Interactions with users of S2D information - the Met Office experience

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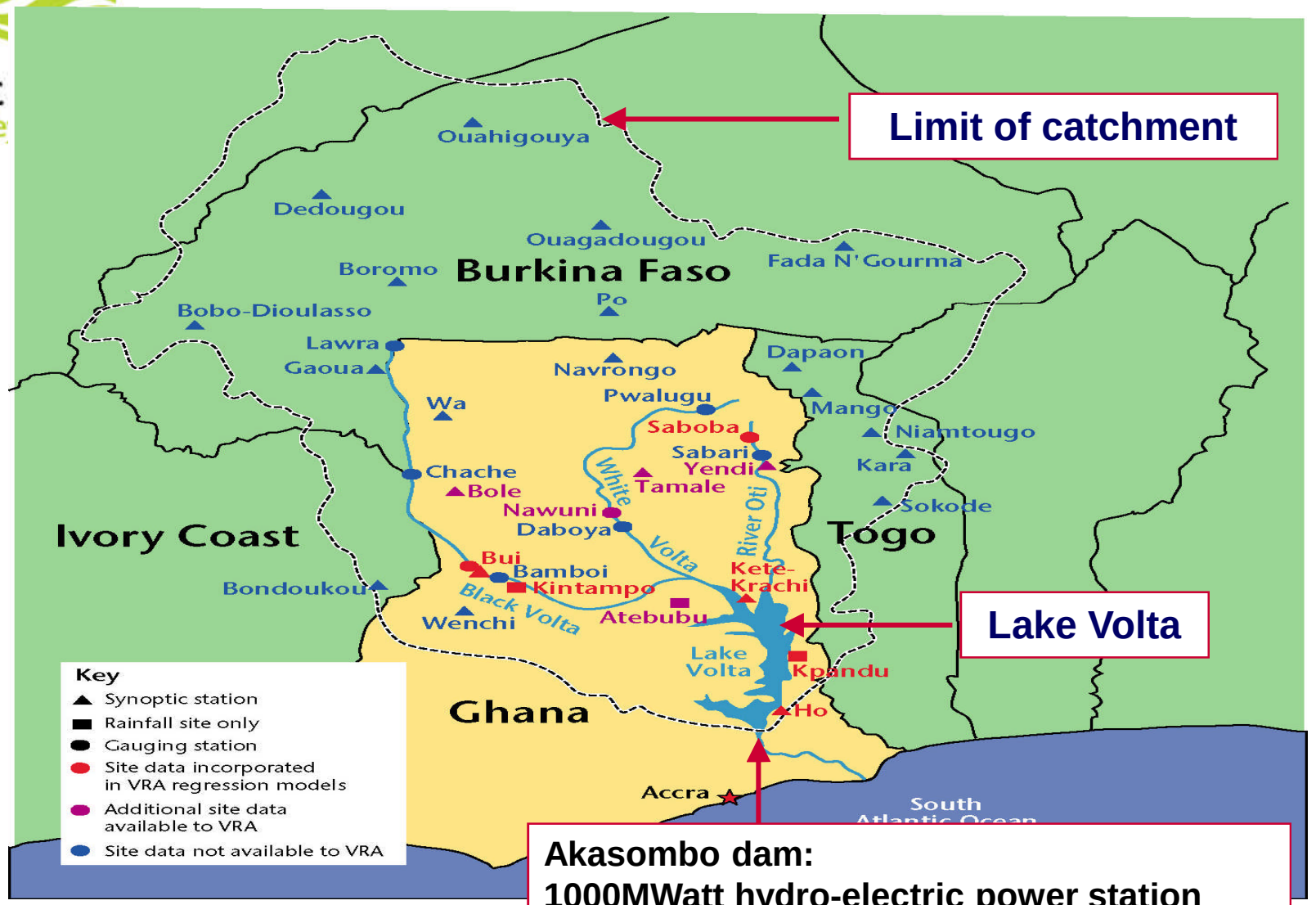
Prediction of flow in reservoir River Volta

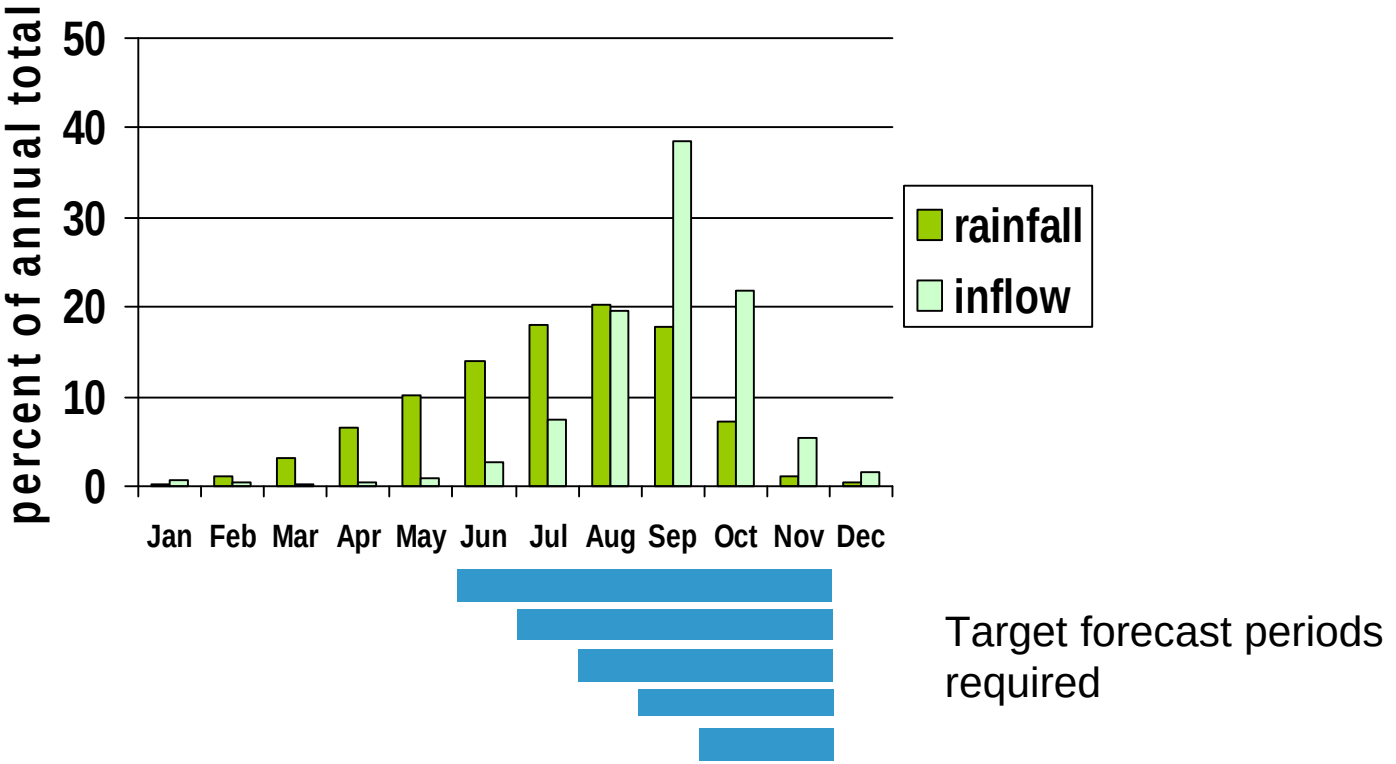
- ‘user-driven’ product
- collaboration River Volta Authority – Met Office
- key point: user already had models for this need; the product is an enhancement to existing practices



Lake Volta

Akasombo dam:
1000MWatt hydro-electric power station
~50% of Ghana's electricity

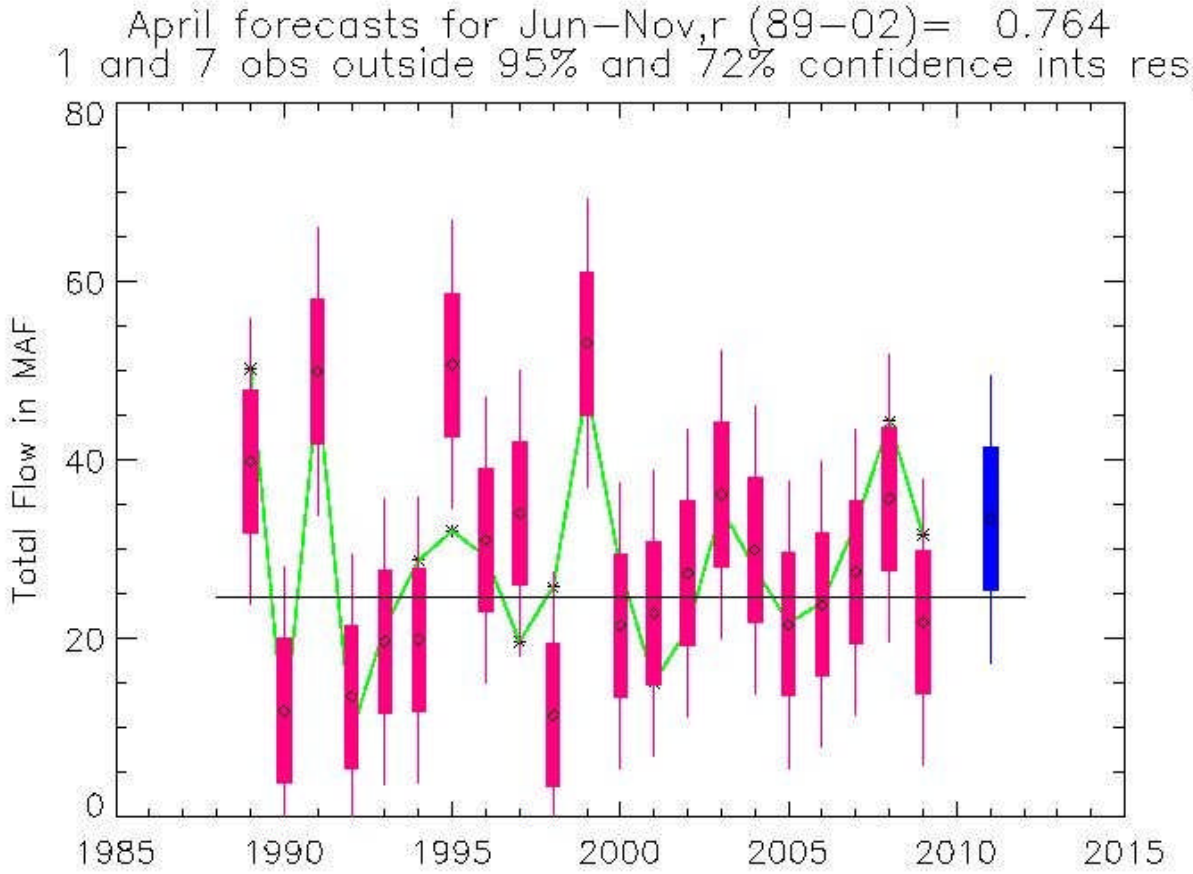
Annual cycle for catchment rainfall and lake inflow (1964-2001)



- **6 forecast are issued at monthly intervals from April to September**
- **The first forecast is issued in April - for inflow in the period June-November (7-month total range)**
- **The last forecast is issued in September – for inflow in the October-November period**

Hindcast verification: 1989-2009

green=observed inflow;
◊ predicted best estimate; box and whisker gives 72% and 95% confidence

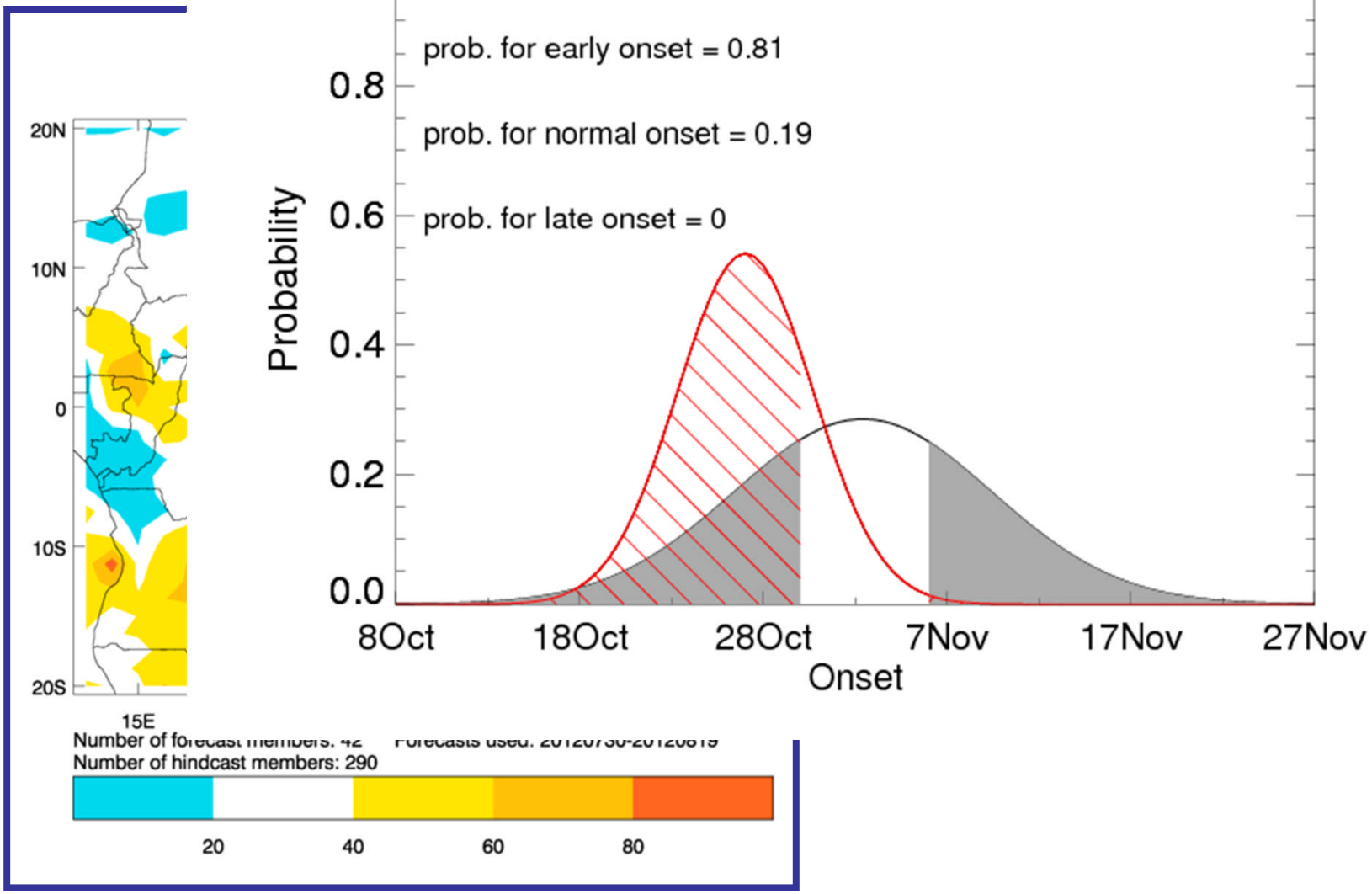


Prediction of monsoon onset

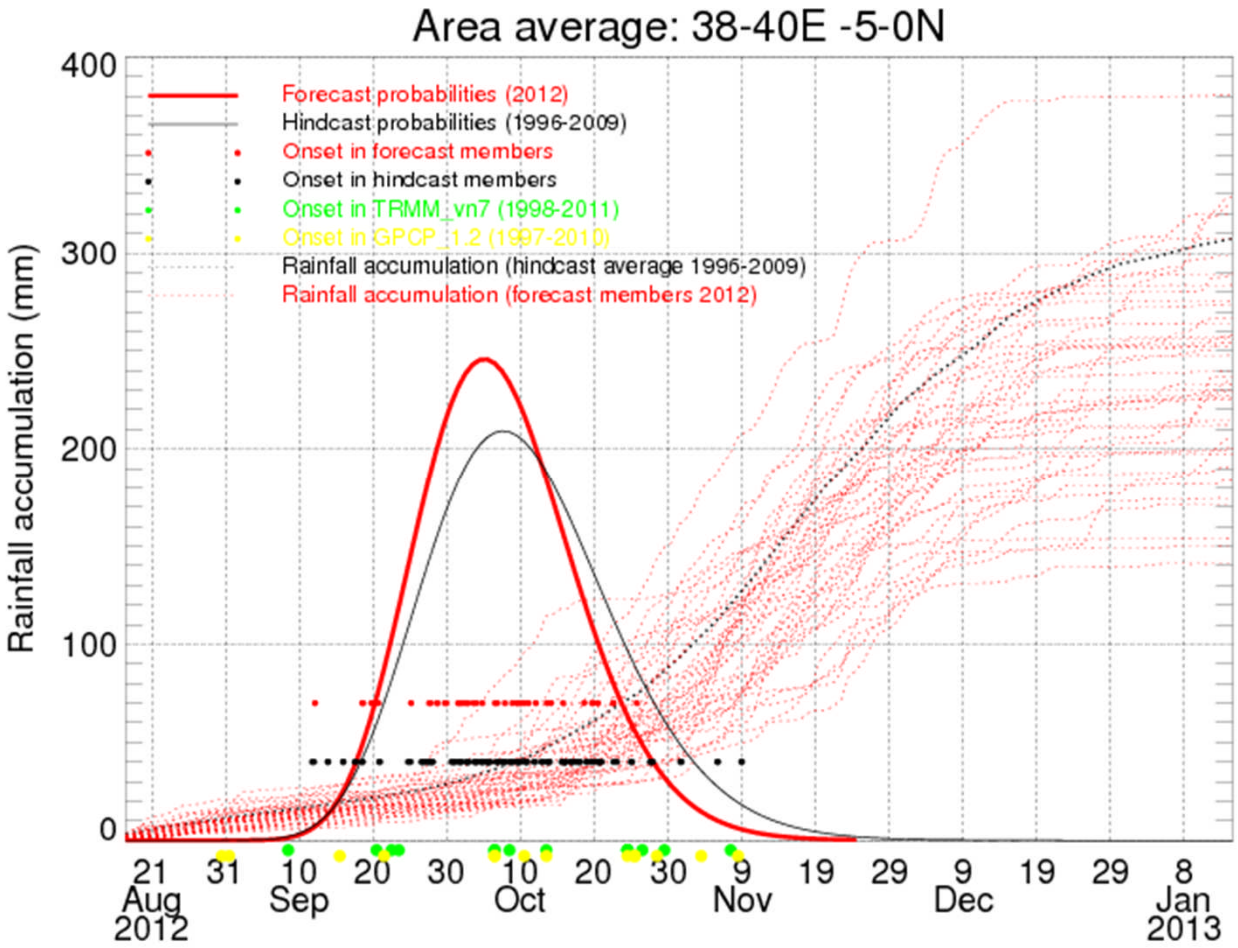
- result of close producer-user interaction
- developed by CSRP (DfID-MOHC)
- key points:
  - very strong user interest
  - ‘new’ science was needed
  - iteratively, refine presentation format

GloSea4 forecast for 2012 onset of short rains

Met Office Hadley Centre

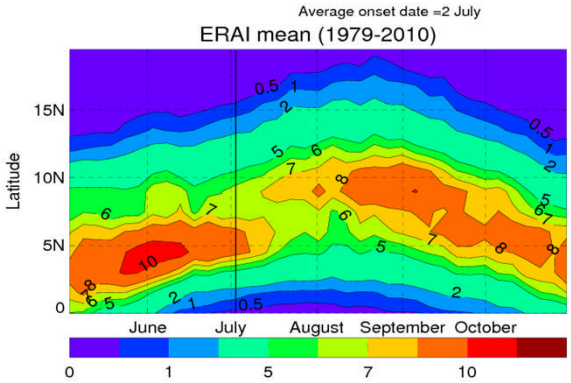


Alternative representation

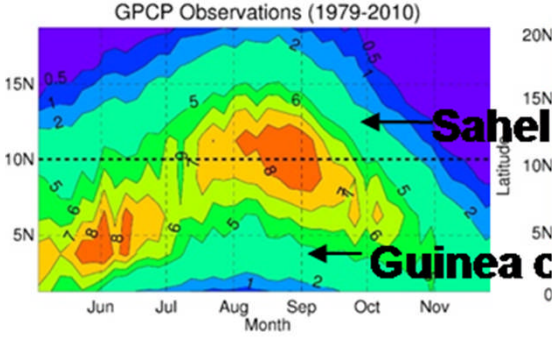


Modelling the West Africa Monsoon

ERA-Interim

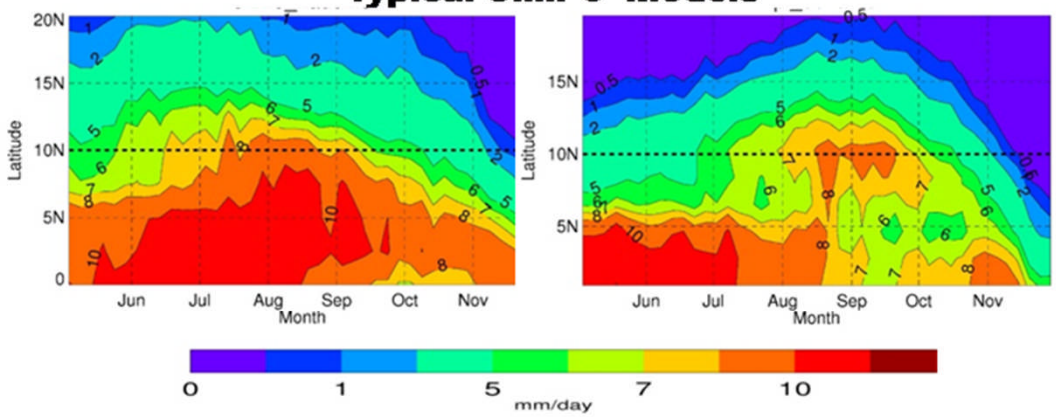


observed



Red indicates latitude of main rains (averaged 10° W-10° E)

Typical CMIP3 models



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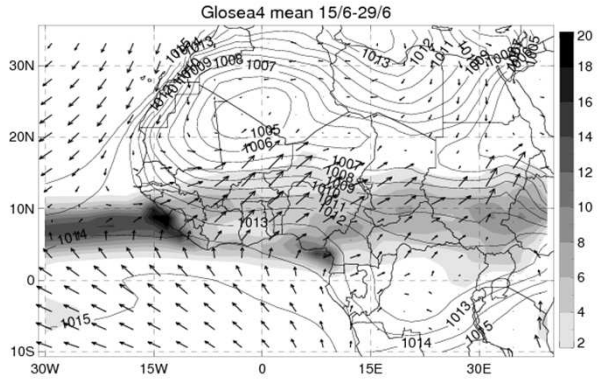
Changes to pmsl, moisture flux and convergence across onset

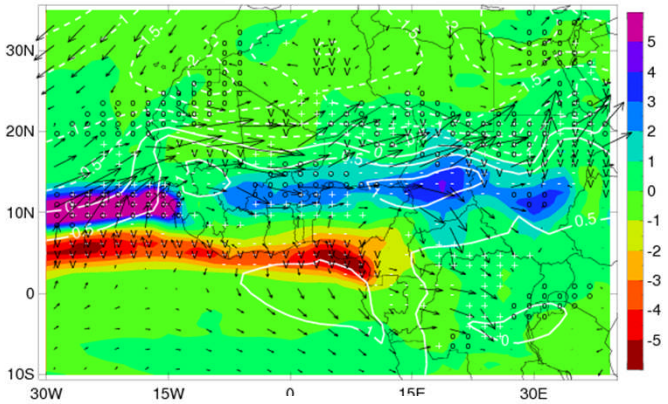
15-day means prior to onset: pmsl, 925hPa moisture flux, rainfall means



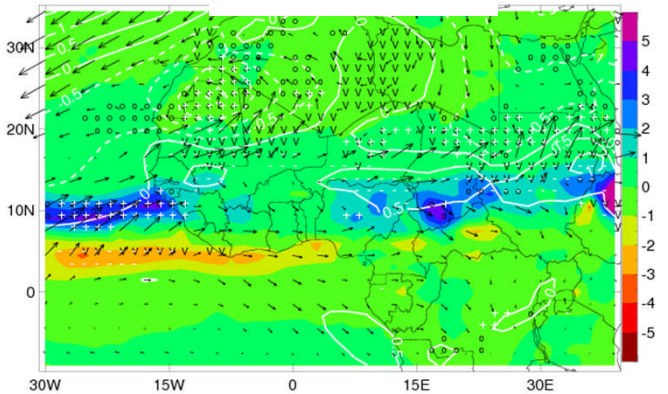
GloSea4 (HadGEM3-based seasonal system)

Difference: in 15day means across onset: 'after' minus 'before'

GloSea4



ERA-Interim



- **GloSea4: zonally oriented pmsl changes support strengthened moisture fluxes and convergence in Sahel.**
- **ERA-I: same features are weaker and less 'organised' – moisture diverted north**
- **GLACE -> soil moisture also important**

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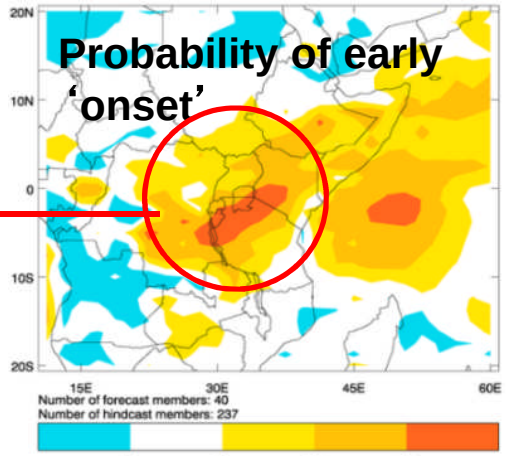
Predicting local onset timing

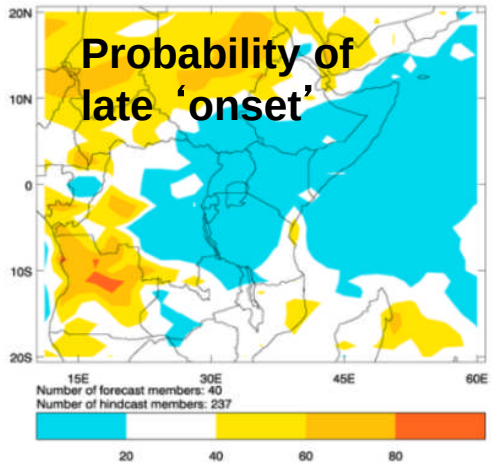
based on local time of arrival of 20% of long-term average

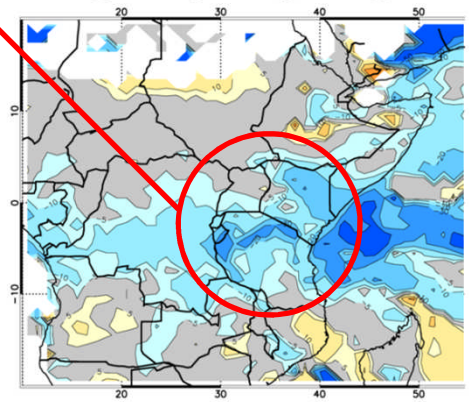
Example: Greater Horn of Africa, short-rains season (Oct-Dec) 2011 – predicted from August

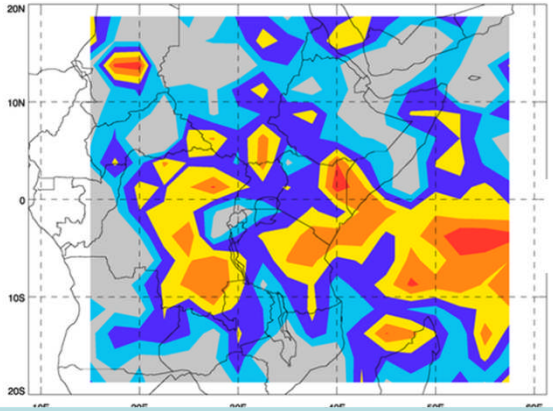
Early onset predicted most likely

Early onset occurred









ROC scores 1996-2009

- **Useful predictions of onset timing are feasible**
- **Forecasts now being trialled in East, West and southern Africa**
- **Monitoring of observed onset (and other events) developed**

Michael Vellinga/Lizzie Good

Seasonal predictions for UK government

- ‘producer-driven’ product
- key points:
  - variety of users and uses
  - specific needs not achievable with current science
  - generic product is a starting point;
    - continual interaction producer-user is essential,
    - information is most useful when combined with forecasts for shorter timescales

Met Office 3-month Outlook

Period: March – May 2013 Issue date: 28.02.13

The forecast presented here is for March and the average of the March-April-May period for the United Kingdom as a whole. This forecast is based on information from observations, several numerical models and expert judgement.

SUMMARY - TEMPERATURE:

For March below-average UK-mean temperatures are more likely than above-average. For March-April-May as a whole, near-average temperatures are more likely, although uncertainty for the period is larger.

The probability that the UK-mean temperature for March-April-May will be in the coldest of our five categories is between 15% and 20% and the probability that it will be in the warmest of our five categories is also between 15% and 20% (the 1981-2010 probability for each of these categories is 20%).

CONTEXT:

Neutral conditions (neither El Niño nor La Niña) continue in the Tropical Pacific; forecasts indicate continuation of such conditions as the most likely scenario over the next three months.

Temperatures in the northwest Atlantic are still above average, at surface and at depth, especially near the coast of Newfoundland. The Madden Julian Oscillation currently shows moderately enhanced activity in the western Pacific. These factors typically allow blocking patterns to develop more readily across northwestern Europe and can bring easterly winds to the UK, which in early spring are often cold.

Models agree with this scenario, predicting a pattern of atmospheric circulation indicating anomalously negative North Atlantic Oscillation conditions, which usually favour colder-than-average conditions over northern Europe. As we move into April and May the relationship between blocking patterns and colder weather is weaker; indeed, by late spring, blocking patterns can bring warmer-than-average conditions to northern Europe and the UK.

The forecast curves in Figure T2 show a shift towards colder-than-average values for March. During April and May the general atmospheric circulation over the North Atlantic region is predicted to be more westerly than in recent months, but signals for UK temperature are weak. For March-April-May as a whole, the outer categories are equally likely, with probabilities of near-average conditions slightly higher than climatological values.

Fig T1

3-month UK outlook for temperature in the context of the observed annual cycle

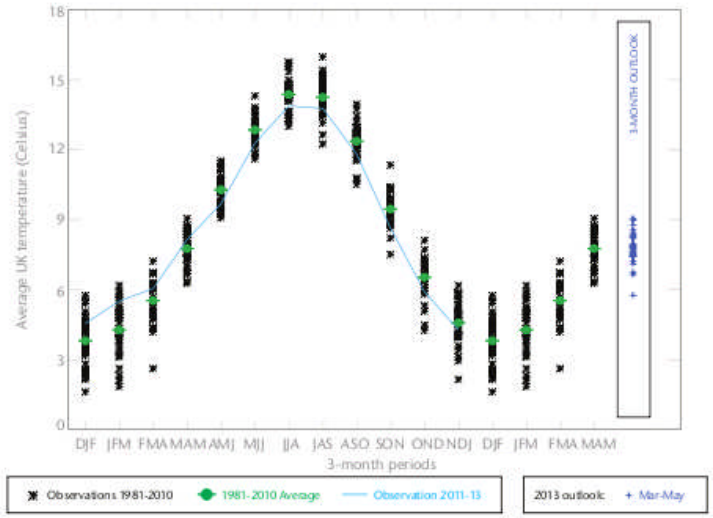


Fig T2

1-month and 3-month UK outlook for temperature in the context of observed climatology

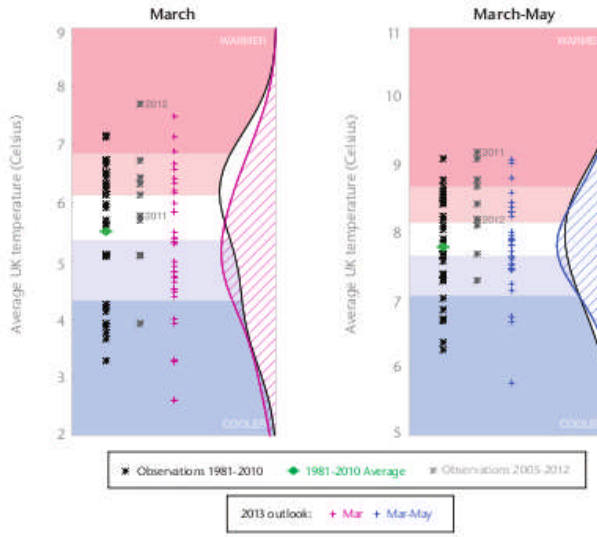
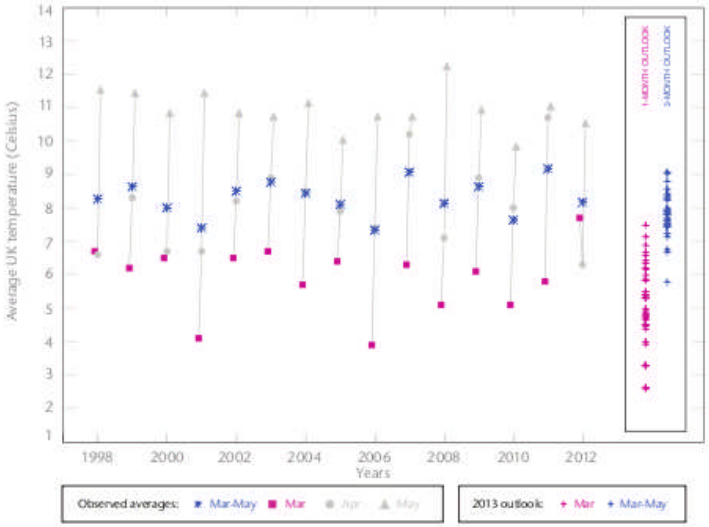


Fig T3

1-month and 3-month UK outlook for temperature in the context of recent climatology: year-to-year and within-season variability



This Outlook provides an indication of possible temperature and rainfall conditions over the next 3 months. It is part of a suite of forecasts designed for contingency planners.

The Outlook should not be used in isolation but should be used with shorter-range and more detailed (30-day, 15-day and 1-to-5-day) forecasts and warnings available to the contingency planning community from the Met Office.

General comments

- no one-size-fits-all solution
- user-provider interaction can deliver additional benefits
- no substitute for ‘good quality’ forecasts – continuing need for improvement in forecasting systems
- personal (intuitive) view: biggest hope for a quick gain is in forecasting user-relevant variables

Thank you