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## A correction factor for evapotranspiration prediction in urban environments using physical-based models

**Alby Duarte Rocha**<sup>1</sup>, Stenka Vulova<sup>1</sup>, Christiaan van der Tol<sup>2</sup>, Michael Förster<sup>1</sup>, and Birgit Kleinschmit<sup>1</sup>

<sup>1</sup>Geoinformation in Environmental Planning Lab, Technische Universität Berlin, 10623 Berlin, Germany

<sup>2</sup>University of Twente, Faculty of Geo-Information Science and Earth Observation (ITC), P.O. Box 217, Enschede AE7500, The Netherlands

Evapotranspiration (ET) is an essential variable to characterise the water balance and urban heat island effect. As a combination of soil evaporation and plant transpiration, ET is highly dependent on the land cover and its surface properties. Most of the well-established physical-based models such as the ones derived from the Penman-Monteith equation focus on the atmospheric interfaces (e.g. radiation, temperature and wind speed), lacking information about the land surface. The model Soil-Canopy-Observation of Photosynthesis and Energy fluxes (SCOPE) can account for a wide range of surface-atmosphere interactions to estimate ET. However, like the majority of modelling approaches to estimate ET, SCOPE assumes a homogeneous vegetated landscape. Urban environments are highly fragmented, presenting a mix of pervious surfaces and impervious anthropogenic elements. However, information derived from high-resolution remote sensing (RS) and GIS to differentiate land surfaces is often available for medium and large cities. In this study, we analysed two urban sites with different levels of vegetation cover and imperviousness located in Berlin, Germany, both equipped with eddy flux towers. GIS data describing land surface properties were used to correct the prediction bias caused by the assumption of homogeneous vegetation by physical-based models. The correction factor increased the model accuracy significantly, reducing the relative bias of the SCOPE model using RS data from 0.74 to -0.001 and 2.20 to -0.13 for the two sites, respectively. RMSE was also considerably reduced in the two sites, from 0.061 to 0.026 and 0.100 to 0.021. At the same time, the coefficient of determination ( $R^2$ ) remained similar after the correction, 0.82 and 0.47 for the two sites. This study presents a novel method to estimate intraurban hourly ET using publicly available RS and meteorological data independent from the flux tower measurements. The presented method can support actions to mitigate climate change in urban areas, where the majority of the world population lives.