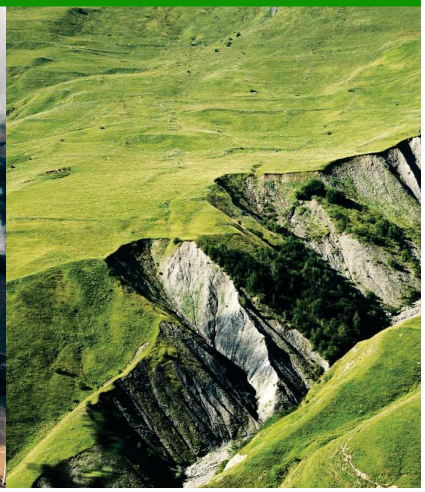
5th INTERNATIONAL CLIMATE CHANGE ADAPTATION CONFERENCE
CAPE TOWN SOUTH AFRICA 18 - 21 JUNE 2018

ADAPTATION FUTURES 2018

Dialogues for Solutions

ABSTRACTS





A834 High Resolution Thermal Stress mapping In Africa: Decision Maps for Urban Planning in Johannesburg

Author/s: Floris Boogaard, Hanze University Of Applied Science, Netherlands

Thermal stress has become a key issue for many cities around the world. With the continuing effects of climate change, thermal stress will become more acute and leads to serious problems already experienced in dense urban areas. Therefore, urban planning departments are in the need of tools that can assess the vulnerability to thermal stress. The present abstract deals with an innovative tool to address this challenge.

The objective of this research is the development of a innovating detailed GIS-based thermal stress map for Johannesburg. Verification of this model outcome is conducted with field data from weatherstations in the city as well as field visit measurements. The end result is an international comparison of the potential and use of heatstress-maps in under different climates: Europe, Asia and Africa.

The quick-scan GIS-based thermal stress map of Johannesburg is developed in order to give a quick insight in possible thermal stress locations in in a part of the city. It is based on accurate Digital Elevation Model and the assumption that for a quick insight of thermal stress some rough simplifications of the actual physical processes can be made. The maps give a detailed estimate of the maximum PET (physiological equivalent temperature) during a heat wave. The TAHMO weather stations in Johannesburg are measuring all heat stress related parameters, including temperature, solar radiation, humidity, wind speed. These are useful for calibration.

The heat stressmap for Johannesburg indicates open, unshaded areas where high Physiological Equivalent Temperature (PET) values (thermal comfort) can be expected. The thermal maps for the African, Dutch and Asian cases are used to compare the differences in simulation results between different climates zones. These maps are currently further calibrated with weather data, used and evaluated by urban planners and other stakeholders to assess the resilience and well-being of cities. The heat stress maps are clearly related with land cover, which gives an argument for urban planners for adjusted land cover from the perspective of mitigation of heat stress.

These maps are ideal quick-scan tools for urban planners who use it with other maps to plan. In the cities of this study, such mapping tools have proven invaluable in the decision-making process and it is envisaged that they will have similar successes in other cities the world over. In Europe and Asia these maps have been an important input for master classes on climate adaptation. It raised awareness on the need to implement measures to tackle heat stress and has led to the implementation of various sustainable urban drainage systems. The maps are developed and applied in the international projects WaterCoG, INXCES, PEARL and Reconect.