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The C3S project UrbanSIS: 1 km resolution ECVs and impact indicators over European cities focusing on the health and infrastructure sectors

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According to the European Commission's "Roadmap for Climate Services" climate services have the potential to become the intelligence behind the transition to a climate-resilient society. UrbanSIS, a proof-of-concept project running until the end of 2017 as part of the Copernicus Climate Change Service, aims at providing high-resolution information for end-users working in the infrastructure and health sectors and a business opportunity for purveyors seeking for climate services in the context of the urban adaptation and resilience to climate-related hazards.

The demonstration consists of three pilot cities: Bologna, Stockholm and Amsterdam-Rotterdam. Aiming to cover a lack of high-resolution climate data that takes into account the heterogeneity of urban physiography and how it translates into local extrema of meteorological variables in space and time, UrbanSIS delivers selected Essential Climate Variables (ECVs) and impact indicators through a web-portal (http://urbansis.climate.copernicus.eu/) where the user is able to visualize, analyse or export the data for further post-processing. Both ECVs and indicators are provided with a spatial resolution of 1x1 km2 and a temporal resolution of 1 hour (or 15 min in the case of precipitation), spanning over two time windows of 5 years each, representing historical/present and future climate.

The downscaling modelling chain combines the NWP system HARMONIE-AROME, the air quality model MATCH and the hydrological model HYPE. For the present climate boundary conditions from UERRA-ALADIN reanalysis are used, while in the climate setting the model (HCLIM) is forced by EC-EARTH with RCP8.5 for the future climate. Because of the high resolution requirements a refined urban physiography was produced by aggregating ECOCLIMAP-II, Copernicus land services and national databases.

This presentation will describe the methodology and present the validation of the Essential Climate Variables and impact indicators for the sectors health and infrastructure. The ability of the model to represent the physical processes involved in the interaction of vegetated and built-up surfaces with the atmosphere will be discussed, namely through the comparison against observations. Finally, we will illustrate the possibilities offered to the user when interacting with the portal. One of the examples is devoted to the analysis of human heat stress during a heat wave and the potential benefit of urban green infrastructure.