Geophysical Research Abstracts
Vol. 21, EGU2019-10383, 2019
EGU General Assembly 2019

Understanding Human Settlement Dynamics in Flood-Prone Areas Using Global Data

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Flooding is one of the most damaging natural hazards, and its negative impacts have increased dramatically in many regions of the world over the recent decades. One possible explanation is that many urban areas are developing and growing at a record pace in flood-prone areas exposed to flood hazards. To better understand the spatiotemporal changes of flood risk, and populations vulnerability to floods, we need to unravel the way in which humans adapt and respond to flood events in flood-prone areas. In this study, we use global datasets to explore human-flood interactions at a large scale. More specifically, to explore human settlement dynamics in flood-prone areas we use a global floodplain map together with estimates of timing and extent of previous flood events by using Earth observation data, for example from flood observatories. The spatiotemporal human settlement dynamics in relation to floods and flood-prone areas is analyzed using global population and human settlements data. With this study we highlight interesting aspects of human-flood interactions. We also provide a general framework that can be used to further investigate population development and human response to floods, which is relevant as urbanization of floodplains continues and put more people and economic assets at risk.