



## **Urban growth patterns in major Southeast Asian cities: Toward exposure mapping and vulnerability assessment**

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Southeast Asia (SEA) is undergoing rapid urbanization, with urban population percentage increasing from 32% in 1990 to 48% in 2015. It is projected that by the year 2040, urban regions in SEA account for 60% of its total population. The region is home to 600 million people, with many densely populated cities, including megacities such as Jakarta, Bangkok, and Manila. The region has more than 20,000 islands, and many cities lie on coastal low-lands and floodplains. These geographical characteristics together with the increasing population, infrastructure growth, and changing climate makes the region highly vulnerable to natural hazards. This study assessed urban growth dynamics in major (defined as population exceeding 1 million) SEA cities using remotely sensed night-time lights (NTL) data. A recently proposed brightness gradient approach was applied on 21 years (1992-2012) of NTL annual composites to derive core-urban (CU) and peri-urban (PU) regions within each city. The study also assessed the sensitivity of above extracted urban categories to different NTL thresholds. The temporal trends in CU and PU regions were quantified, and compared with trends in socio-economic indicators. The spatial expansion of CU and PU regions were found to depend on geographical constraints and socio-economic factors. Quantification of urban growth spatial-temporal patterns, as conducted here contributes towards the understanding of exposure and vulnerability of people and infrastructures to natural hazards, as well as the evolving trends for assessment under projected urbanization conditions. This will underpin better risk assessment efforts for present and future planning.