



The early history of global earthquake maps

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This presentation unveils the development of global maps of Earth's seismicity along a century, since the earliest attempts in the late 1830's to the year 1935, when the concept of earthquake magnitude was introduced.

Initially, earthquake regions were marked qualitatively, with different degrees of shading according to the frequency and strength of the shocks. This approach was influenced by earlier depictions of volcanic belts, and indeed volcanoes were usually shown in such maps. It was not until the early 20th century when it was widely recognized that earthquakes were usually independent from volcanic phenomena. In the late 19th century, the maps progressed in detail, and began incorporating epicentres, especially for earthquakes originating under the sea. The early 20th century witnessed the first maps which quantified seismicity on a global scale. But it was not until 1935 that the first systematic map of global earthquake frequencies was published.

The initial developments are traced back to Heinrich Berghaus' Geographical School at Potsdam (1839), followed by the first truly global earthquake maps by Alexander Keith Johnston (1848) and Augustus H. Petermann, disciple of Berghaus (1849). These early attempts, published in thematic atlases, were soon imitated by others, for example by John P. Emslie (1852) and Traugott Bromme (1854) with different degrees of simplification or artistic infographic additions. This early stage was culminated by the map by Robert Mallet and his son, John W. Mallet (1857, published 1859), which was based on R. Mallet's extensive compilation of earthquakes. Similar maps were published along the rest of the century.

Major improvements were the global maps by August H. Sieberg, published in progressively more detail since the late 19th century until the 1930s. The first, crude, efforts to quantify regional earthquake frequencies on a global scale were published in parallel by John Milne and Montessus de Ballore at the break of the 20th century.

The development of instrumental seismology then allowed a systematic detection and compilation of earthquakes originated even in remote and/or marine regions. Eventually, Nicholas H. Heck, in the USA, compiled an earthquake database and used it to draw a new generation of qualitative map with shadings in 1935. In the meanwhile, using Heck's database, the Spanish seismologist Alfonso Rey Pastor quantified, for the first time systematically, the frequency of earthquakes over the globe, using a gridded latitude-longitude map (1935), the precursor of modern earthquake rate maps.