Evaluating Intensity Prediction Equations for Italy

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The macroseismic intensity has been, and will likely continue to be used for purposes such as seismic hazard assessment, loss estimation and communication to the public. Recently, there have been numerous validation studies for ground motion prediction equations (GMPEs), while intensity prediction equations (IPEs) have received less attention. We attempted to extend the validation study to IPEs. We evaluated a number of Italian IPEs and one global IPE using intensity observations in Italy since 2002, derived from multiple datasets. The prediction and observations were compared using a simple metric of mean absolute error, as well as conventional residual analysis. IPEs with a physically meaningful functional form were found to perform better. Some IPEs derived from a large amount of data were not found to perform better than those derived from a moderate amount of data. A global IPE was found to have comparable performance with the best indigenous model, suggesting that the regional difference of intensity attenuation may not be significant. These findings could guide the development of IPEs in the future.