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Applicability of Remotely Derived Global Population Datasets in Earthquake Risk Assessment of Istanbul, Turkey

Rashmin Gunasekera (1), Helene Galy (1), and Keiko Saito (2)

(1) Willis Re, Analytics and Solutions, Ipswich, United Kingdom (gunasekerar@willis.com), (2) Cambridge University Centre for Risk in the Built Environment (CURBE),University of Cambridge, Cambridge, UK

There has been a considerable increase in the use of remotely-derived population data in studies of public policy, disaster reduction and in commercial applications. To assess its applicability (in terms of suitability and sensitivity) in natural hazard risk assessment, we have analysed two globally consistent population datasets that incorporate Remote Sensing as a means of estimating population count: LandScan Global Population Database (LandScan, Dobson *et al*., 2000), and Global Rural Urban Mapping Project (GRUMP; Balk *et al*., 2005). Both datasets provide population counts of resolution of up to1 km^2.

LandScan data, intended to estimate ambient population at risk from natural hazards and relies on a methodology based on using the second order administrative population data from census and ancillary data sources. In contrast, the methodology of GRUMP aims to delineate urban from rural areas using census and remotely sensed night time lights. The impact of ancillary data used in these global population datasets plays a pivotal role in its applicability to natural hazard risk assessment.

We analysed the two databases to evaluate the impact on residential population in Istanbul, Turkey, for a potential earthquake scenario. The modelling results using both LandScan and GRUMP data show divergence of results at districts levels where the spatial areas of the district are large and population concentrations are low. The total number of buildings damage was calculated to be 1,924,636 and 1,742,604 from LandScan and GRUMP datasets respectively. Provision of this sensitivity analysis information from these complementary methods would help strengthen the disaster risk reduction options and improve sustainable land use practices through enhanced public participation in the decision making and governance processes. In relation to further development of this technology, although panchromatic low-light imaging data would be useful, multispectral low-light imaging data would also provide valuable information on the type or character of lighting; potentially stronger predictors of variables, such as ambient population density and economic activity.