SHADING AREAS, SKY-VIEW FACTOR AND UV RADIATION IN URBAN CANOPY OF MOSCOW-CITY

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The main goal of this investigation is to develop a kind of "urban reanalysis" – the database of meteorological and radiation fields under Moscow megalopolis with high spatial resolution. That's why is quite useful to calculate SVF (Sky View Factor) for obtaining losses of UV radiation in complex urban conditions. Usually, the raster-based SVF analysis the shadow-casting algorithm proposed by Richens (1997) is popular (see Ratti and Richens 2004, Gal et al. 2008, for example). SVF image is obtained by combining shadow images obtained from different directions. An alternative is to use raster-based SVF calculation similar to vector approach using digital elevation model of urban relief. Chen et al. (2012) implemented it in this way mentioning that it "has an advantage in that it does not involve marginal error, i.e. once the radius is decided, the DEM layer can be prepared accordingly so every calculated pixel in the Mask layer has a correct value". We used similar raster-based calculation of SVF. The data should prepared for analysis using the following sequence of operations:

- Select resolution value , to which building heights and surface elevations should be reduced.
- Rasterize buildings layer with resolution r and using height field for raster values.
- Resample digital elevation model to resolution r.
- Sum building height raster with digital elevation model raster using map algebra.

So, using this algorithm, we can take into account shading capacity of urban canyons in city landscape. This way allows to estimate additional attenuation of UV radiation in urban conditions.

References:

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