Pb+PbCl_2$) with various lengths L are installed, e.g., of a few tens of meters (small dipoles) or the potential difference is measured between electrodes a few kilometers or tens of kilometers apart (large dipoles).



Typical measuring arrangement of a field station



Typical electrode arrangement of a field station



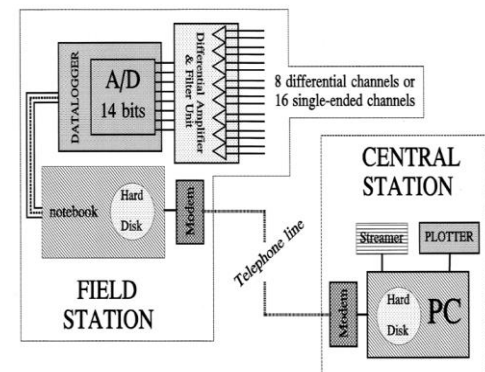
Real-time data collection telemetric network.

Field data is transmitted to the central station. Subsequently, a series of analog recorders is used to record in real time the changes in the Earth's electric field in the various parts of the country.



Telemetry data collection network in digital format.

Computers are used to collect and store digital data of changes in the Earth's electric and magnetic field at field stations. This data is collected and then sent, once a day via the internet, to the central laboratory and stored on a PC in a database.



Regarding changes in the Earth's electric field, our laboratory has the world's most extensive database, from 1981 to the present day.

Our archive includes:

Analog recordings of changes in the Earth's electric field from 1981 to the present.

Digital records of changes in the Earth's electric and magnetic field from at least 1995 to the present.