



The role of instruments in the history of Geophysics: the case of Seismology

Graziano Ferrari

Istituto Nazionale di Geofisica e Vulcanologia, Italy (graziano.ferrari@ingv.it)

Science is the study that leads to discriminate knowledge of the material world based on observation, experiment and induction. Geophysics is the combination of the former concern about the explanation of every day phenomena in our environment, with the achievements of physics that were exploited within the laboratory, either by experiments or by theoreticians.

Unlike other disciplines such as physics or chemistry, geophysics is a mosaic of disciplines also very different among each other. The main differences concern the object and method of study or the evolutionary path.

Many cyclic phenomena of the Earth are long-term processes so that a long period of study is essential to a thorough understanding. Extreme natural events such as earthquakes, volcanic eruptions, floods, etc. significantly contribute to the natural hazards. So, in seismology, volcanology, hydrogeology, as in those disciplines who study significant changes in climate or in geomagnetism, long time series of data are very useful, along with the instruments that registered them and the scientific paradigms within which they were produced. These aspects, contributing to the history of geophysics, are extremely useful especially for the fallout on the mankind's life and activities. To be useful, as well as the recovery, the historical data must be "normalized" to the current use we want to do of them. This process makes an essential contribution to knowledge of the instruments that recorded this data: their principles of operation, their constants and their variability over time.

Many of the disciplines involved in geophysics, as seismology, geomagnetism, etc. require observations both geographically distributed and synchronized. Geomagnetic and seismological recordings, together with astronomical and meteorological observations have been frequently done in the same observatories, in the past.

Despite their relative cyclic nature, since earthquakes may not occur in the exact same way, thorough analysis of earthquakes of the past are particularly important. The reconstruction of a history of instrumental seismology, of its most important turning points, of the mutual inspiration between theories and experiments, and the recovery and current scientific use of its data will be presented.