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On the added value of WUDAPT for Urban Climate Modelling

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Over half of the planet's population now live in cities and is expected to grow up to 65% by 2050 (United Nations, 2014), most of whom will actually occupy new emerging cities of the global South. Cities' impact on climate is known to be a key driver of environmental change (IPCC, 2014) and has been studied for decades now (Howard, 1875). Still very little is known about our cities' structure around the world, preventing urban climate simulations to be done and hence guidance to be provided for mitigation.

Assessing the need to bridge the urban knowledge gap for urban climate modelling perspectives, the World Urban Database and Access Portal Tool – WUDAPT – project (Ching et al., 2015; Mills et al., 2015) developed an innovative technique to map cities globally rapidly and freely. The framework established by Bechtel and Daneke (2012) derives Local Climate Zones (Stewart and Oke, 2012) city maps out of LANDSAT 8 OLI-TIRS imagery (Bechtel et al., 2015) through a supervised classification by a Random Forest Classification algorithm (Breiman, 2001).

The first attempt to implement Local Climate Zones (LCZ) out of the WUDAPT product within a major climate model was carried out by Brousse et al. (2016) over Madrid, Spain. This study proved the applicability of LCZs as an enhanced urban parameterization within the WRF model (Chen et al. 2011) employing the urban canopy model BEP-BEM (Martilli, 2002; Salamanca et al., 2010), using the averaged values of the morphological and physical parameters' ranges proposed by Stewart and Oke (2012). Other studies have now used the Local Climate Zones for urban climate modelling purposes (Alexander et al., 2016; Wouters et al. 2016; Hammerberg et al., 2017; Brousse et al., 2017) and demonstrated the added value of the WUDAPT dataset.

As urban data accessibility is one of the major challenge for simulations in emerging countries, this presentation will show results of simulations using LCZs and the capacity of the WUDAPT framework to be of high relevancy in multiple regions of the world, such as Africa or Asia.