



Urban climate impacts on the daily temperature and relative humidity cycles using multi-site measurements in Budapest

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It is quite well-known that the concentrated presence of human beings and their activities substantially modify the natural environment including atmospheric composition (primarily due to air pollution), radiation characteristics (as a result of artificial covers) and local circulation (mainly because of the vertical extent and density of buildings). All these fundamentally influence the everyday lives of inhabitants resulting in several health issues and implying the necessity for complex urban planning. In order to address the possible raising issues, one of the useful approaches focuses on the urban climatic influences. For this purpose we aim to analyze the urban climatic effects in a central district of Budapest relative to the southeastern suburb district of the city where the synoptic station of Budapest is located. Thus, we initiated a specific program with multi-site in-situ meteorological measurements in the spring of 2015 in the southern central located district (district IX), which can be found near the river Danube. The target district mainly consists of 3- and 4-storey older and newly built buildings. The newly built buildings are mainly the results of the local government's efforts to improve the urban environment for the citizens. Within the framework of the block rehabilitation program started in the 1990s, the inner parts of the old house blocks were demolished, and inside the blocks common green areas have been created. In our urban climate measurement program the resulting climatic conditions are evaluated with air temperature and relative humidity data recorded along a pre-defined path, which consists of 24 measuring points within the studied area. The measuring sites are located in different characteristic points of the district, such as green parks, narrow streets, paved squares, and wider roads with busy city traffic. In order to calculate the urban heat island intensity, temperature measurements are compared to the hourly recorded data of the synoptic station of Budapest (ID number: 12843). Similarly, the relative humidity measurements are also compared to the humidity in the suburbs. On the basis of the first year's experiences of the measurements we extended the measuring period for at least 24 hours starting a 3-day-long summer measuring campaign (4-6 July 2016), thus, the full daily cycles of air temperature and humidity can be analysed from recorded continuous measurements. After the summer measuring campaign the whole measurement program continued in autumn 2016 and spring 2017 (on several days starting at 14 pm Thursdays and lasting 24 hours until the very next day). Thus, daily cycles during warmer and colder general conditions are compared in the central and suburban parts of the city.