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Determination of natural and socio-economic factors affecting landslide damage: an econometric approach using empirical evidence from the Calabria Region (Southern Italy)

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Many studies investigated how natural and human factors control the occurrence of landslides. In addition, considerable efforts have been made to quantitatively and qualitatively estimate damage, direct as well as indirect, due to the occurrence of landslides. However, only very few studies explicitly investigate how socio-economic factors affect the magnitude of damage caused by a landslide event. Nevertheless, socio-economic factors will be crucial determinants of landslide damage. For example, at household level, more wealthy households will be able to build houses in areas less susceptible to landslides or will be more able to take preventive measures to mitigate landslide damage. At the same time, the higher the income the higher the value of the property that will be damaged in case of a landslide occurrence.
At regional level, the landslide damage is likely to depend on factors such as population density, income level and distribution, and rurality. In addition, it should be taken into account that historical data or inventories will be more precise when it comes to reporting landslide frequency and damage in the more recent years, while events that occurred longer ago are less likely to be reported unless major damage was caused. This might give the false impression that landslides occurred less frequently but were more damaging in the past.
Therefore, this study econometrically estimates a landslide damage function. Based on a landslide inventory for an Italian region, landslide damage index is calculated for landslide damage assessment. Using state of the art econometric techniques, we identify which natural and socio-economic factors significantly affect landslide damage while correcting for time fixed effects. As such it provides a useful tool to predict future land damage. Furthermore, it provides useful insights for policy makers about the factors they should primarily try to alter in order to reduce landslide damage.