Earthquake loss estimation models for exposure data with higher resolution and quality

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A common practice in PML estimation for insurance purposes is the use of aggregate loss (AL) functions. They estimate the possible losses of "representative" building type in certain database and are applicable to an asset with unknown structural properties. However, the exposure data produced recently is based on the improved global building stock databases, some of them created with the use of the modern inventory data capture tools such as remote sensing. In this work we present a comparison of the estimated earthquake losses in Germany by use of AL functions and the ones applicable to data with higher resolution and quality. We considered both improved data resolution and quality. We concluded that the estimates might vary from 5% to 30% if the loss models are able to account for the settlement size. For example, for intensity VIII, the use of AL function would cause under and over estimation of losses by 10% if applied to rural and urban settlement that in fact are characterized by different building properties. For the case of improved data quality, the losses might be under and over estimated for 50% to 100% if AL function is applied to an asset of stone masonry or reinforced concrete frame structure consequently. Thus, in order to improve the reliability of our estimates for exposure data with higher resolution and quality we propose the use of loss functions pertinent to particular building type and settlement size. The global exposure databases QLARM and PAGER and the advanced methods for developing earthquake loss models such as HAZUS and RISK-UE might perfectly serve the intended needs.