Large Scale Exploitation of Satellite Data for the Assessment of Urban Surface Temperatures

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The rate at which global climate change is happening is arguably the most pressing environmental challenge of the century and it affects our cities. Temperature is one of the most important parameters in climate monitoring and Earth Observation (EO) systems and the advances in remote sensing science increase the opportunities for monitoring the surface temperature from space. The EO4UTEMP project examines the exploitation of EO data for monitoring the urban surface temperature (UST). Large variations in surface temperatures can be observed within a couple of hours, particularly when referring to urban surfaces. The geometric, radiative, thermal, and aerodynamic properties of the urban surface are unique and exert particularly strong control on the surface temperature. EO satellites provide excellent means for mapping the land surface temperature, but the particular properties of the urban surface and the unique urban geometry in combination with the trade-off between temporal and spatial resolution of the current satellite missions impose the development of new sophisticated surface temperature retrieval methods particularly designed for urban areas. EO4TEMP develops a novel UST algorithm exploiting multi-temporal, multi-sensor, multi-resolution EO data, to be validated with in-situ measurements in urban sites and to be applied to Sentinel-3 and Sentinel-2 data. Therefore, EO4UTEMP will provide an advanced methodology for deriving frequent UST estimations at local scale (100 m), capable of resolving the diurnal variation of UST and contribute to the study of the urban energy balance.