Geophysical Research Abstracts
Vol. 21, EGU2019-13563, 2019
EGU General Assembly 2019

Effects of spatial resolution of satellite images on the remote sensing-based evapotranspiration estimation of urban greenery

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The heterogeneous nature of vegetation in urban greenery, together with the high spatio-temporal variability of water, soil, and microclimate characteristics and management practices escalates the complexity of evapotranspiration (ET) estimation of urban green spaces. Remote sensing-based ET estimation offers the potential to estimate the actual ET of urban greenery over large scales where the field-based approaches of ET estimation are not feasible. The accuracy and cost of remote sensing-based ET estimation approaches are mainly determined by the spatial resolution of the images that vary from centimetres to kilometres. This research aims to investigate the impact of the spatial resolution of satellite images on the ET measurements of urban parklands. Three satellites with different spatial resolutions of high, medium and coarse were selected including WorldView2 (8 bands, spatial resolution of 2.46m), Landsat (8 bands, spatial resolution of 30m), and MODIS (36 bands, spatial resolution of 250m). Since ET is closely related to landscape greenness, we used two vegetation indices of Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI) to calculate the ET of urban landscape plants in the Adelaide Parklands, the largest parklands in Australia that is consist of 29 parks forming a green belt of approximately 780 hectares encircling the CBD of Adelaide. The study was undertaken during the period 2011-2015. Our results showed that the EVI-MODIS and NDVI-WorldView2 methods adequately predicted the annual ET of the Adelaide Parklands.