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Flood forecasting and alerts in West Africa – experiences from co-developing a pre-operational system at regional scale

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Flooding is a rapidly growing concern in West Africa. Several floods have occurred in recent years with severe consequences including loss of lives and damaged infrastructure. Flooding is also projected to increase with climate change. Access to operational forecasts is a critical component in addressing these challenges. This study presents results from our joint efforts to co-design, co-adapt, and co-operate a short- and medium-term operational hydrological forecasting and alert pilot system for West Africa, within the FANFAR project (www.fanfar.eu).

The system has been co-developed through a cycle of workshops, training sessions, and expert exchanges involving representatives from hydrological services, emergency management agencies, river basin organisations, and expert agencies in 17 countries in West and Central Africa. Multi-criteria decision analysis was employed to clarify and prioritize system objectives and configurations. We found that the most highly prioritized objectives were: high accuracy, clear flood risk information, reliable access, and timely production and distribution of the information. Our agile development approach also provided ample opportunities to focus development efforts on the most highly prioritized components, and incorporate stakeholder feedback in the development process.

The system is built on an ICT cloud platform that employs a daily forecasting chain including meteorological reanalysis and forecasting, data assimilation of gauge observations and satellite altimetry, hydrological initialisation and forecasting, flood alert derivation, and distribution through e-mail, SMS, web visualisation and API. The system is designed to enable multiple configurations and integration of several information sources (e.g. different hydrological models, observations, flood hazard thresholds etc.). We present the system configurations, stakeholder-driven adaptations, challenges, and current forecast performance. To our knowledge, the FANFAR system constitutes a significant advancement toward the vision of achieving efficient flood

management in West Africa.