

LARGE EARTHQUAKES IN CHILE: AN ANALYSIS FROM 2010 UP TO PRESENT TIME.

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ABSTRACT: Chile and most countries in the Pacific Coast of South America sit over a huge convergent tectonic boundary with a subduction zone between the South American and Nazca Plates. The Andes Mountains have been built in the past 500 million years largely due to this subduction zone, and its growth has increased in the last 65 million years. The aim of this study is to observe the nature of Chile Earthquake from February 2010 to the present time, attempting to identify patterns in the behavior and geographic distribution of the large magnitude earthquakes and its aftershocks through the time, in respect to their frequency, magnitude and depth. Also it is relevant to understand the temporal distribution of the events and the amount of energy involved, to better describe the major event's nature. The first step included the acquisition of data from the United States Geological Survey (USGS) website, specifically from the NEIC (National Earthquake Information Center Catalog) to be downloaded into the CSV format, collecting data relative to the seismic activity from 2010-2-26 00:00:00h to the present time, magnitude minimum 4.0, and in the area from -30N to -42S, -77W to -68E covering the region correspondent to Chile and Argentina. Time and date were converted into numeric values to count the number of events based on defined ranges of magnitude, and calculating the energy and cumulated energy based on the Gutenberg – Richter relationship using the magnitudes. Plots were performed relating cumulated energy and time, focal depth versus time, cumulated number of events and time, and a Richter-Gutenberg curve were created. Subsets of selected data based on different ranges of magnitudes and depths are displayed using ESRI ArcGIS® online, adjusting the symbols to represent the ranges of values in respect to their location and also a plot of magnitude versus depth was made in this study. The number of earthquakes and cumulated seismic energy through time follow the same pattern once they report the seismic activity from the great magnitude earthquake in March of 2010 that released such a great amount of energy and was followed by a great number of aftershocks with smaller magnitude until nowadays. The spatial distribution of the earthquakes with the greatest magnitudes is completely related with the geography of the main fault, the trench of subduction and the displacement pattern of the plates.

KEYWORDS: CHILE EARTHQUAKES, SEISMOLOGY, GUTENBERG-RICHTER RELATION.