



Geomorphic and hydrologic controls on urban expansion

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The spatial organization of human settlements is influenced by geomorphological, hydrological, climatic and geographic drivers, resulting in inhomogeneous distributions across the globe (i.e. specific sites show very high human density levels and other regions are almost uninhabited). Natural resources availability and environmental criticalities highlight the relevance to forecast how human settlements will be distributed in the near future, especially in a climate change perspective. Here we analyse human settlements dynamics in space and time in an area close to Beijing in the Northeast of China. We employ remote sensed nightlight images available from 1992 to 2013 as a proxy of human population and urbanization level. We develop a spatially explicit model to simulate human settlements dynamics (i.e. city growth). Precipitation and temperature data, elevation, distance from the river network and from the shoreline are used as environmental drivers. The model enables the identification of relevant drivers controlling urban agglomeration dynamics and allows for the prediction of future human settlements patterns in space and time.