

AMMA-ALMIP-MEM project

soil moisture & μ waves Tb

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(paper submitted to *IGARSS*)

- AMMA-ALMIP-MEM first spatial verification of SM/Tbs C-band

AMSR-E
C-band
Tb

HTESSEL

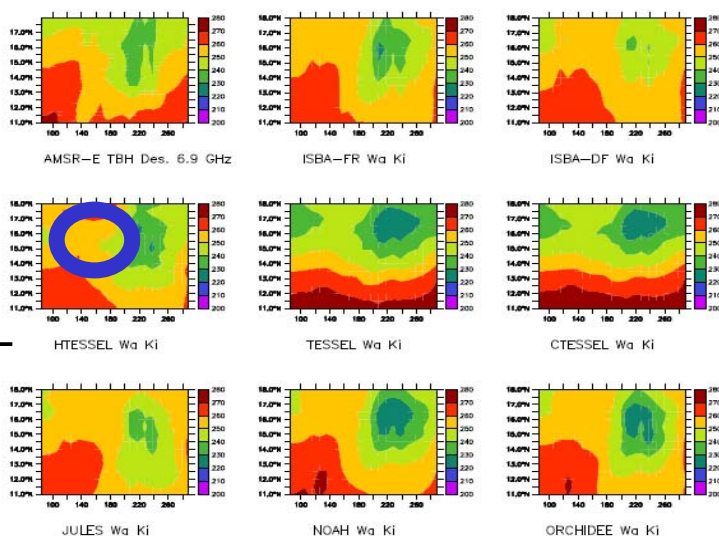
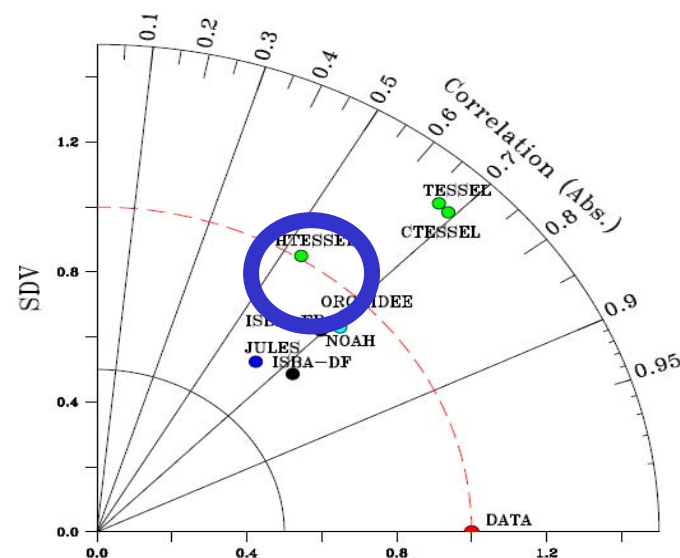
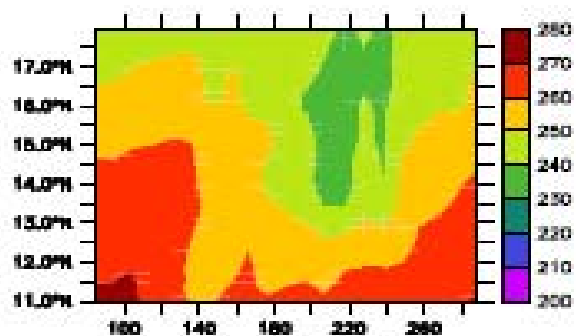


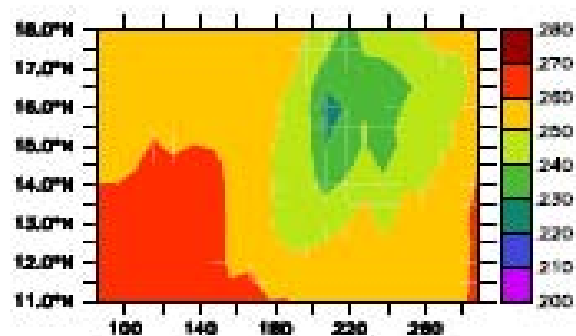
Fig. 2. Time-latitude diagram of the horizontally polarized brightness temperature (K) observed by AMSR-E and simulated by ALMIP-MEM. Time axis is in Day of Year. For each ALMIP-MEM simulation a bias correction was applied, specifically computed for each LSM when comparing simulated and observed brightness temperature.



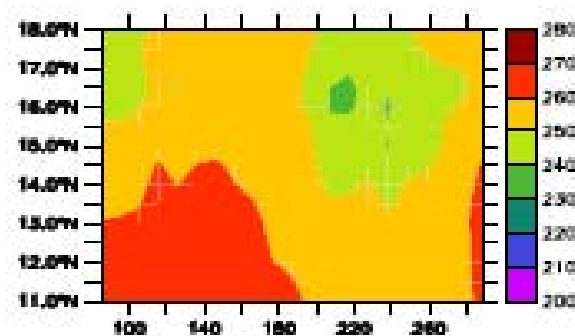
Result: HTESSEL+CMEM is un-biased and reproduces satellite obs. statistics!
Question: What happens in HTESSEL that deteriorates correlation?



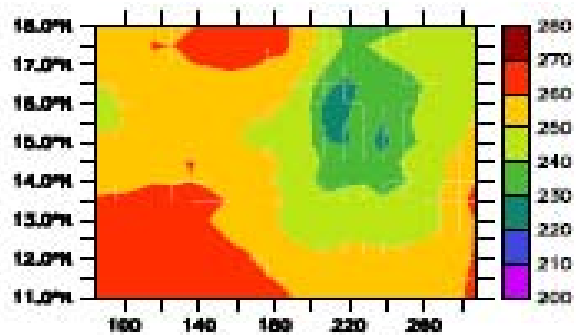
AMSR-E TBH Des. 6.9 GHz



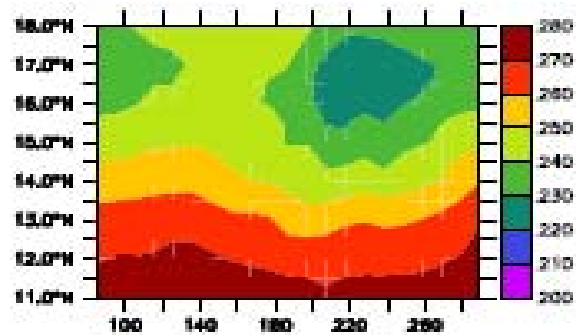
ISBA-FR Wa Ki



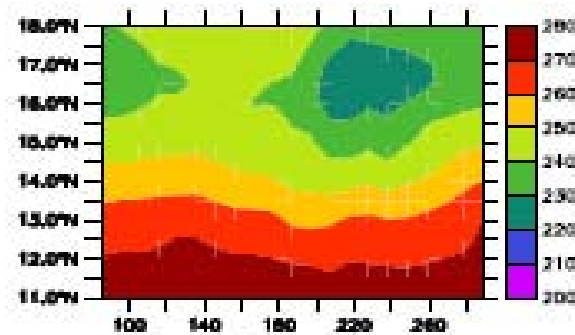
ISBA-DF Wa Ki



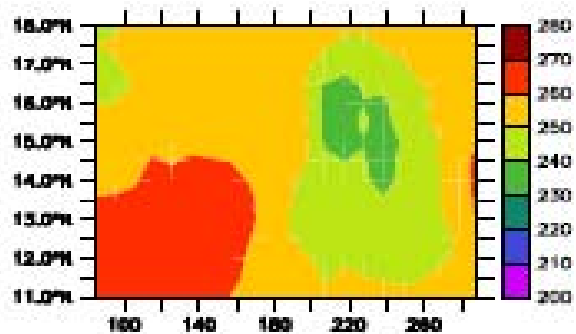
HTESSEL Wa Ki



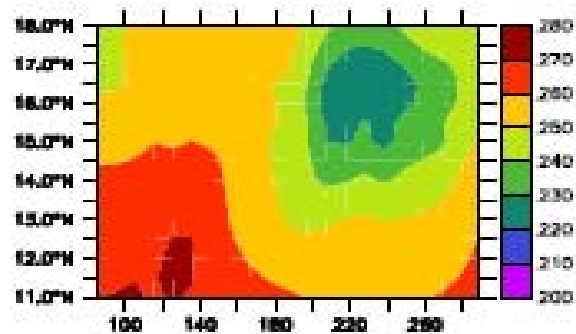
TESSEL Wa Ki



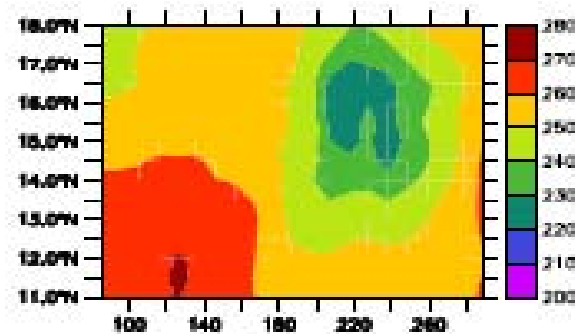
CTESSEL Wa Ki



JULES Wa Ki



NOAH Wa Ki



ORCHIDEE Wa Ki



EARLY FLOOD WARNING IN AFRICA: RESULTS OF A FEASIBILITY STUDIES IN THE JUBA, SHABELLE AND ZAMBEZI RIVERS IN AFRICA

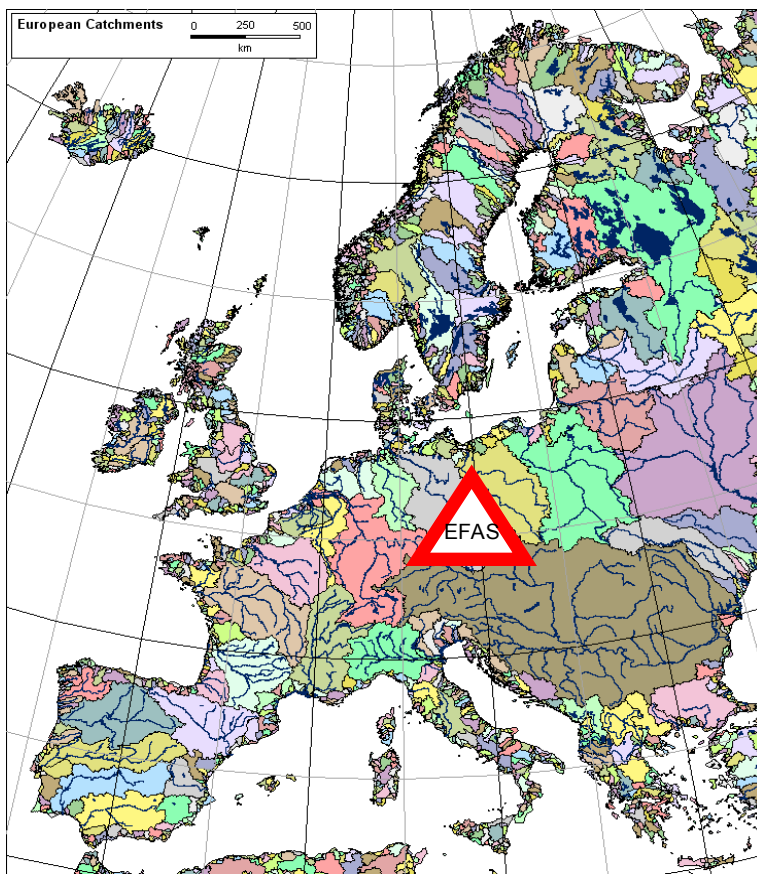
Ad de Roo¹, Florian Pappenberger², Jutta Thielen¹, Vera Thiemig¹

(1) *Land Management and Natural Hazards Unit, Institute for Environment and
Sustainability*

(2) *European Centre For Medium Range Weather Forecasts*

European Flood Alert System (EFAS)

Added value information for Member States towards preparedness for flood events 3-10 days in advance



Development:

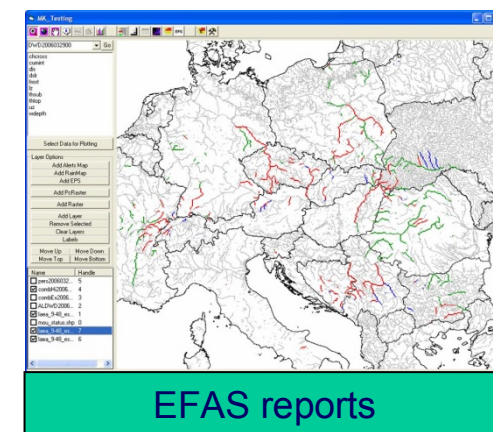
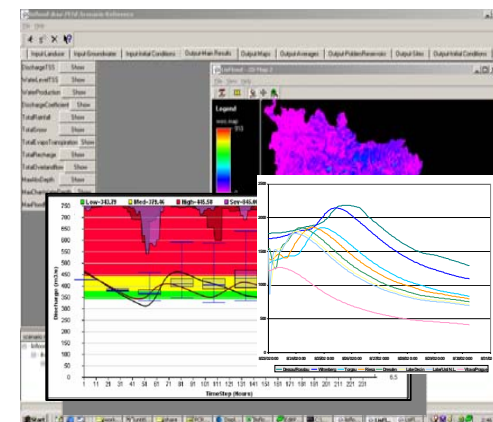
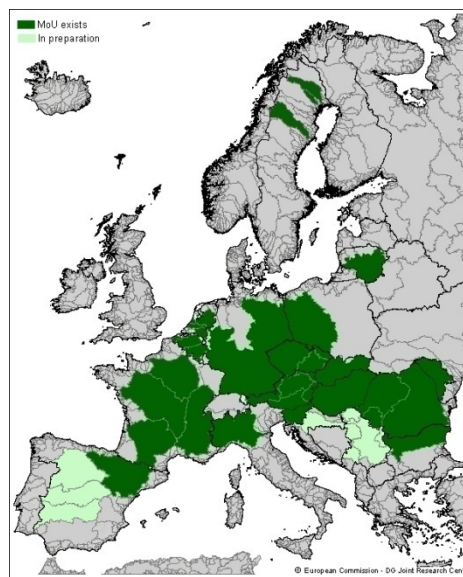
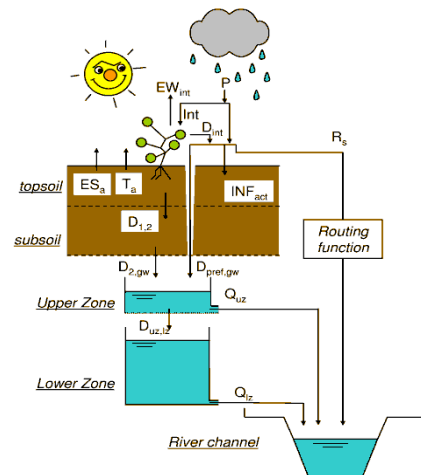
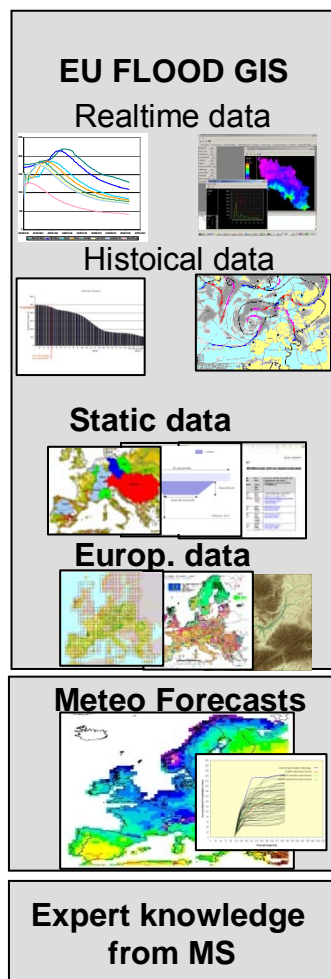
- JRC since 2003 (following major transnational floods in Europe)

Support:

- DG Env, DG Enterprise,
- European Parliament,
- Member States
- Int. River Commissions

Schematic view of EFAS

INPUT





Pilot study:

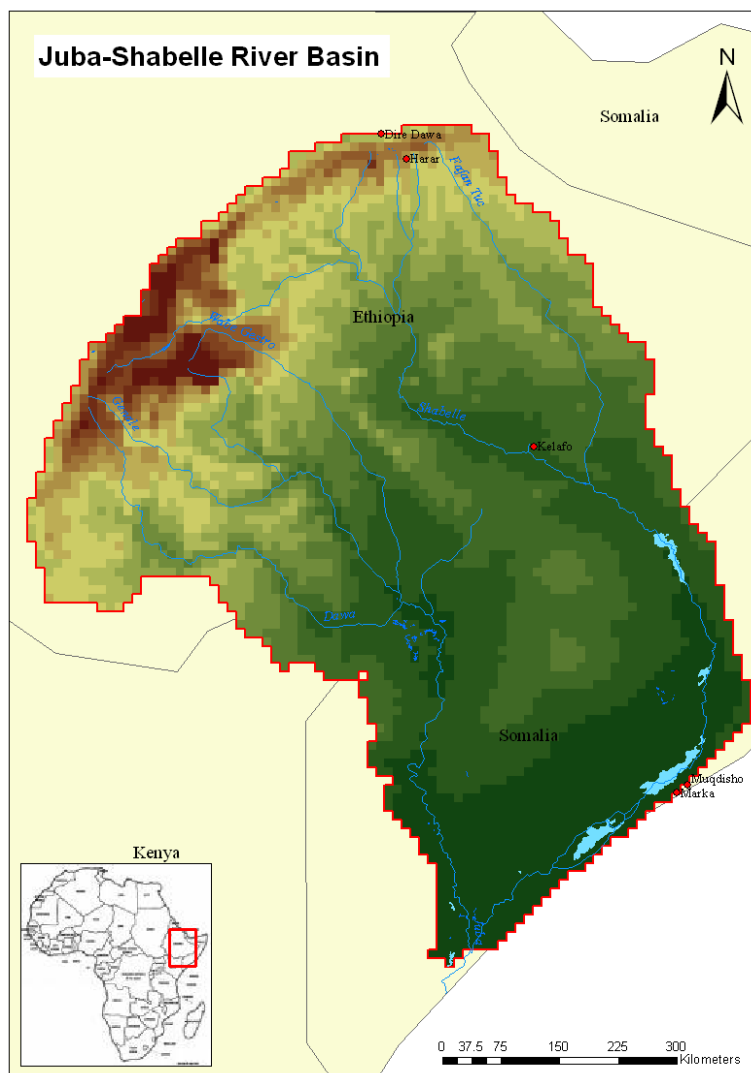
Transfer of EFAS methodologies to Africa

- different climatic forcing: large scale, long durations
- little data and catchment descriptions
- Two pilots: **Juba-Shabelle** and **Zambezi** river basins
- joined projects with *Washington State University* (Zambezi) and *Somalia Water and Land Information Management* (Juba-Shabelle)





Juba-Shabelle River Basin



- shared between Ethiopia and Somalia
- 783000 km²
- Altitudes range from 3000 m to sea level
- mainly natural vegetation such as riparian forest, bush lands and grasslands, but also swamps
- in collaboration with *Somalia Water and Land Information Management (SWALIM)*

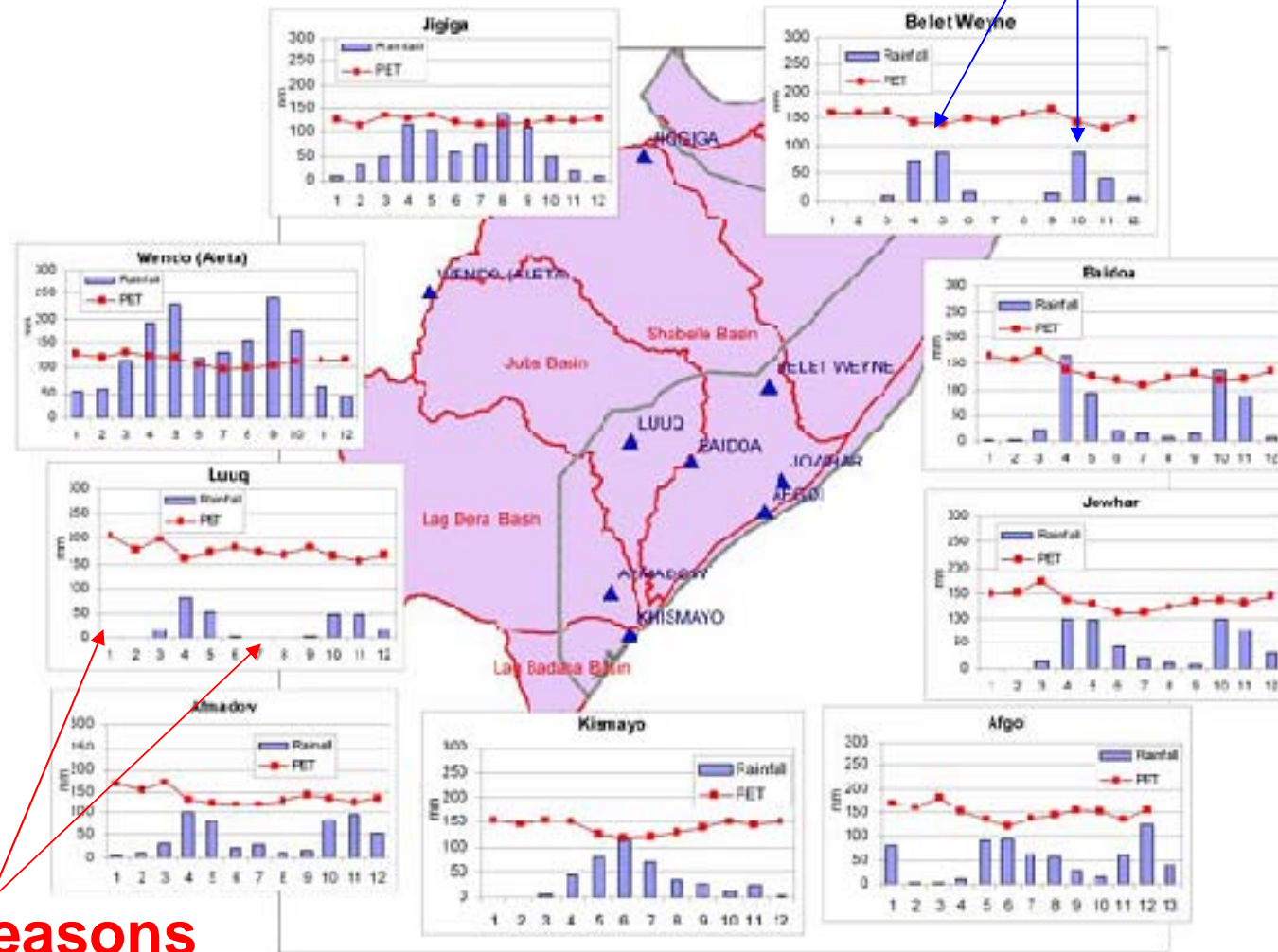
Setting up pilot basins for Africa

- Topography, soil and land use data available at JRC African Observatory
- River flow data obtained from Global Runoff Data Centre (GRDC/WMO) and African partners, e.g. SWALIM
- Weather *observations* (station and satellite data) from WMO, Washington State University, ECMWF (European Centre for Medium-range Weather Forecasts), and other sources
- Weather *forecasts*: ECMWF archived forecasts and re-forecasts for 2 events with state-of-the-art model



2 rain seasons

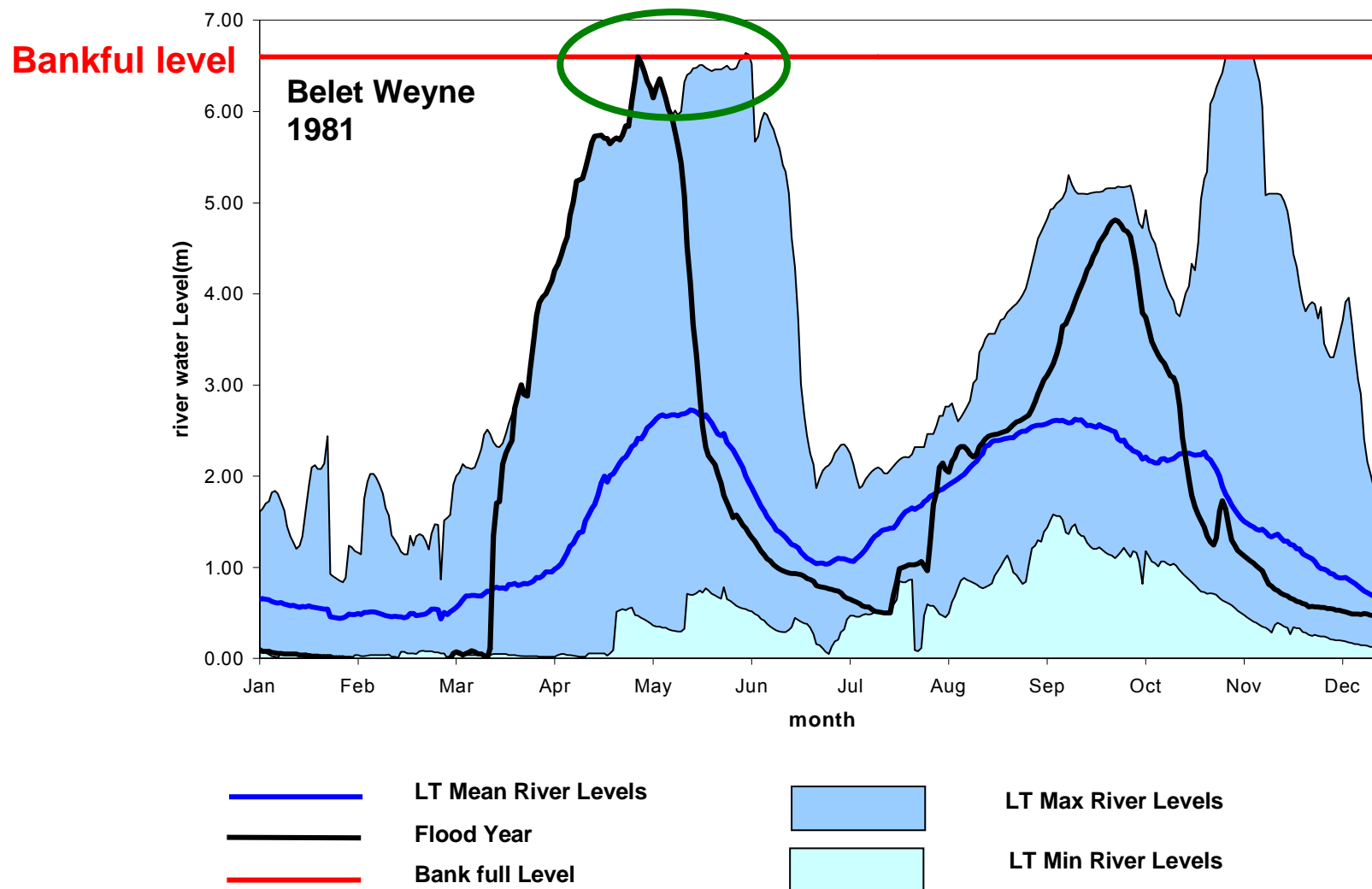
Climate in Juba/Shabelle



2 dry seasons

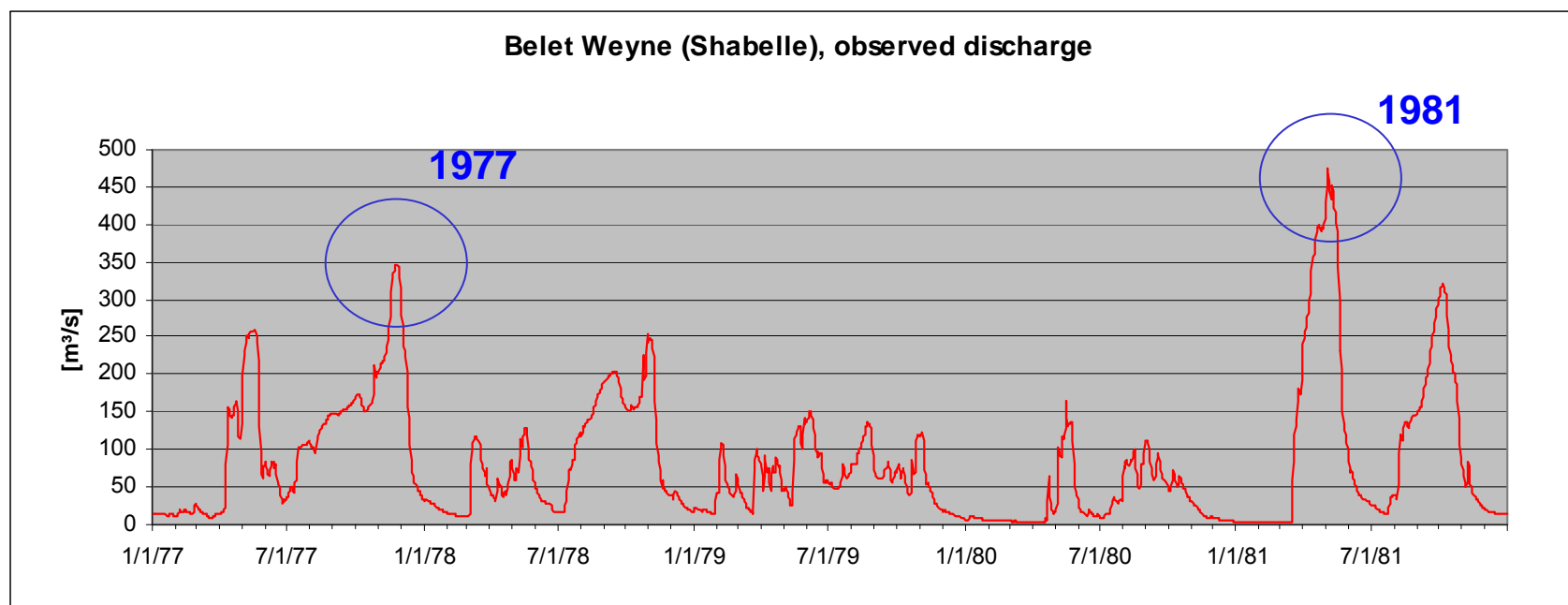


Longterm High and low river levels



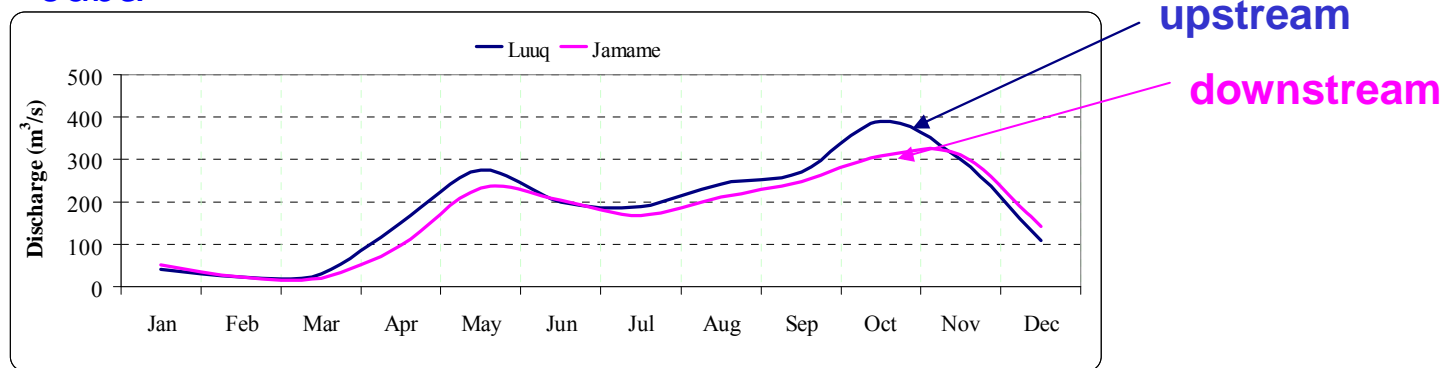
Historical flood years

1961, 1977, 1981, 1997/8, 2005, 2006

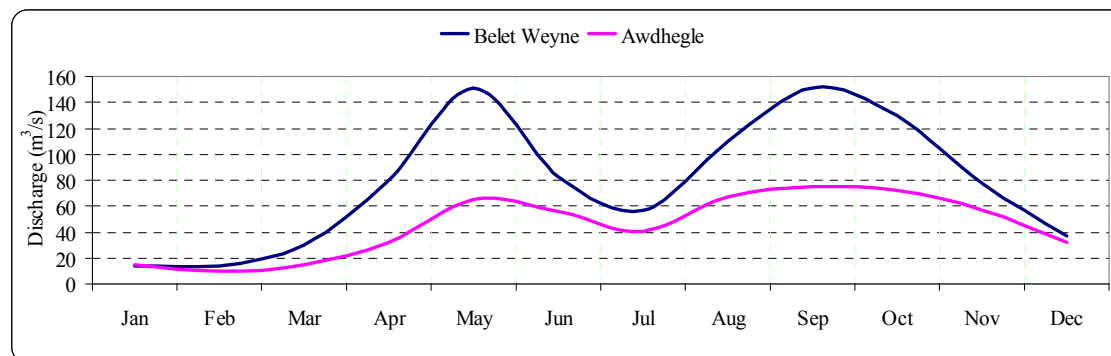


Long-term mean flows for upstream and downstream stations

Juba



Shabelle

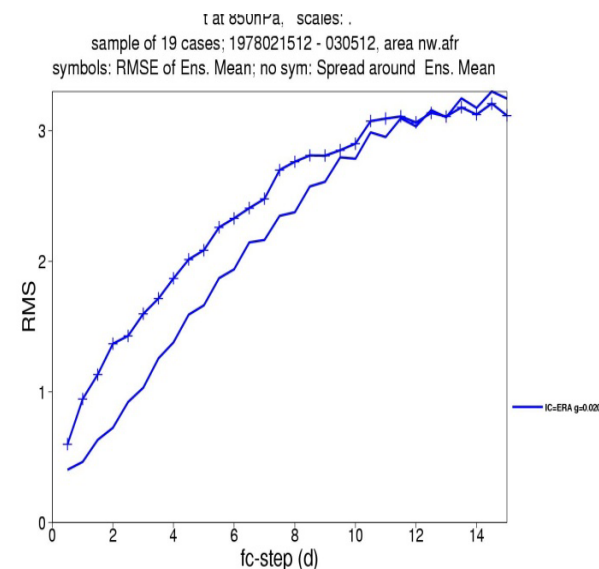
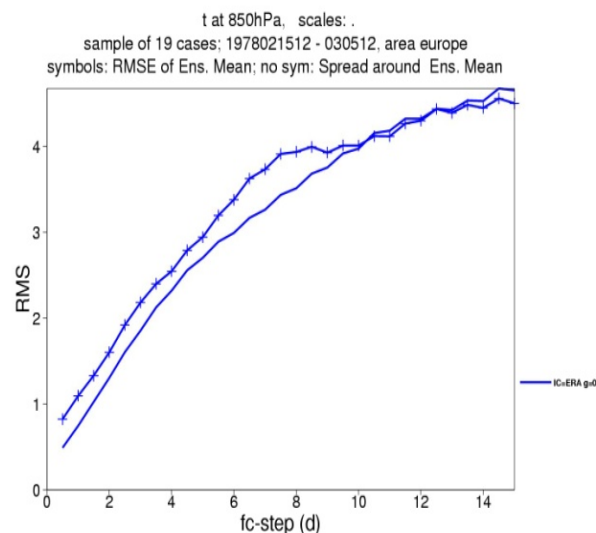
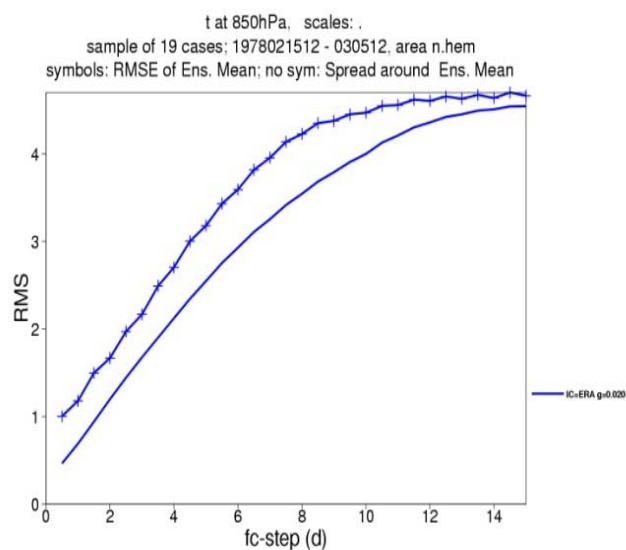


Flow reduction from upstream to downstream: over bank spillage and irrigation diversion -> tuning of hydrological model necessary

VAREPS forecasts for Africa (Feb-Apr 1978)

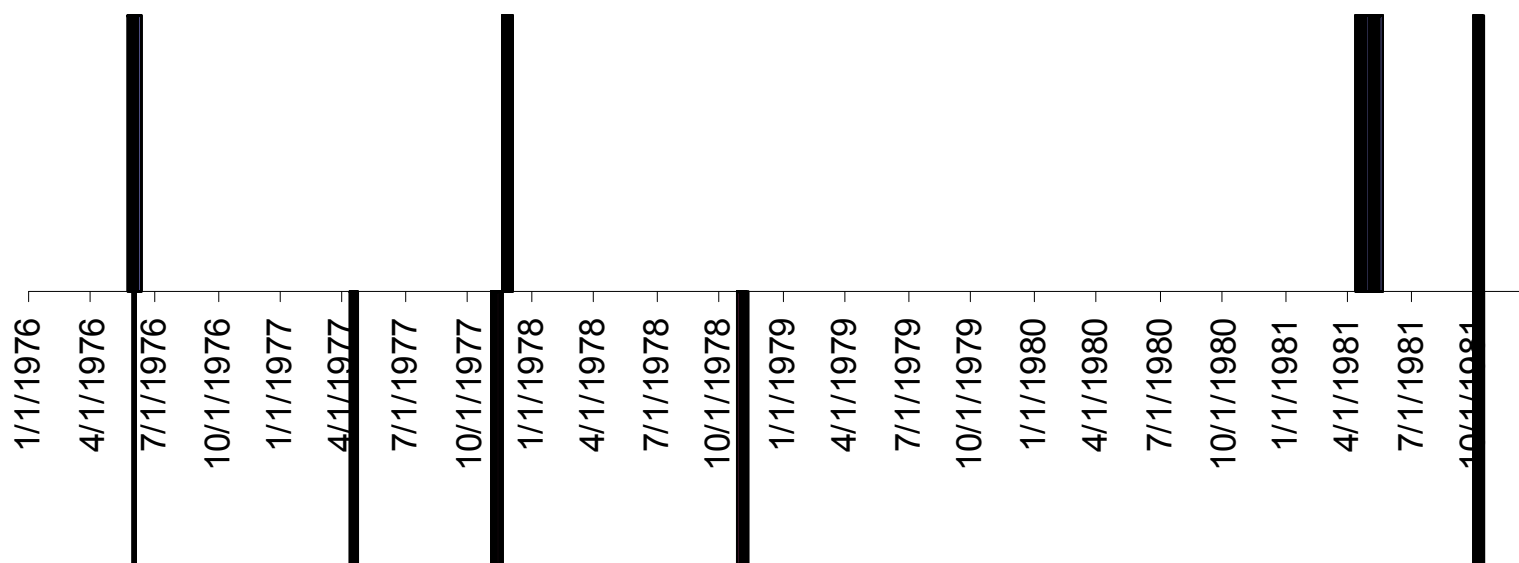
VAREPS ensembles are being run for the period 15 Feb to 15 Apr 1978 (19 cases have been completed). These forecasts are run in the operational configuration, with model cycle 33r1. ICs are defined by ERA-40. Initial perturbations are scaled larger ($\gamma=0.020$ instead of 0.014) than in the operational EPS to take into account the fact that ERA-40 T159 analyses are less accurate than operational T799L91 analyses.

These plots show the 19-case average error of the ensemble-mean (blue with symbols) and the std (blue) for T850 over NH (left), Europe (middle) and North-west Africa ($12.5 \leq \lambda \leq 35N$, $-22.5 \leq \Theta \leq 12.5$, left).



Preliminary results for Shabelle (Belet Weyne)

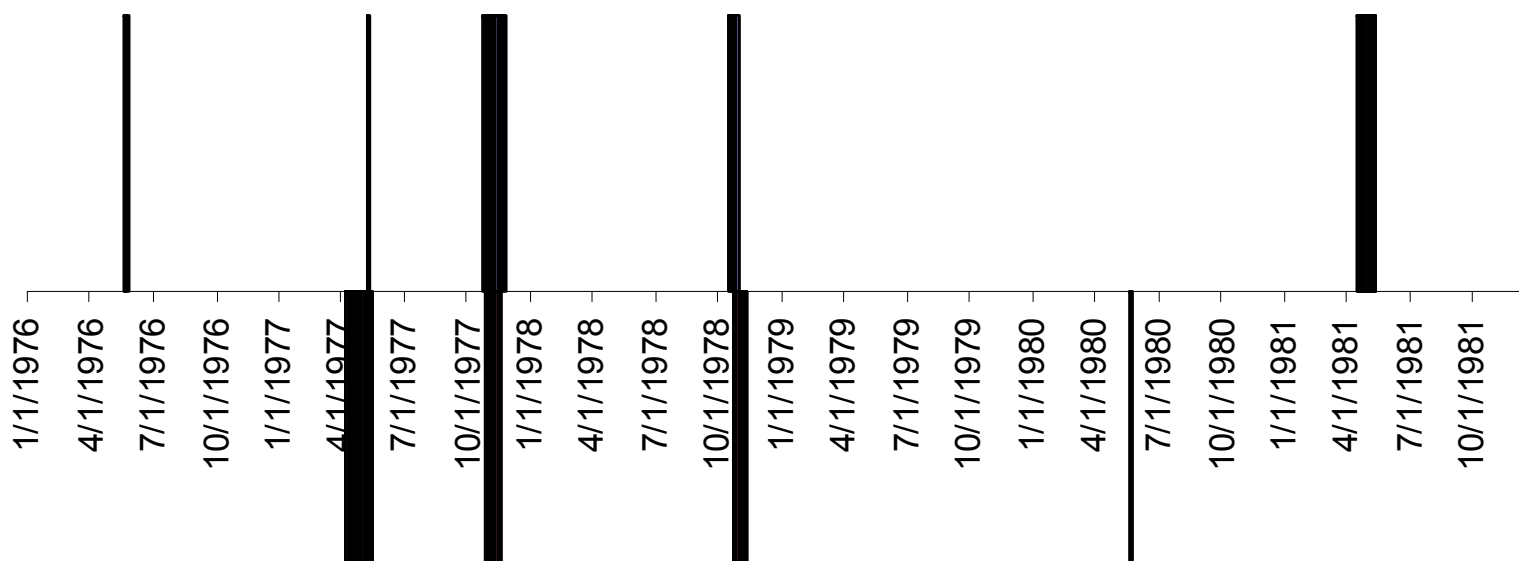
Observations exceed critical threshold



Simulations exceed critical threshold

Preliminary results for Juba (Luuq)

Observations exceed critical threshold



Simulations exceed critical threshold

Summary

- European Flood Alert System (EFAS) methodologies currently tested for African basins (Zambezi and Juba-Shabelle)
- Challenge to collect data for set-up, testing and verification
- First results show that
 - observed meteorological fields have much uncertainty
 - weather forecasts for historic events have limited skills
 - data collection is a challenge
 - flood events can be depicted by the simulations
- Successful set-up can be used for climate change studies

For more information:

<http://natural-hazards.jrc.it>

<http://efas.jrc.it>

Contacts:

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