FUTURE CLIMATE FOR AFRICA

Impact Stories

More and more flooding in Ouagadougou area, Burkina Faso

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Project:
AMMA-2050

Authors:
Christopher Taylor,
Maïmouna Bologo/Traoré and
Tazen Fowe

IMPACT

The analysis has illustrated the important contribution that climate change is having to the historical trend in Sahelian flooding. The work highlights the key atmospheric drivers of the change in storm characteristics, allowing assessment and the representation of these processes in climate models. The CP4-Africa climate simulation produced by IMPALA captures the physics of storms much more realistically. AMMA-2050 are using outputs from this simulation to look at how extreme storms will change in a much warmer climate and using this information to assess flood risk in Ouagadougou.

AMMA-2050 has developed methodologies for mapping inundation across Ouagadougou from intense storms, taking account of changes in land use and climate. Hydrological modelling allows exploration of how flows and inundated areas may change in the future at the city level in response to climate and land use change.

The provision of climate information will enable decision-makers to have appropriate tools to plan and develop the "Grand Ouaga" plan.

THE CHANGE STORY

New research shows that the frequency of extreme storms in the Sahel has tripled in the last 35 years, in response to climate change. In Burkina Faso, this period has also been marked by large-scale urbanisation, but accompanied by low levels of investment in flood-resilient infrastructure and management. The combination of these processes has led to a sharp increase in flood frequency and damage, with significant socio-economic impacts across the country.

The impacts have been particularly severe in Ouagadougou, notably in the major flood of 2009, when a record-breaking 263 mm of rainfall was recorded in the city, and tens of thousands of people were displaced from their homes. Both climate change and urban expansion are expected to continue to drive an upward trend in flooding in the future. The new scientific understanding will be vital to informing the development of climate information and products that can support appropriate planning for Ouagadougou, to strengthen the resilience of the city's people and infrastructure to enhanced understanding of increasing future flood risks.

In developing the AMMA-2050 proposal, the 2009 flood event in Ouagadougou quickly became a key reference point. Stakeholders wanted to understand whether climate change played a role in this damaging event, and importantly, whether it was likely to recur in the future. At the same time, scientists wanted to understand what was driving the apparent increase in heavy rain events. A team of researchers was brought together to analyse past records (including rain gauges, satellite measurements and reports of flooding in newspapers) to try to understand historical trends and place them in the context of global warming.

FCFA area of change 1:

Enhancing scientific knowledge and prediction of African climate and new understanding of the resulting impact on the robustness of future climate change scenarios.

FURTHER RESOURCES

Coping with urban flooding in Ouagadougou, Burkina Faso

Trends in flood events and their relationship to extreme rainfall in an urban area of Sahelian West Africa: The case study of Ouagadougou, Burkina Faso

New research will improve early warning of devastating megastorms

LEARNING

The key factor that enabled this new scientific understanding to be of direct relevance to, and immediate support for, strengthening flood-resilient urban planning was the nature of the funding from the FCFA programme. The programme demanded a focus of climate science on user needs. A strong focus on flooding was clearly expressed by African consortium members and stakeholders during the development phase of the proposal.

However, understanding how extreme rainfall will change in the future is a particularly challenging problem for climate scientists as their primary tools (climate models) are notoriously poor at simulating intense storms. On the other hand, the programme provides significant funding for tackling difficult climate science questions, allowing specialists in climate and hydrological modelling and observations to be brought together. Moreover, with the availability of a state-of-the-art climate model capable of realistically capturing storms from IMPALA, researchers are much better placed to go beyond understanding the past and say something about the future.

Framing the work in the context of user needs and the decisions different sectors face has been challenging but has driven both users and researchers to communicate more closely. Understanding the practical urban planning requirements in a city like Ouagadougou and knowledge of the limitation of existing climate information has driven AMMA-2050 researchers towards novel investigations they might not have otherwise pursued.

Future Climate for Africa's Areas of Change are:

1. Enhancing scientific knowledge and prediction of African climate and new understanding of the resulting impact on the robustness of future climate change scenarios.
2. Strengthening scientists' capacities to develop decision-relevant climate information.
3. Increasing the capacities of users/decision making bodies/institutions to appropriately integrate climate information within medium-term decision-making.
4. Approaches that support co-production of decision-relevant climate information and enable channels for on-going dialogue between the providers and users of climate information.
5. Identifying social, political, behavioural and economic barriers to the use of climate information in long-term decision-making, working to elicit solutions which support effective integration of climate risks within decision making across scales, sectors and social groups.
6. Approaches to climate science research and climate-sensitive risks within medium-term decision making which enable active participation and address the specific concerns of women and marginalised groups.

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