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Estimation of flood risk exposure with cross fertilization between multi-platform remote sensing and census information.

Giorgio Boni , Angela Celeste Taramasso, and Giorgio RothDept. of Civil, Chemical and Environmental Engineering, University of Genova, Genova, Italy (giorgio.boni@unige.it)

Risk exposure adjournment in flood prone areas is usually limited by the unavailability of frequently updated information about urbanization and census. This limitation is produced mainly by the complexity of the long process that lead to thematic maps compliant with common product requirements.

Therefore, the mapping of exposed elements and population does not fully exploit the potential high refresh rate typical of remote sensing. This aspect may be particularly important in developing countries, where exposure may change at sub-yearly scale.

This work explores the potential of the combination of the high refresh rate of satellite night-time light products with the high precision of urban maps and census information. Target is the evaluation of the population exposure to the flood risk in urban areas.

The idea is to calibrate nightlight vs. urban density/population relations where contemporary estimations of both variables are available. These, combined with flood hazard maps, allows the estimation of the flood risk. Results will be validated using independent estimates of the population exposed to the flood risk in the same area.

Moreover, time series of nightlight products will be used to estimate the same variables at different times, demonstrating the possibility of rapid updates.

The work is based upon DMSP night-time light series, global urban footprint (GUF) maps by the German AeroSpace Center (DLR) and census data from the Italian institute of statistics (ISTAT). The independent data for the population exposed to risk are provided by the Italian Environmental Protection Agency (ISPRA).


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