Explaining the pitfalls of quantifying population in riverine floodplains using Nighttime Light

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Flooding is globally one of the most damaging natural hazards. Flood risk will most likely increase in the near future due to increases in flood frequency attributed to climate change and growth in population and wealth in flood prone areas. This growth in wealth and population is increasingly considered as a major driver for the increase in flood losses in the last decades. Floodplains are susceptible to floods, but historically people have always been settling in floodplains. The growth of population in floodplains, which is a substantial cause for increased flood risk, is essential to consider for decision making in floodplain development, as improper development increases flood exposure and aggravates flood risk. The science of socio-hydrology tries to capture the interaction between humans and floods in the floodplain, but it is necessary to identify these mechanisms on a broader scale. A way of doing this, is to look at the development of floodplain population density over the years, but population data is not available on a long temporal scale. Therefore, Nighttime light data was used to model the gaps in the availability of population data. Nighttime light data captures the illumination on earth and is available on a large temporal and spatial scale. It also has a high correlation with population data. However, the relationship between Nighttime light data and population data is not straightforward. This study tries to model a population proxy using Nighttime light data and explains when and why it does or does not work. Validation of the model shows that in some regions the predicted data is relatively precise, but ultimately, due to the lack of data, the accuracy is unknown. This study shows that understanding the behavior of NTL is valuable, because it has the potential to map Socio-Economic variables in data-scarce areas.