EGU21-10965
https://doi.org/10.5194/egusphere-egu21-10965
EGU General Assembly 2021


# Drought risk in urban areas: a monetization of drought risk in 97 cities around the globe

**Tristian Stolte**[1], Philip Ward[1], Hans de Moel[1], Felix van Veldhoven[2], Snigdha Garg[3], and Neuni Farhad[3]

[1]Institute for Environmental Studies, Vrije Universiteit Amsterdam, Amsterdam, the Netherlands (tristian.stolte@vu.nl)
[2]Climate Adaptation Services, Bussum, The Netherlands
[3]C40 Cities, New York, USA

This research attempts to monetize drought risk in 97 cities around the globe, using multiple climate and socioeconomic scenarios. Subsequently, it identifies possible adaptation actions to mitigate drought risk in these cities. This study is essential because whilst much effort has been put into modelling drought on all spatial scales in recent decades, urban areas are often not explicitly included in these analyses, even though we live in a rapidly urbanizing world. Two types of drought risks for cities are identified and investigated: (1) drought induced food shortages and increased food prices (agricultural drought), and (2) municipal surface water supply shortages (hydrological drought). To assess agricultural drought risk, we represent the hazard using the Standardized Soil Moisture Index, and exposure using physical agricultural areas. For hydrological drought risk, we represent the hazard by linking discharge data from climate models to water withdrawals per city, with exposure data on the total population of a city. The risks are monetized by estimating the replacement costs of freshwater by means of alternative water sources like desalination. Vulnerability is qualitatively included by spatially overlapping the monetized values with vulnerability indicators and primarily gives context to the risk estimates. Finally, an inventory of reactive, preventive and transformative adaptation actions is developed to provide cities with a perspective for action. Cities may use this inventory to identify a mix of adaptation measures, where a combination of the three approaches would be an adequate way to address both short- and long-term risks and opportunities. The overall goal of this research is to provide an order of magnitude of potential drought risk, as well as to identify possible next steps in drought risk research in urban areas.