



The Abdus Salam
**International Centre
for Theoretical Physics**



2453-3

School on Modelling Tools and Capacity Building in Climate and Public Health

15 - 26 April 2012

Tailoring Information for Risk Management

CECCATO Pietro

*International Research Institute for Climate and Society; IRI
The Earth Institute Columbia University
61 Route 9W, Monell Building, Lamont Campus
10964-8000 Palisades, NY
U.S.A.*

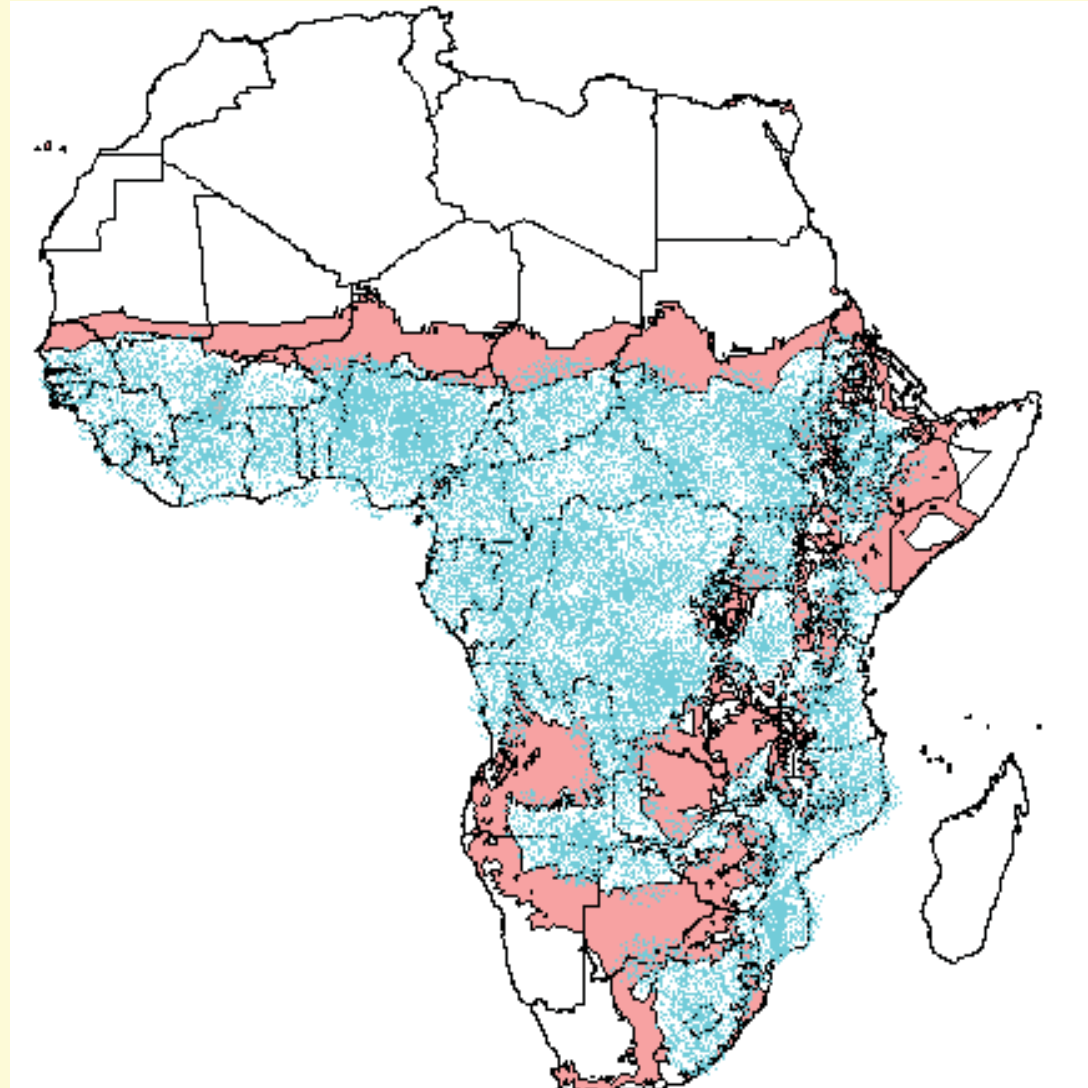
Tailoring Information for Risk Management

Human Health



Climate and Distribution of Malaria

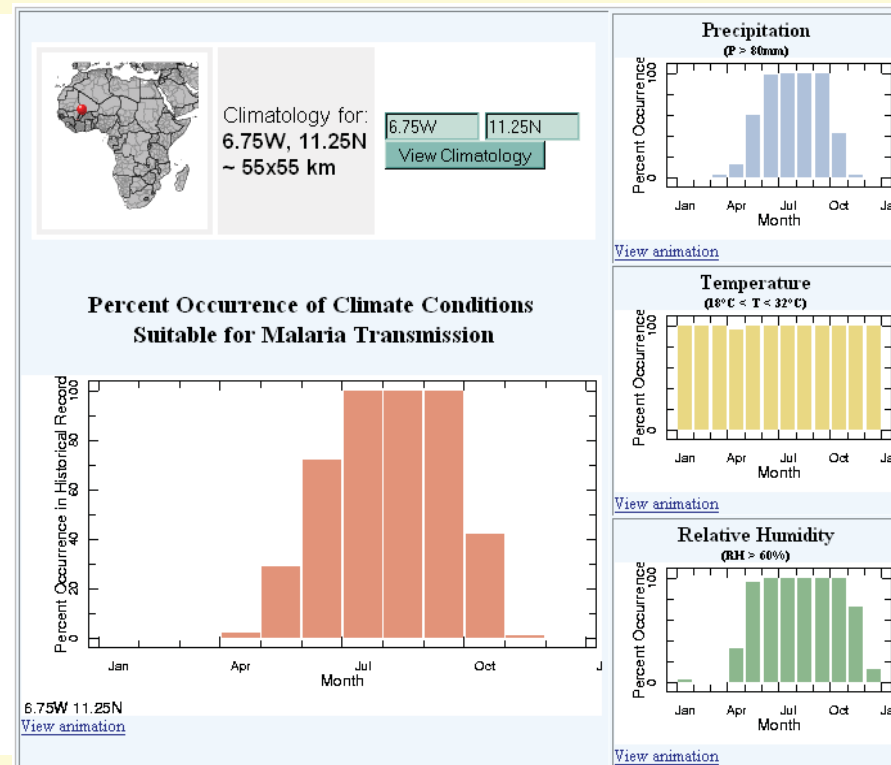
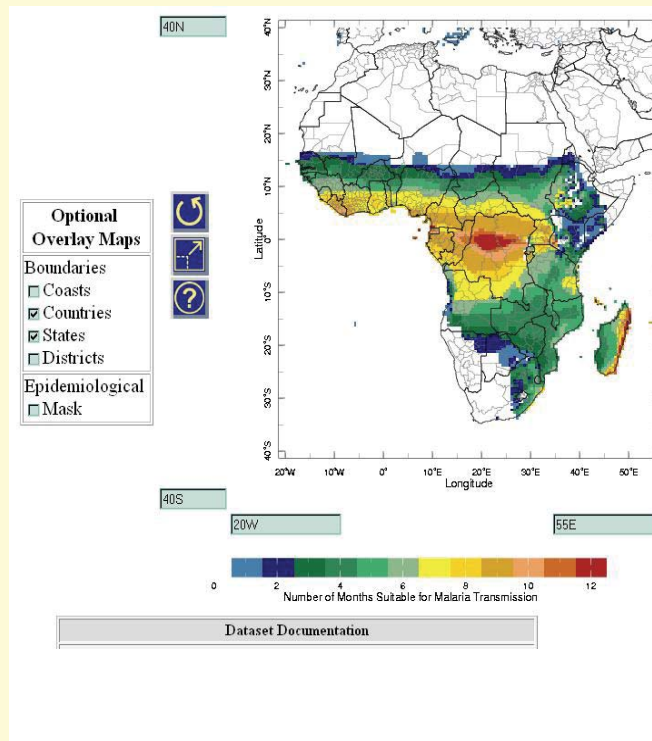
Endemic Malaria in Africa



Climate and Seasonality of Endemic Malaria

Climate suitability for endemic malaria

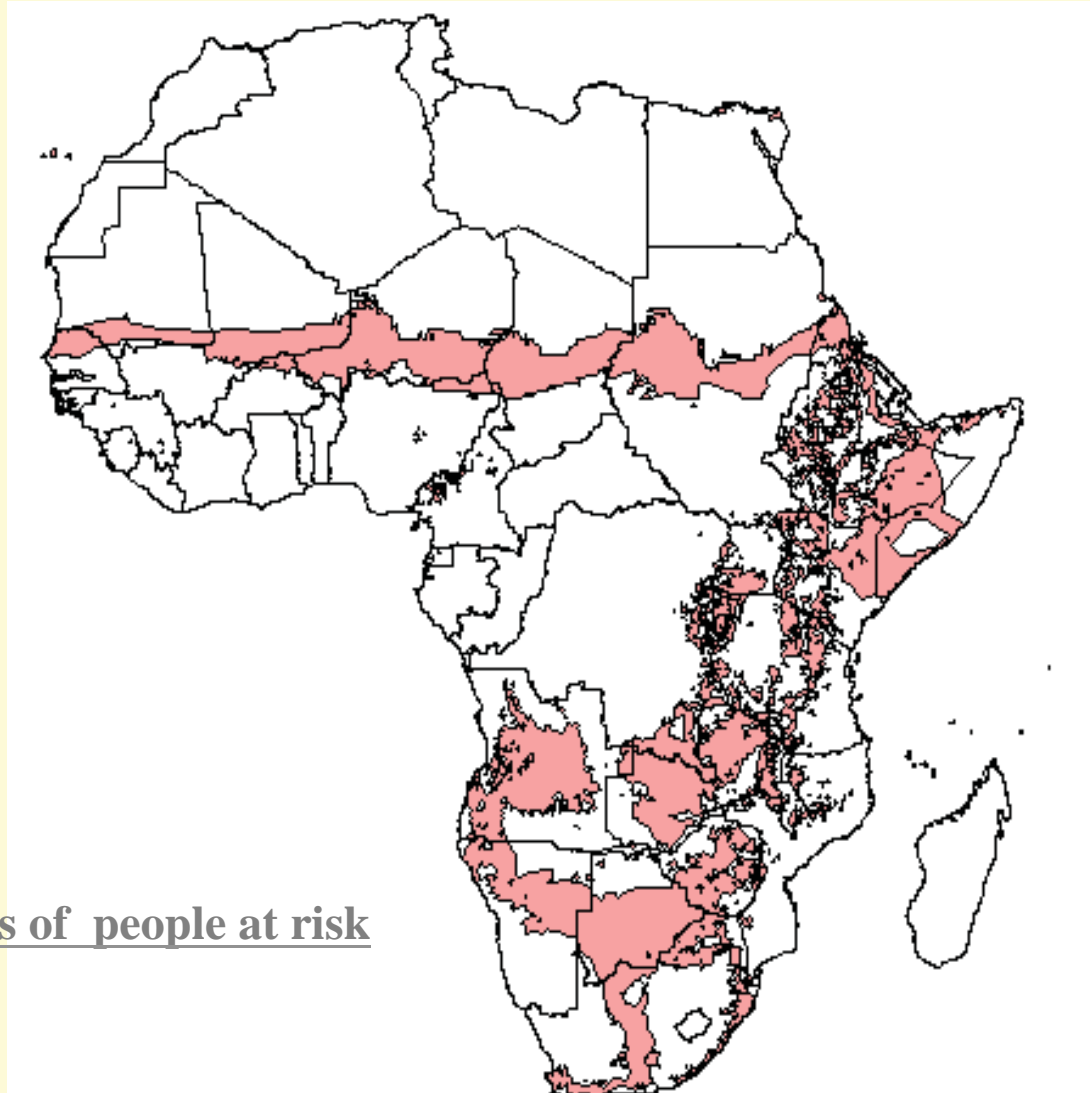
= 18-32°C + 80mm + RH>60%



<http://www.malariajournal.com/content/5/1/38>

Climate and Distribution of Malaria

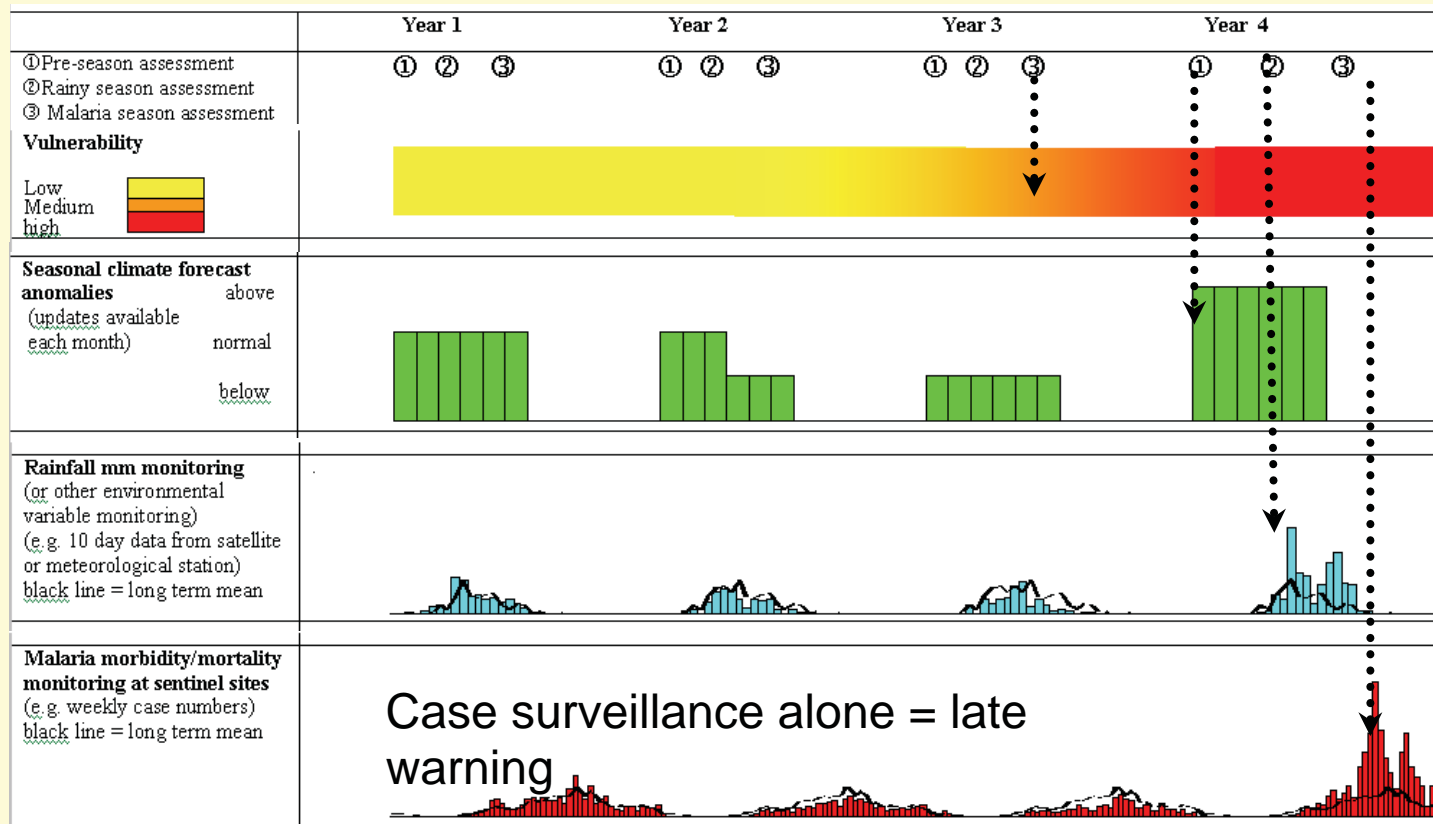
Epidemic Malaria in Africa in Semi-Arid and Highland Areas



124 millions of people at risk

Developing and Establishing Early Warning System

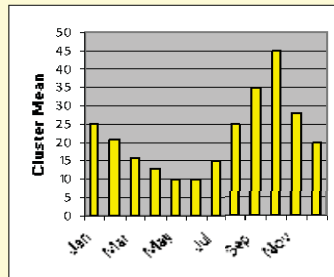
Integrated EWS gathering cumulative evidence for early and focused epidemic preparedness and response (WHO 2004)



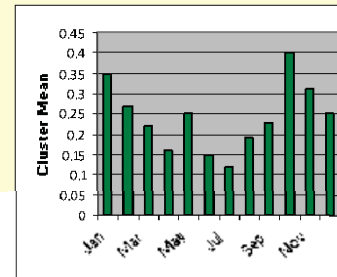
Flag 1 – Flag 2 – Flag 3

Alert & Response

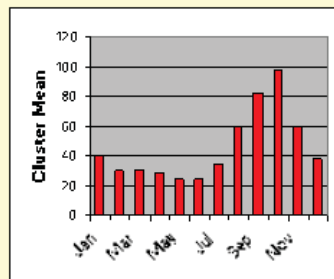
Studied the malaria spatial and temporal distribution in Eritrea



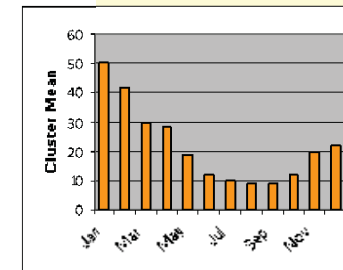
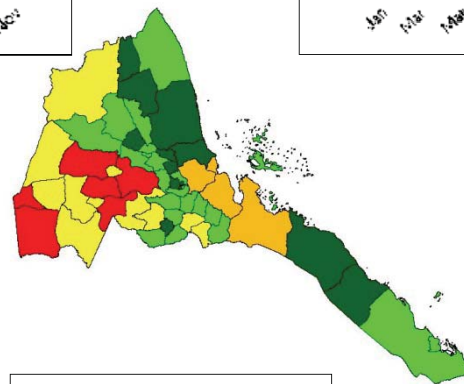
Moderate incidence West (Oct peak)



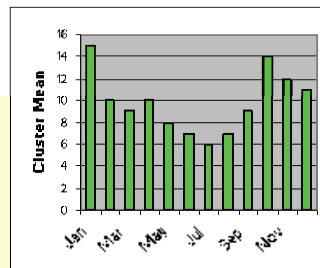
Very Low incidence (Jan/Oct peaks)



High incidence (Oct peak)



Moderate incidence East (Jan peak)

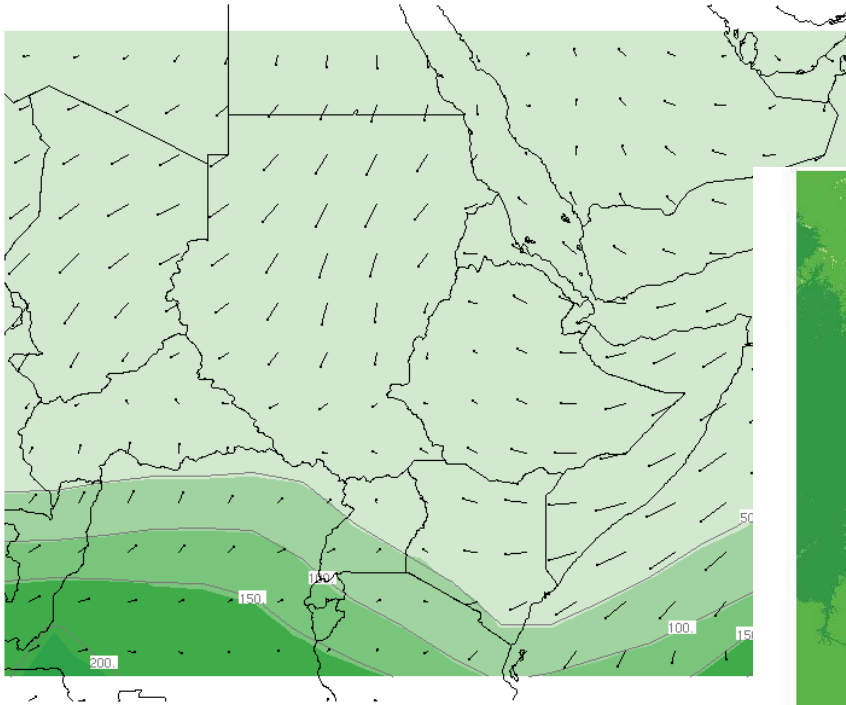


Low incidence (Jan/Oct peak)

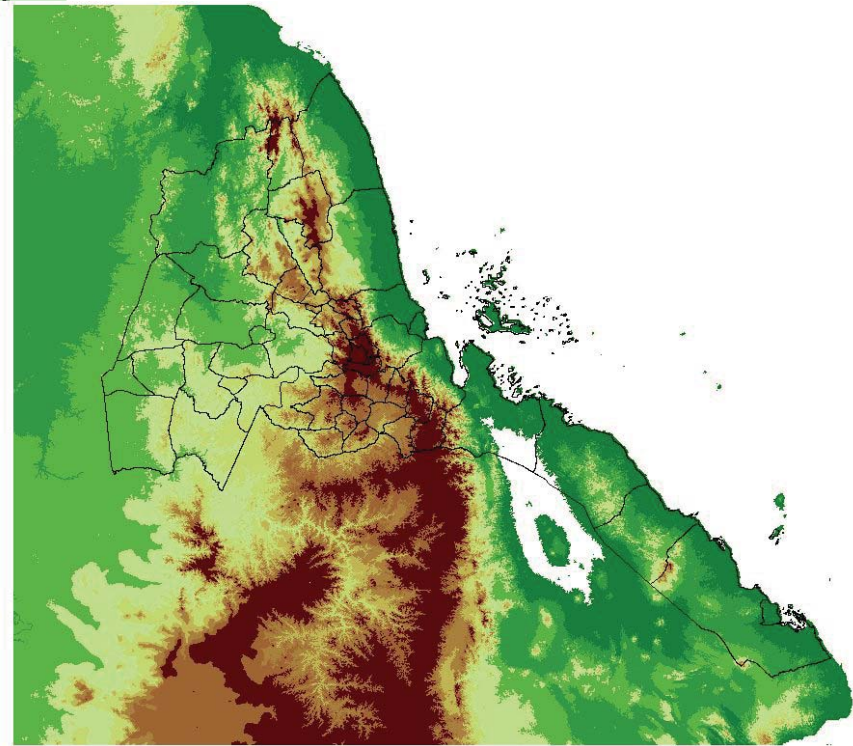
A new Malaria stratification map for Eritrea provided the basis for understanding the relationship between Malaria and Climatic factors

Eritrea Case Study

Malaria spatial and temporal distribution in Eritrea

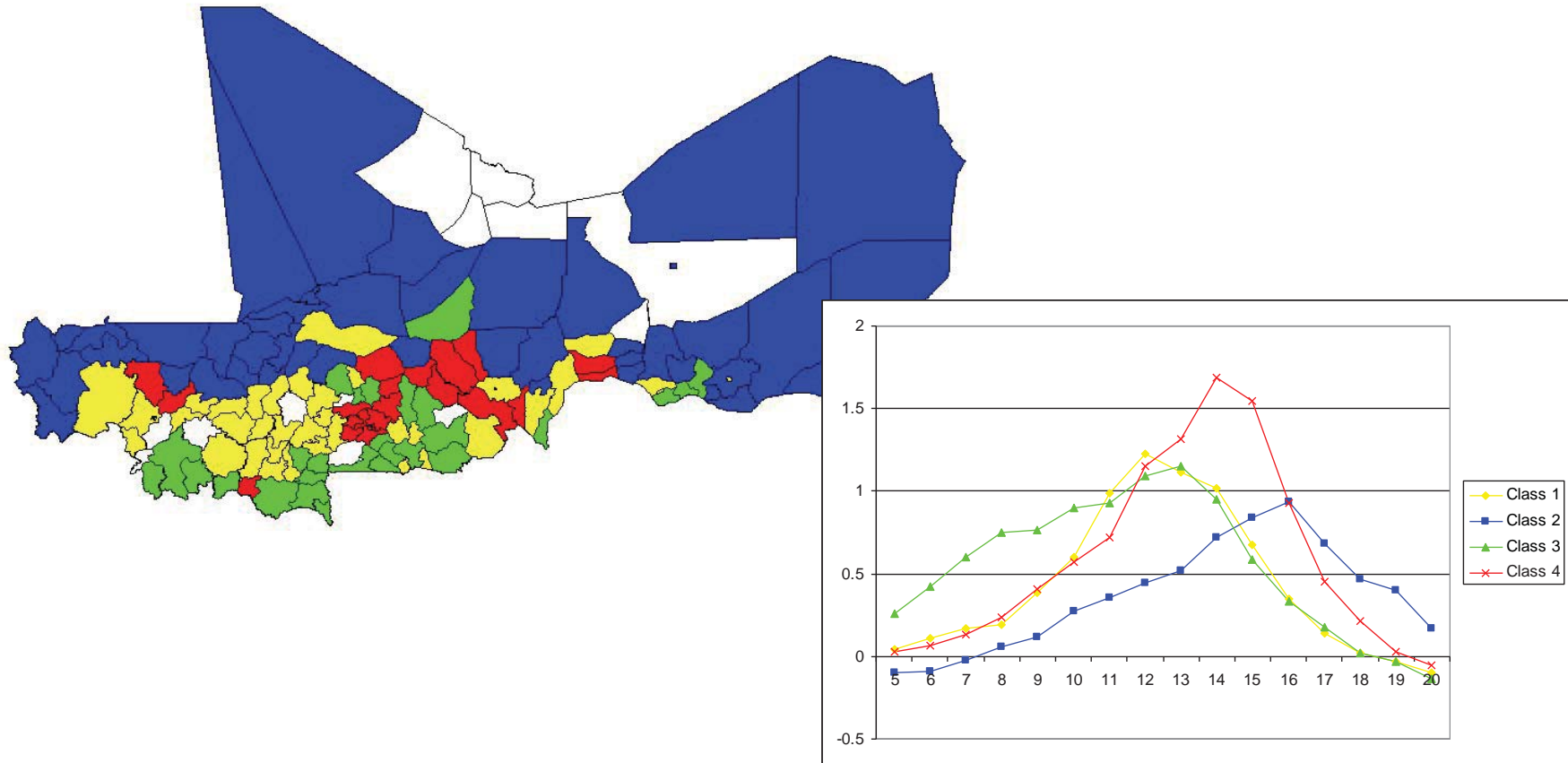


Time Jan Pressure 925. mb



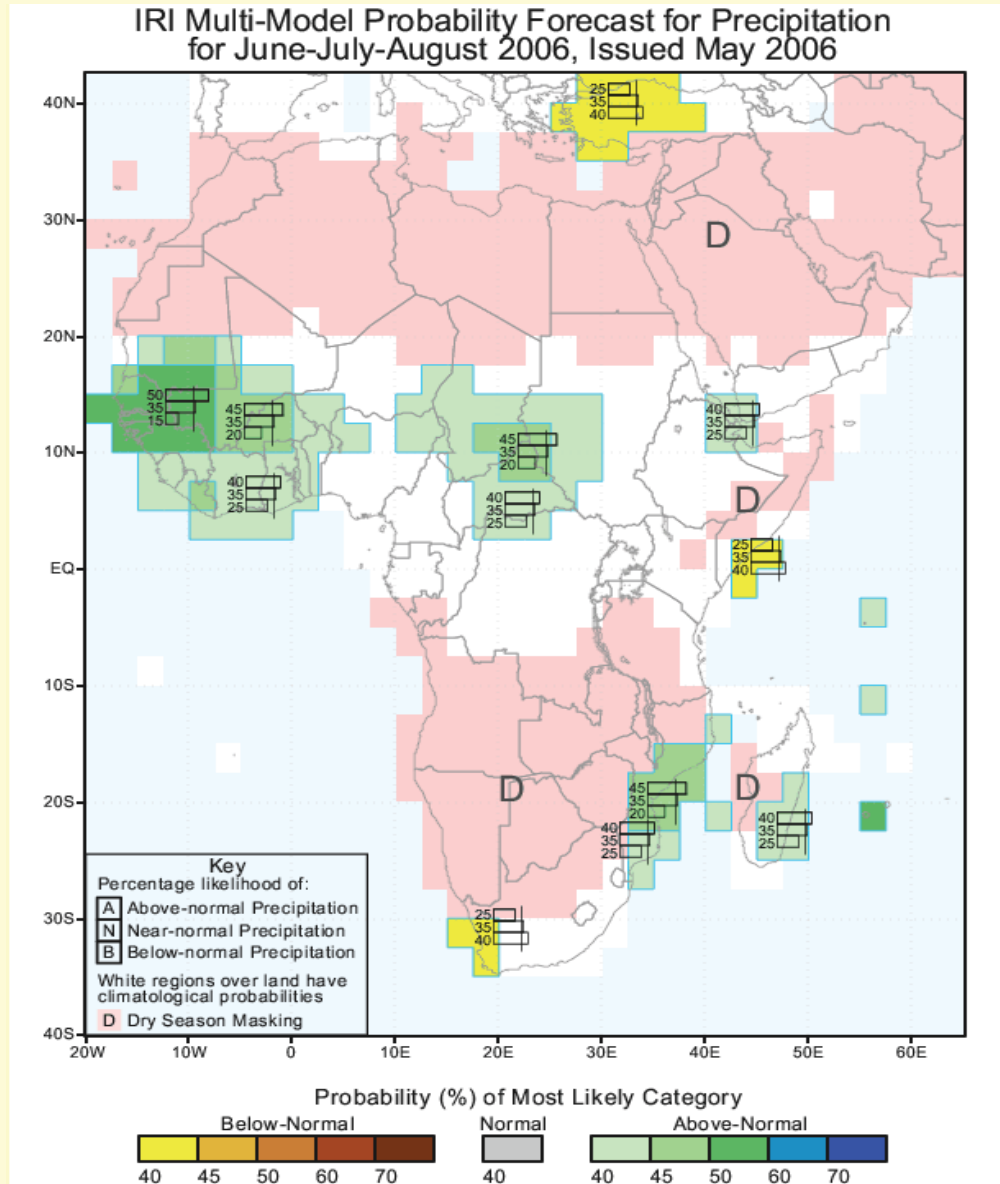
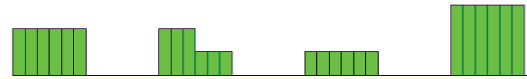
Meningitis Case Study

Meningitis spatial and temporal distribution in Mali, Niger, Burkina Faso



A new Meningitis stratification map provided the basis for understanding the relationship between Meningitis and Climatic factors

Long-Term Forecasting...



Thomson et al.
(2006)

Malaria early
warnings based
on seasonal
climate forecasts
from multi-model
ensembles

Nature **439**,
576-579.

Short-Term Forecasting...



- Monitoring Rainfall, Vegetation and Water Bodies
 - Using measurements from meteorological stations or from remotely-sensed images available free of charge

IRI Data Library Map Room

IRI develops simple tools accessible via Internet to analyze the relationship between Climate and Human Health

Climate and Health Resource Room

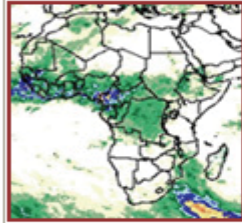
Climate affects health in a number of ways. These affects may be direct, as with heat stress, or indirect, as with infectious diseases such as malaria and dengue. This facility aims to explore and inform users about the climate-health relationship with an emphasis on the seasonal nature of that relationship, where appropriate. This "Climate and Health Resource Room" will begin with a focus on malaria, a mosquito-borne disease of major public health importance in much of the developing world, and sub-Saharan Africa in particular. It is our intention to increase the content of the resource room by including analyses that focus on other diseases and regions, as well those developed at other institutions.

Please click on the African continent to enter the Climate and Health Resource Room.



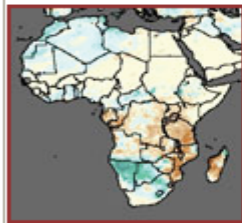
Monitoring Tools for Epidemic Malaria

Malaria Early Warning System



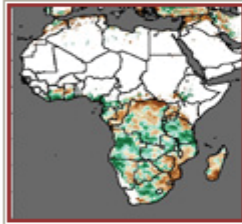
MEWS is a rainfall-monitoring product based on dekadal rainfall estimates from the Climate Prediction Center. The interface allows users to view recent rainfall estimates with a seasonal and recent historical perspective. Time series analyses of rainfall data are generated based on user-selected parameters.

Rainfall Estimate Differences



The Rainfall Estimate Differences (RED) map illustrates the difference between the most recent dekadal rainfall estimates from the Climate Prediction Center and their short term average (from 2000 to last recent complete year). These differences should not be confused with conventional rainfall anomalies, but may provide insight into changes in malaria risk in areas where precipitation anomalies are the principal cause of malaria epidemics by providing a recent historical reference.

Rainfall Estimate Percentages



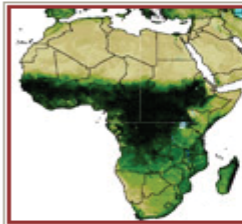
The Rainfall Estimate Percentages (REP) map expresses the most recent dekadal rainfall estimates from the Climate Prediction Center as a percentage of the short term average (from 2000 to last recent complete year).

MODIS Image Download Tools



Several regional tools facilitate access to MODIS images, which are provided by the United States Geological Survey. Images are available for West Africa, East Africa, and Southern Africa.

NDVI Analysis Tool



An interactive map of the Normalized Difference Vegetation Index for West Africa, East Africa, and Southern Africa. Time series analyses of NDVI are generated based on user-selected parameters.

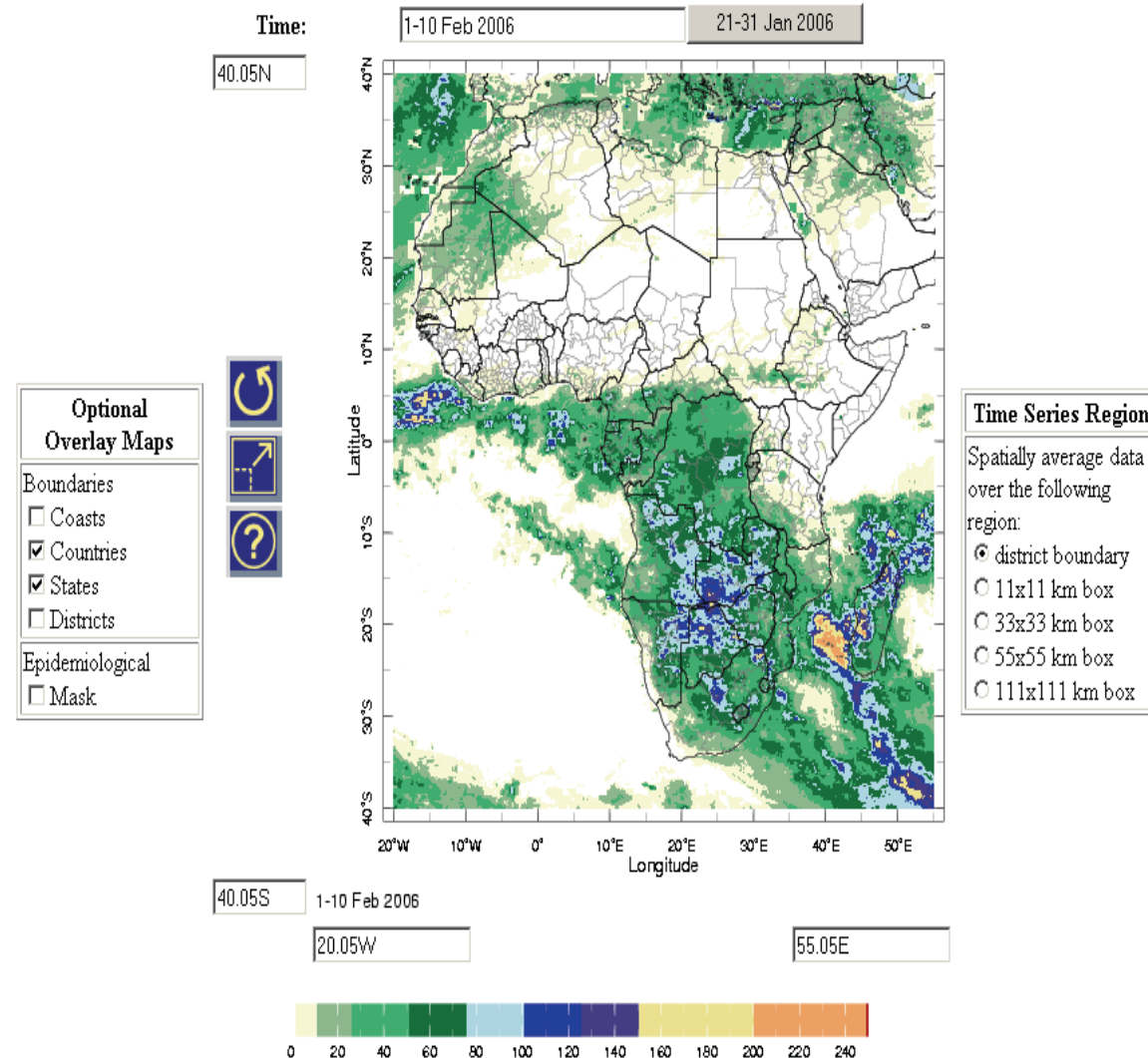
Rainfall Estimates Product derived from Satellites

Interface to provide additional information on the current rainfall season compared with recent seasons

Malaria Early Warning System (MEWS)

The MEWS interface provides a contextual perspective of recent precipitation by comparing it to previous seasons and recent short-term averages. More information about how to use the interface is available [here](#).

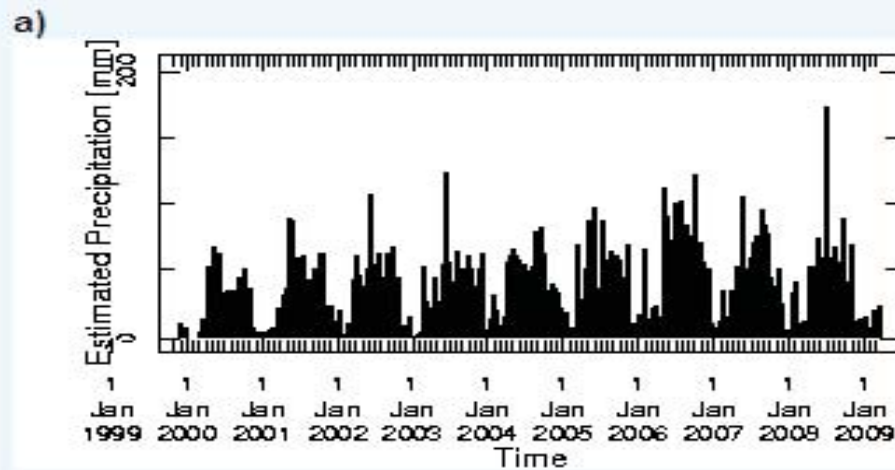
Clickable Map for Rainfall Summaries



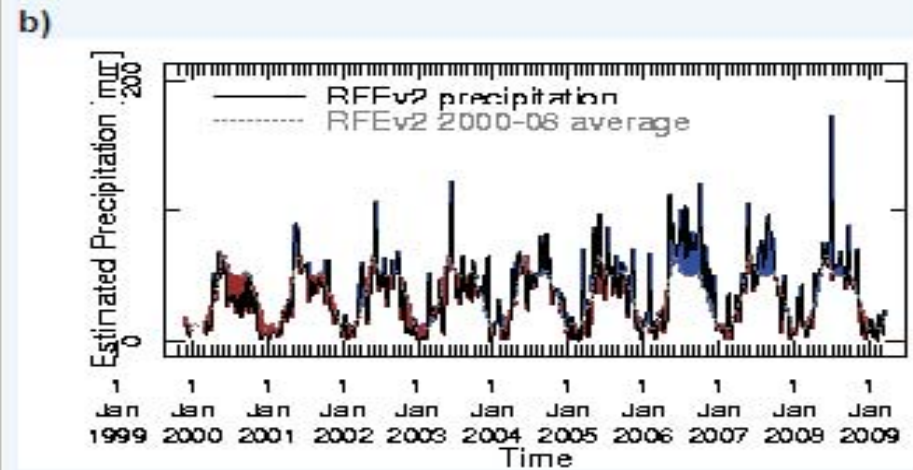


Observations for:
**Illubabor, Oromiya,
Ethiopia**

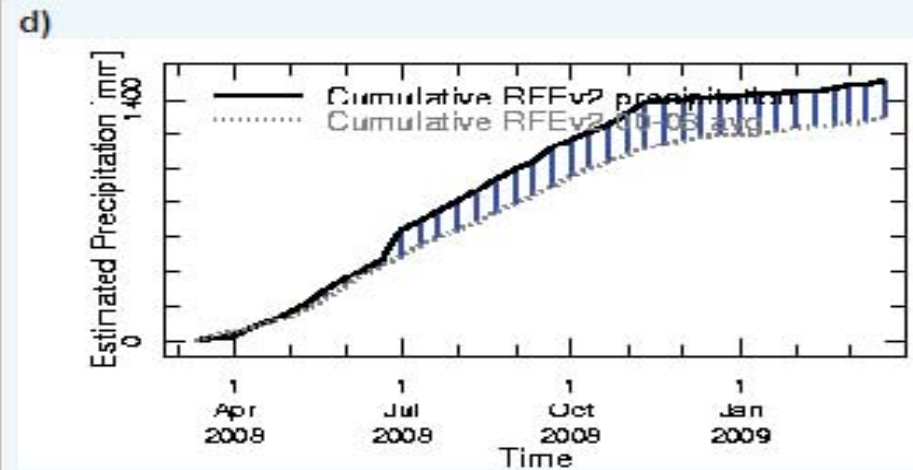
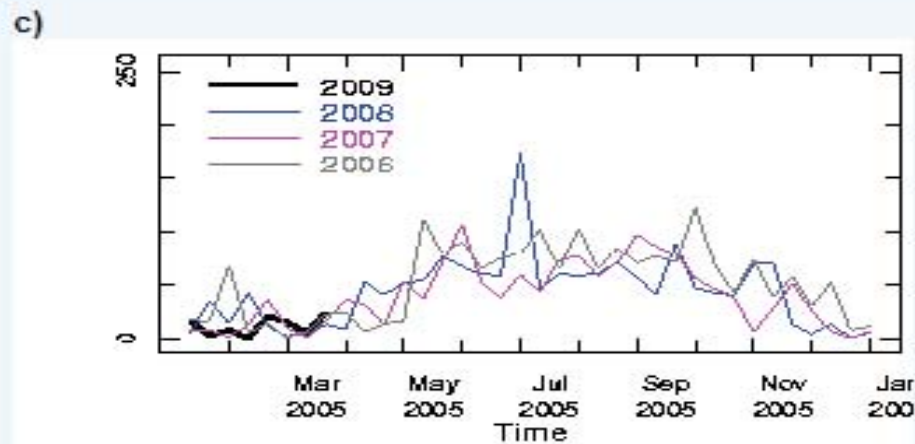
district



[Data in this graph](#)



[Data in this graph](#)

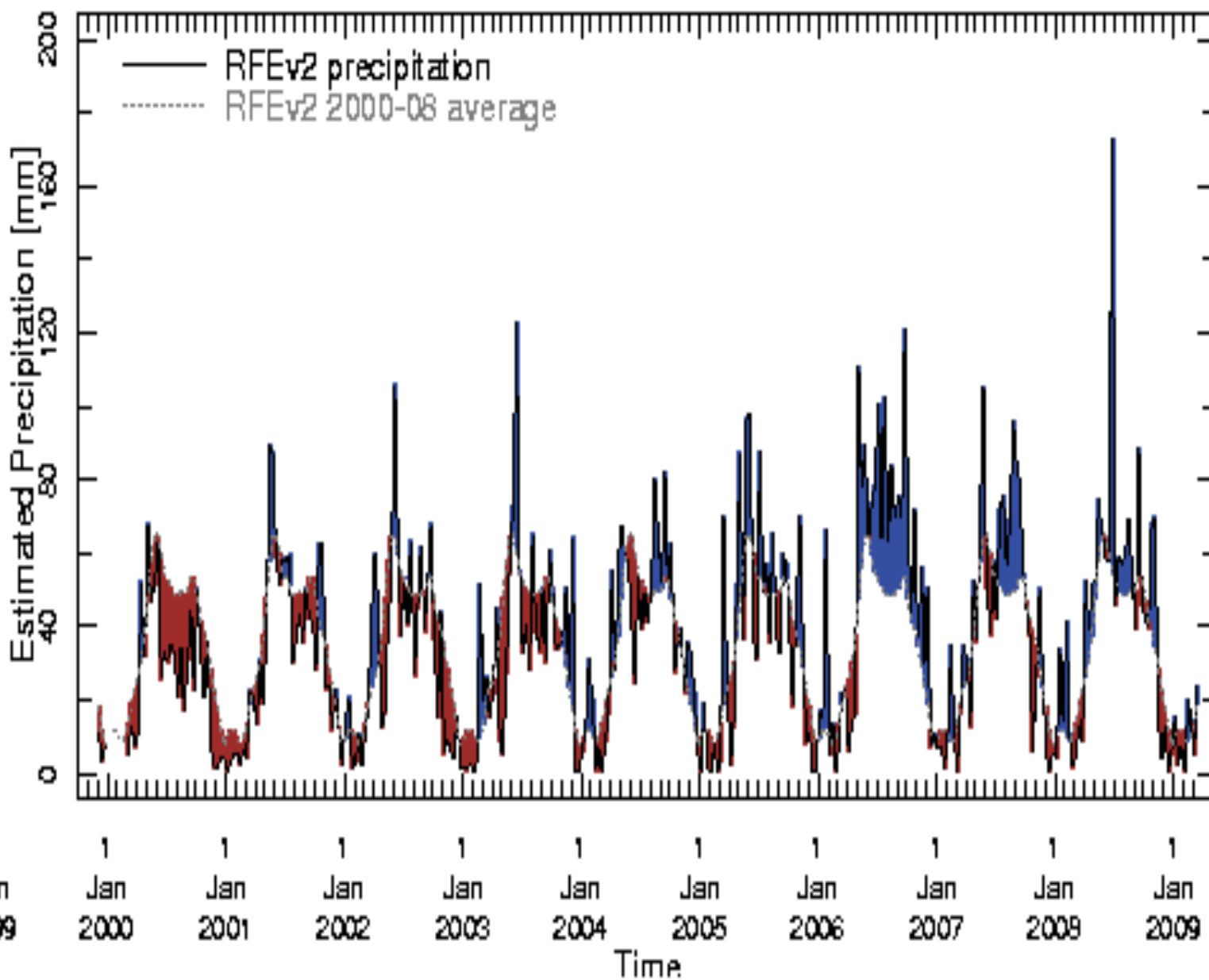


200

Zoom ▾



0



0000 1 Dec 1999

2400 15 Mar 2009

Operational Use of MEWS



National Malaria Control Program strengthen vector control measures, prepare emergency containers with mobile treatment centers and mobilize localized response



Climate Data Analyses

Meeting Abuja Targets...

Areas which have been persistently wetter (2 or 3 years) or drier (-2 or -3 years) during 2001-2003 compared to the 2000 baseline time series of rainfall variability for b) Niger, c) Eritrea and d) Botswana

