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The DACCIWA project: Dynamics-aerosol-chemistry-cloud interactions in West Africa

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This contribution provides an overview of the EU-funded DACCIWA (Dynamics-Aerosol-Chemistry-Cloud Interactions in West Africa) project. DACCIWA consists of 16 European and African research organisations and has strong links to universities, weather services and government organisations across West Africa. The project runs from 2010 to 2018 and is built around a major international field campaign in 2016.

A key motivation for DACCIWA is the expected tripling of anthropogenic emissions in southern West Africa (SWA) between 2000 and 2030, whose impacts on human health, ecosystems, food security and the regional climate are largely unknown. An integrated assessment of this problem, which is mostly due to massive economic and population growth and urbanization, is challenging due to (a) a superposition of regional effects with global climate change, (b) a strong dependence on the variable West African monsoon, (c) incomplete scientific understanding of interactions between emissions, clouds, radiation, precipitation and regional circulations, and (d) a lack of observations.

DACCIWA combines measurements in the field in SWA with extensive modelling activities and work on satellite data. In particular during the main DACCIWA field campaign in June-July 2016 high-quality observations of emissions, atmospheric composition and meteorological parameters were sampled. The campaign involved three research aircraft, three ground-based supersites, enhanced radiosonde launches, and intensive measurements at urban sites in Abidjan and Cotonou. These data have already been quality-controlled and will be freely available to the research community through a database at http://baobab.sedoo.fr/DACCIWA/ after the end of the project. The resulting benchmark dataset is currently combined with a wide range of modelling and satellite-based research activities that will ultimately allow (a) an assessment of the roles of relevant physical, chemical and biological processes, (b) an improvement of the monitoring of climate and atmospheric composition from space, and (c) a contribution to the development of the next generation of weather and climate models capable of representing coupled cloud-aerosol interactions. The latter will ultimately contribute to reduce uncertainties in climate predictions.

An important part of the DACCIWA mission is to work with operational centres, international programs, policy-makers and users to foster the uptake of research results and to actively guide sustainable future planning for West Africa. Amongst other things, this will be achieved through the writing of policy briefs and recommendations for model development towards the end of the project. More specific aspects of DACCIWA will be presented in other contributions to this session.