



## **Developing climate services for sensitive cities within C3S**

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Urban areas are strongly influenced by climate change and by the changing frequency and duration of extreme weather events. The research project C3S\_422\_Lot1\_SMHI supports the development of tailored climate services for the local authorities of five cities (Asunción, Yakutsk, Maputo, Dakar and Port Vila), highly sensitive to climate change according to UN-HABITAT, within Copernicus Climate Change Service (C3S). Using the projections of 18 GCMs ensembles for three future time-horizons (2011-2040, 2041-2070, 2071-2100), under two IPCC RCPs (RCP4.5 and RCP8.5), the impacts of these changes have been investigated in relation to the needs for climate change information of users (local decision-makers and UN-HABITAT), aimed to improve local management of emerging natural risks, territorial planning and to develop resilience plans through implementing effective measures for adapting infrastructure and minimizing the effects on their life quality, health care, transport, water management and energy supply. The C3S\_422\_Lot1\_SMHI project is taking steps towards the use of downscaled climate model simulations to meet the need of local users (e.g. city municipalities), also in vulnerable cities lacking in meteorological observations. The projections of EC-Earth model, downscaled for all five target cities, using ERA5 reanalysis, has been used to evaluate the change in the future seasonality of temperature and precipitation extremes and of their expected effects in the cities, in relation to their current vulnerabilities and challenges, to support the development of plans for increasing their resilience to future climate change. Here we present the projects results for a cold Siberian city (Yakutsk), built on periglacial structures, highly susceptible to a growing instability under the future climate warming. This is both a local and global concern, as: i) the landscape alteration through the collapse of ice cellars is expected to impact transport infrastructure and city buildings; and ii) the Siberian permafrost holds is a large reservoir of greenhouse gases (methane), which through their release in the atmosphere is likely to accelerate the ongoing warming.