

Characterizing Earthquakes: Local Magnitude to Moment Magnitude

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Abstract—A quantitative measure is needed to compare the size of earthquakes worldwide, which is independent of the density of population and type of construction. Earthquakes are classified in categories ranging from minor to great, depending on their magnitude. Magnitude is the quantitative measurement of the amount of energy released by an earthquake. Different types of magnitude scales are used to measure the magnitude of an earthquake such as Richter scale, Body-wave magnitude scale, Surface-wave magnitude scale and Moment-magnitude scale. Each scale measures different characteristics of the seismic waves, and is computed by different formula under varied saturation conditions. Selection of the scale depends upon the earthquake size. In this study, we briefly discuss the different magnitude scales, mode of measurement to obtain the magnitude by using these scales in India and the relevance of each scale. Relationship between the different magnitudes and their conversion equations are also discussed.

Keywords: *Magnitude, Richter, Body-wave, Surface-wave, Moment-magnitude.*