

HISTORICAL SEISMOGRAMS AT THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF COIMBRA

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ABSTRACT

In the early 20th century the Geophysical Institute of the University of Coimbra – Instituto Geofísico da Universidade de Coimbra (IGUC) – added seismology to its fields of study, which were then meteorology and Earth’s magnetism. Ever since IGUC has kept a continuous record of the ground motion. When seismic observations began at IGUC earthquake knowledge was still very limited. The seismic catalogs produced in 1909 indicated only the time of the “beginning of tremor”, “beginning of the second phase”, “beginning of the main phase”, “time of maximum amplitude” and “end of tremor”, as well as the “maximum amplitude” recorded in the seismograms. By the 1920s the now well-known P- (compressive), S-waves (shear), and surface waves (Love and Rayleigh) were already identified. The seismic data recorded in Coimbra were analyzed along with data recorded in other European and World stations to determine earthquake epicenters. At this time earthquakes were classified according to their epicentral distance: 1) “tremor domesticus”, epicenter less than 500 km away from the station; 2) “tremor vicinus”, epicenter between 500 and 3000 km; 3) “tremor remotus”, epicenter between 3000 and 10000 km; and 4) “tremor ultimus”, epicenter more than 10000 km away from the station.

The seismic station in Coimbra was the first deployed in mainland Portugal. Lisbon only acquired a seismograph after the devastating earthquake of Benavente in 1909. Unfortunately, the seismogram of the Benavente earthquake recorded in Coimbra appears to have disappeared. The Benavente earthquake was recently revisited based on seismograms recorded in other European stations. This study concluded on relevant earthquake parameters, which were so far unknown (epicenter, magnitude and focal mechanism). This study showed that historical seismograms have a scientific value that goes beyond their historical value. IGUC is currently doing an effort to recover its seismic collection. In result, many of the relevant historical seismograms have already been digitized. In this presentation we will show the present state of the IGUC seismogram collection, we will show some of the seismograms already digitized and we will discuss the different hypothesis for recovering the collection. We will further show examples of techniques that can be used to extract relevant scientific information from historical seismograms.