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USING DATA CUBE TECHNOLOGY FOR STORING AND ANALYSING EARTH OBSERVATION DATA IN THE DROUGHT AND FLOOD MITIGATION SERVICE(DFMS)FOR UGANDA

Abstract

The DFMS Project is a 5-year project to develop the Drought and Flood Mitigation Service(DFMS) for Uganda, i.e. create a cloud-based platform that transforms environmental data into actionable information and allows professional users access via an online portal. DFMS is primarily aimed at mitigating the impacts of drought and floods on Ugandan society but will provide information that enables improved water, environmental and agricultural management in a much wider sense by providing access to robust meteorological, hydrological and other Earth Observation information. DFMS is developed in cooperation with the Government of Uganda, led by the Ministry of Water and Environment, and receives funding through the UK's International Partnership Programme, administered by the UK Space Agency. The DFMS Project is implemented by a Consortium of UK organisations, led by the RHEA Group. Operational since November 2019, DFMS is operated by those who developed it, providing the service to decision-makers in public and, in the near future, private organisations in the water, environmental, and agriculture sectors in Uganda. DFMS is a suite of information products, provided as an on-line service, accessed via the Internet. DFMS provides both weather and hydrological forecasts for the next 2,7,and 90 days. The 2 and 7-day forecast contains predictions of rainfall, air temperature, wind, pressure, visibility, relative humidity, dewpoint, cloud amount, and runoff. The 2-day weather forecasts are generated in 3-hour blocks, updated twice a day, at 4 km resolution, using the UK MetOffice's Tropical Africa model. The 90-day forecast uses the GloSea5 system, consists of probabilities of rainfall and runoff at 60km resolution, and is refreshed every 2 weeks. The hydrological forecasts make use of the VIC model(Liang et al.,1994). The DFMS Platform is built using Open Source software, including Open Data Cube technology for storing and analysing Earth Observation data. It extensively uses (free) satellite remote sensing data, but also takes in data gathered in situ. Besides the data that is processed in it, the platform receives user-ready information products which are visualised in DFMS or combined with other data and information to create further insights. All this data and information is also stored in and available from archives. Finally, by making the platform scalable and replicable, DFMS can be extended to contain additional features or be rolled out in other countries.