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Comparison of instrumental Mercalli seismic intensities

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The Mercalli intensity scale is widely used in the world. There have been many reports about relationships among the seismic intensity and instrumental measurements such as PGV. We compared several methods to calculate instrumental seismic intensity as one of collaborative works with Chile.

We used regression relationships of the modified Mercalli seismic intensity with PGA, PGV (Wald et al., 1999 : MMI(PGA), MMI(PGV)) and with amplitude used for the JMA instrumental seismic intensity (Shabestari and Yamazaki, 2001: MMI(JMA)). The regression relationships by Wald et al.(1999) are valid in 5-8 for MMI(PGA) , and 5-9 for MMI(PGV). We used acceleration records obtain by University of Chile for the 2010 Chili earthquakes. The number of stations are nine. The JMA instrumental seismic intensity were calculated also, and they range from 4.8 to 5.6.

The differences among MMI(PGA), MMI(PGV), and MMI(JMA) reached 1.6, the the difference is not negligible. The rms of MMI(PGA)-MMI(PGV) is 0.5, 0.7 for MMI(PGA)-MMI(JMA), and 0.4 for MMI(PGV)-MMI(JMA). MMI(PGA)-MMI(PGV) clearly has positive correlation with intensity. Whereas MMI(JMA) is a little smaller than MMI(PGV), the difference does not show clear correlation with the instrumental seismic intensity.

We will increase number of data, and investigate the instrumental seismic intensities with felt seismic intensity.

Keywords: instrumental seismic intensity, modified Mercalli seismic intensity, the 2010 Chile earthquake