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Spatial Information for Human Health

Recent spatial epidemiology studies have suggested and even developed spatially explicit models for mapping risk of vector-borne diseases (VBDs) such as malaria as a function of several indicators of vulnerability, hazard and exposure (Kienberger & Hagenlocher, 2014; Hagenlocher & Castro, 2015). There is a clear need for more rigorous methods of capturing spatial and temporal effects of such indicators in the finest resolution possible. While there is some uncertainty in some studies as to whether incorporation of spatially explicit regression such as Geographically Weighted Regression (GWR) (Fotheringham et al. 2002) would significantly alter the final map of population at risk, there has been general recognition and appreciation of how spatially explicit mapping has exposed and assessed heterogeneity (Hay et al., 2004; Tatem et al. 2012; Hagenlocher & Castro, 2015).

To keep up with the “Big Data” era, computational power continues to improve exponentially as datasets and methods that capture the effects of both space and time are becoming increasingly available. In the field of Geographical Information Science (GIScience), computationally-efficient methods for spatio-temporal analysis remain a major concern. Consequently, a novel spatio-temporal method called Geographical and Temporal Weighted Regression (GTWR) has been suggested as an extension of GWR, in which local spatio-temporal effects of variables are explored (Fotheringham et al., 2015). The effectiveness of this novel spatio-temporal modelling has been assessed by the aforementioned study in which GTWR was applied for modelling of housing prices in London.

I propose to extend, apply calibrate and assess the GTWR method for spatio-temporal vulnerability mapping of VBDs (e.g., malaria) in Kenya. I hope to engage with fellow attendees during the SPATIAL 2015 un-conference to discuss insights in the application of the GTWR method in this realm of spatio-temporal epidemiology. Moreover, I hope to discuss with other GIScientists ways in which future data collection tools could be improved to better collect,
assess spatial and temporal information (and uncertainties thereof) with consideration of scale and other aspects.

References