



SPACE TOOLS AND SOLUTIONS FOR MONITORING THE ATMOSPHERE IN SUPPORT OF SUSTAINABLE DEVELOPMENT

Graz, AUSTRIA, 11 – 14 September 2007

Kabaselle, J

IGAD Climate Prediction and Applications Centre (ICPAC)

P O Box 10304 00100 GPO

Tel: +254 020 3878340

Fax: +254 020 3878343

NAIROBI - KENYA

Email: jkabaselleh@icpac.net

Website: <http://WWW.icpac.net>



OUTLINE



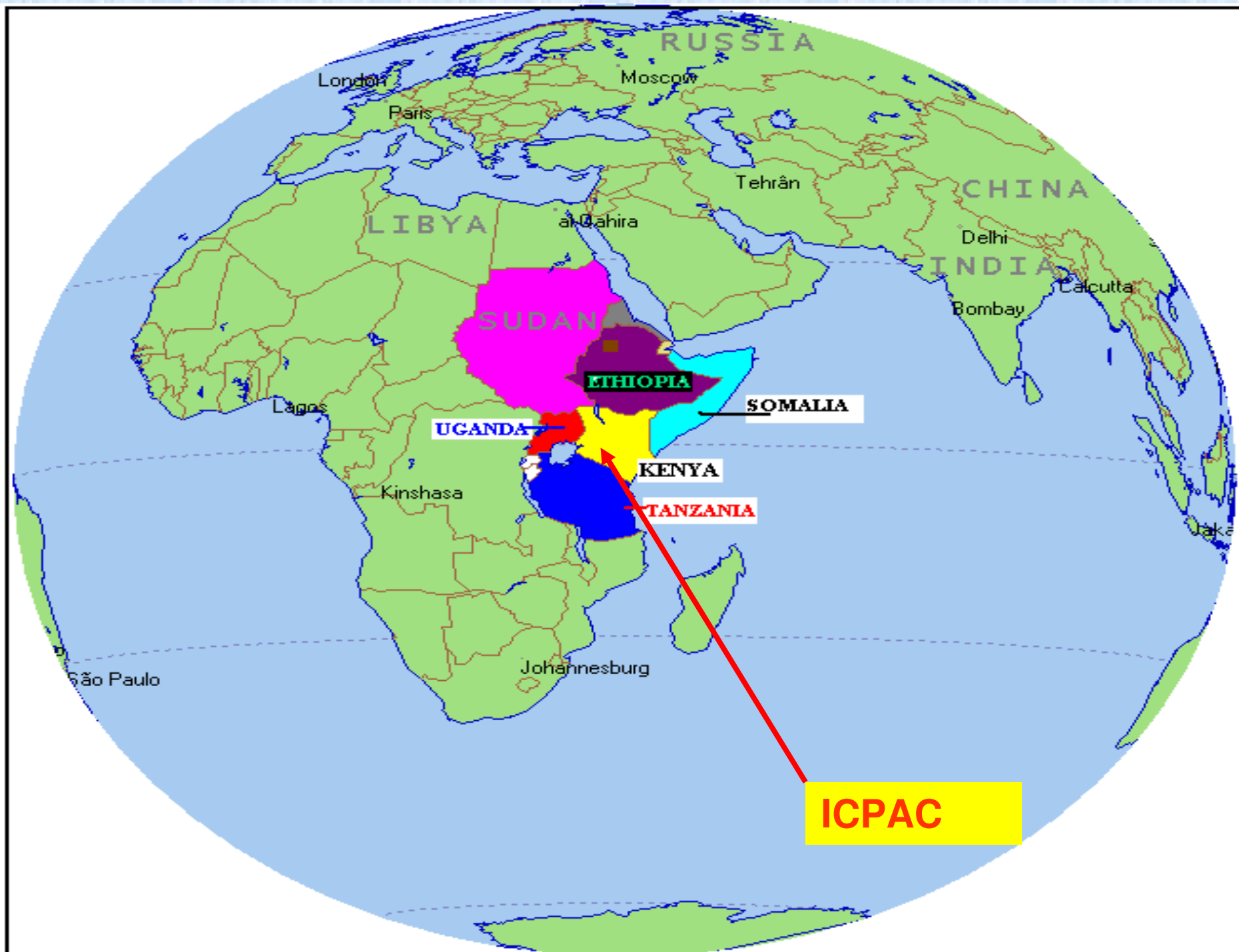
- **ICPAC**
- **Background and Motivation**
- **Introduction**



What is ICPAC

IGAD Climate Prediction and Applications
Centre Nairobi (*ICPAC*) dealing with regional
climate early warning for **TEN COUNTRIES**
IN the greater horn of Africa(GHA)

MAP OF MEMBER COUNTRIES OF IGAD





ICPAC Core Programmes



- **Computer Services and Data Management**
- **Climate Diagnostics, Prediction and Climatology**
- **Climate Applications**
- **Documentation, Research and Development**
- **End-User Liaison**
- **Operational activities**



ICPAC ACTIVITIES

- Identification of past climate characteristics for risk zoning – climatology of climate extremes
- Climate evolutions over the last three months to assess the persistency of climate events
- Monitoring of current state of climate
- Prediction of future expectations- 10 days, one and three months projections
- Application products: impacts products

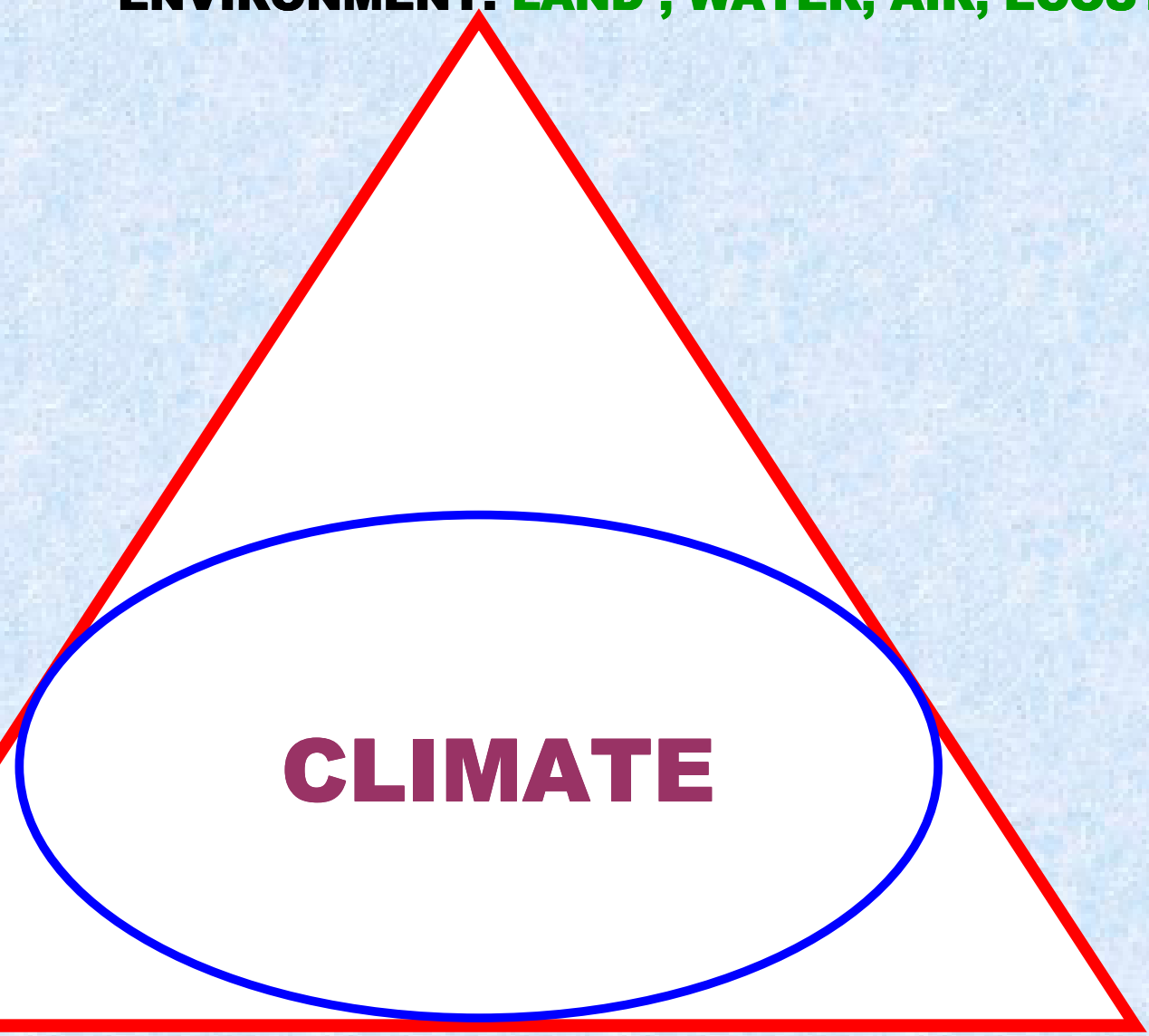


- **Subsistence rain-fed agriculture** mainstay of most economies of the GHA countries
- **Extreme climate** events (floods & drought) common with devastating effects on all major sustainable development sectors and often retard national economic growth
- **ICPAC:- Specialized IGAD Institution;**
responsibility
 - ✓ **Monitoring**
 - ✓ **Prediction**
 - ✓ **Applications**



SUSTAINABLE DEVELOPMENT TRIANGLE

ENVIRONMENT: LAND ; WATER; AIR; ECOSYTEMS



CLIMATE

SOCIETY,
basic needs
, Population

ECONOMY
wealth, trade
Poverty

**CHALLENGES OF CLIMATE
IN SUPPORT OF SUSTAINABLE
DEVELOPMENT**



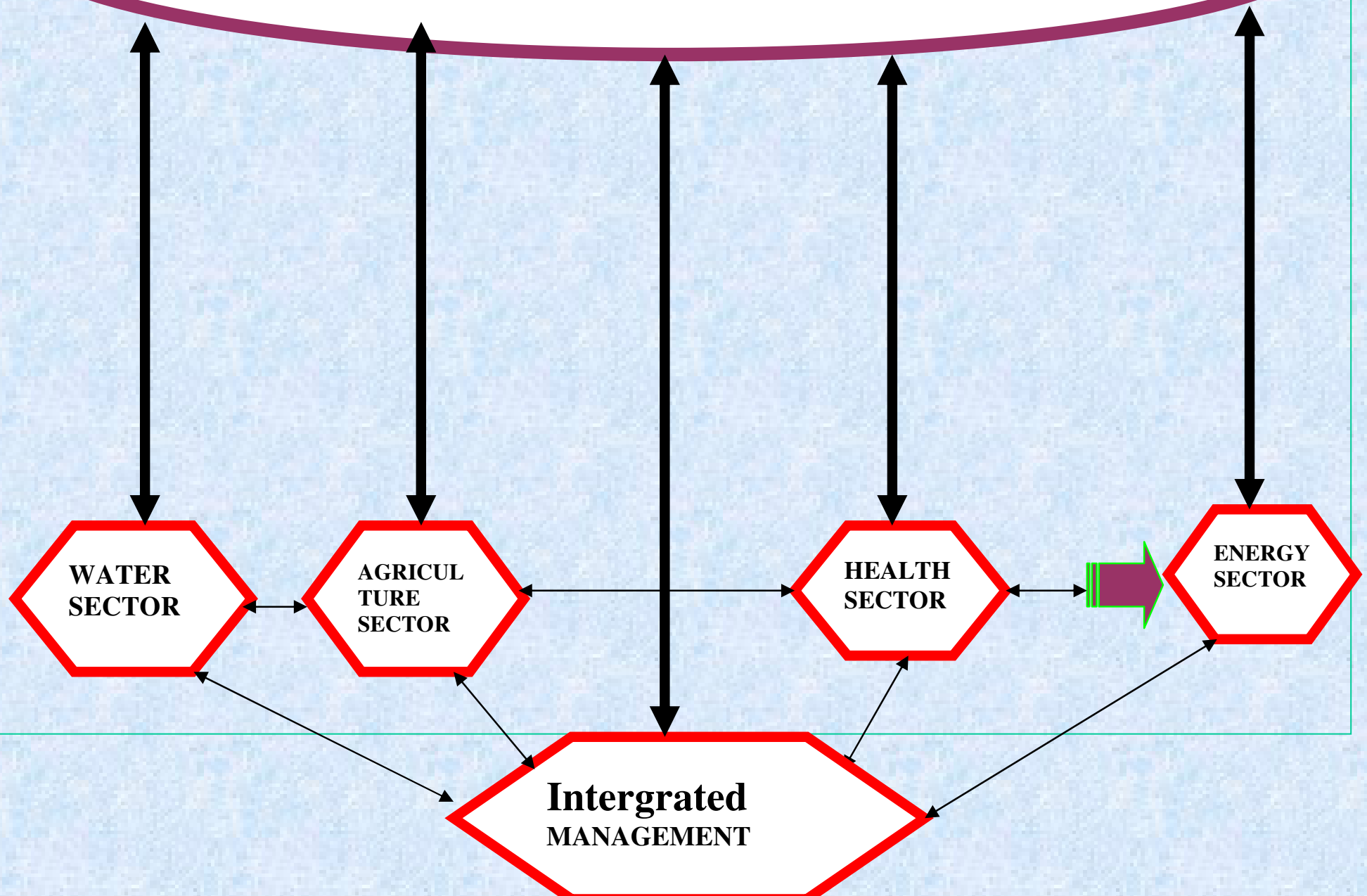
Natural resource base of economic and social development



- Water management
- Energy
- Agriculture
- Health



WEATHER / CLIMATE INFORMATION & PREDICTION PRODUCTS





EXTREME CLIMATE EVENTS IN GHA

- Drought
- Floods
- Lightening
- Cyclones
- Strong Winds
- Extreme Temperatures
- Landslides



VARIABILITY ENERGY - HYDROPOWER





IMPACTS OF CLIMATE VARIABILITY SOCIAL & INFRASTRUCTURE - FLOODS





Use of Space Technology for monitoring extreme climate events

- **Meteorological satellites enable the acquisition of atmospheric and surface information**
- **Thus enable us to monitor the formation and development then use information for prediction and warning for safeguard of lives and property**



RS and GIS information tools for decision making

Satellites are used in acquiring the following information

- SSTs including ENSO
- Tropical cyclones
- Monitoring of Clouds
- Vegetation indices (drought)
- Floods

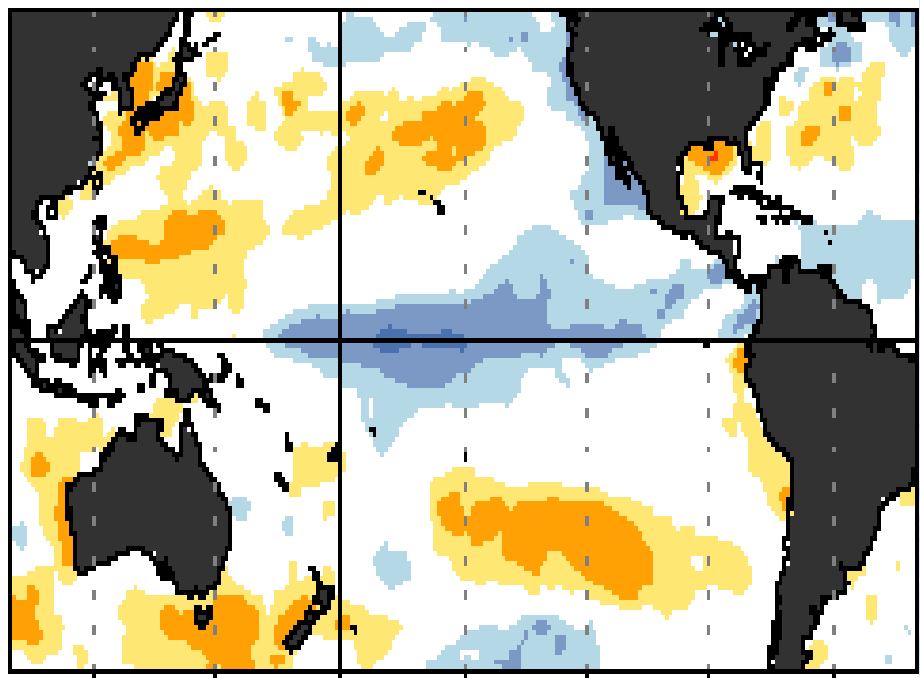
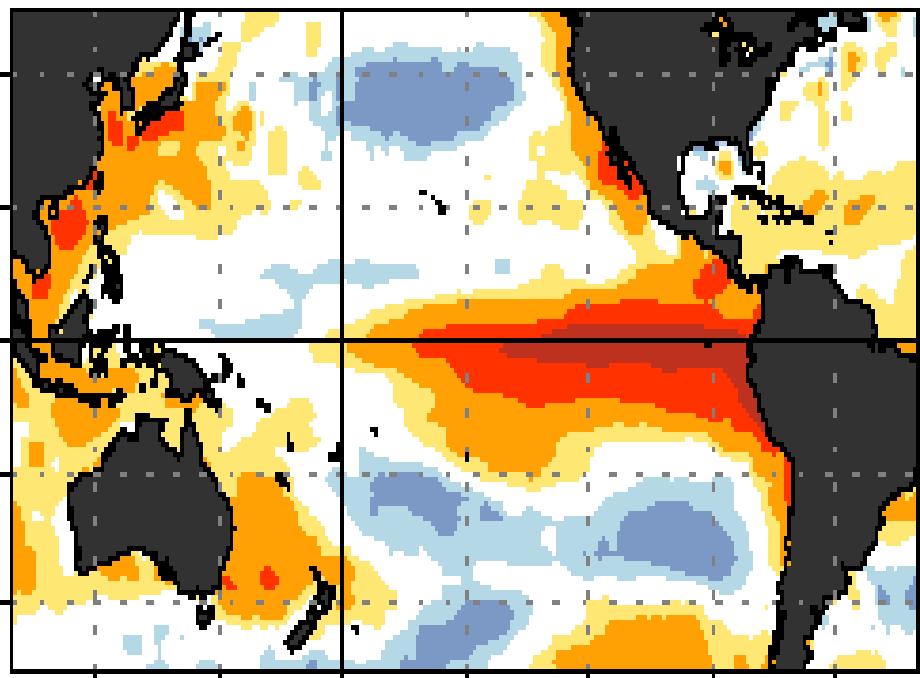


El Niño/ La Niña: SST Patterns

10 15 20 21 22 23 24 25 26 27 28 29 30

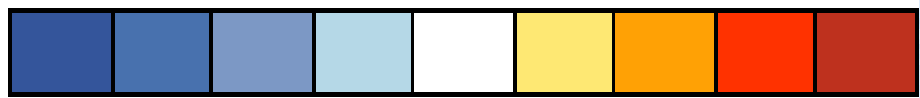
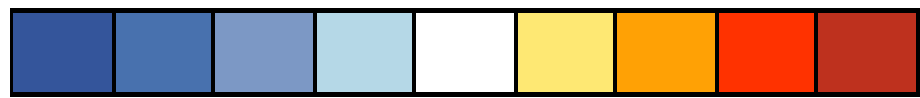
10 15 20 21 22 23 24 25 26 27 28 29 30

OCEAN TEMPERATURE DEPARTURES (°C)



120E 150E 180 150W 120W 90W 60W

120E 150E 180 150W 120W 90W 60W



-3 -2 -1 -0.5 0.5 1 2 3

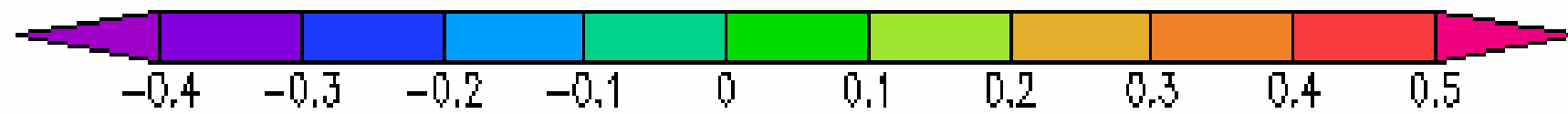
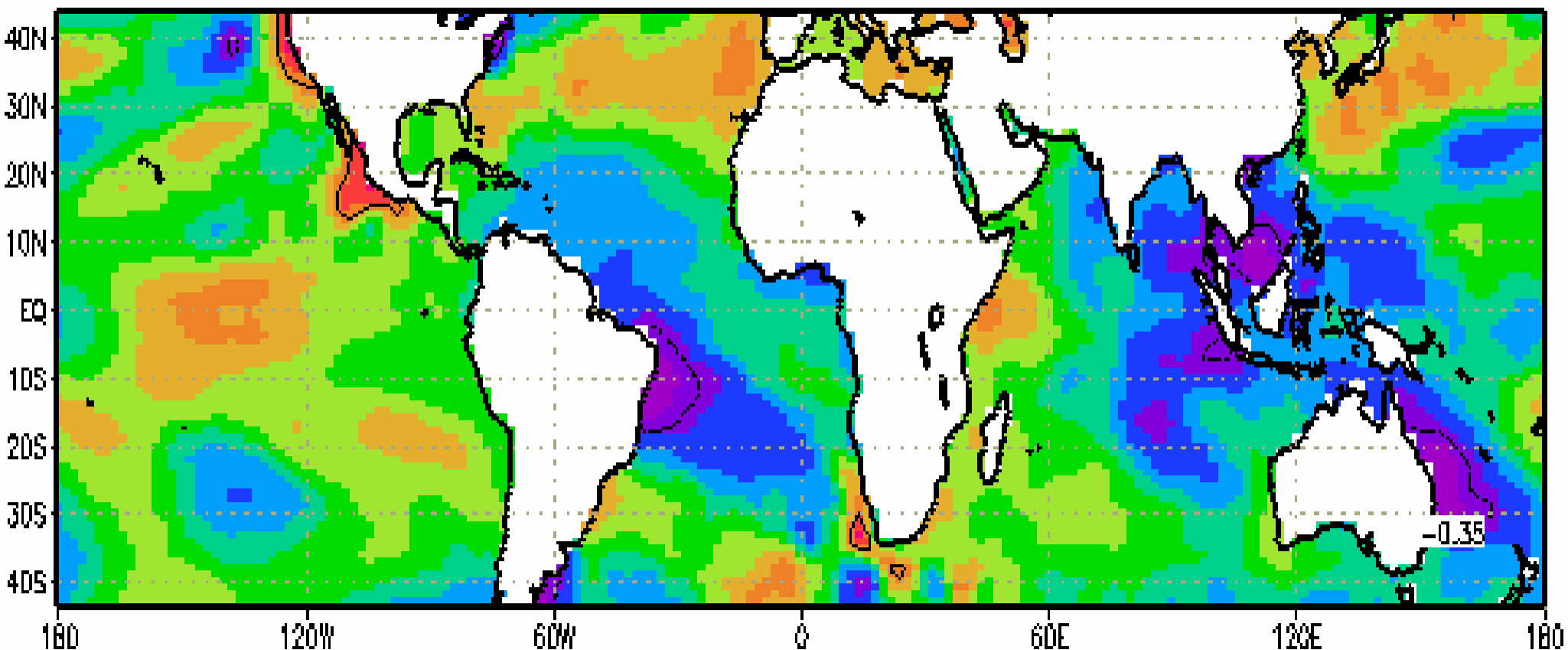
-3 -2 -1 -0.5 0.5 1 2 3



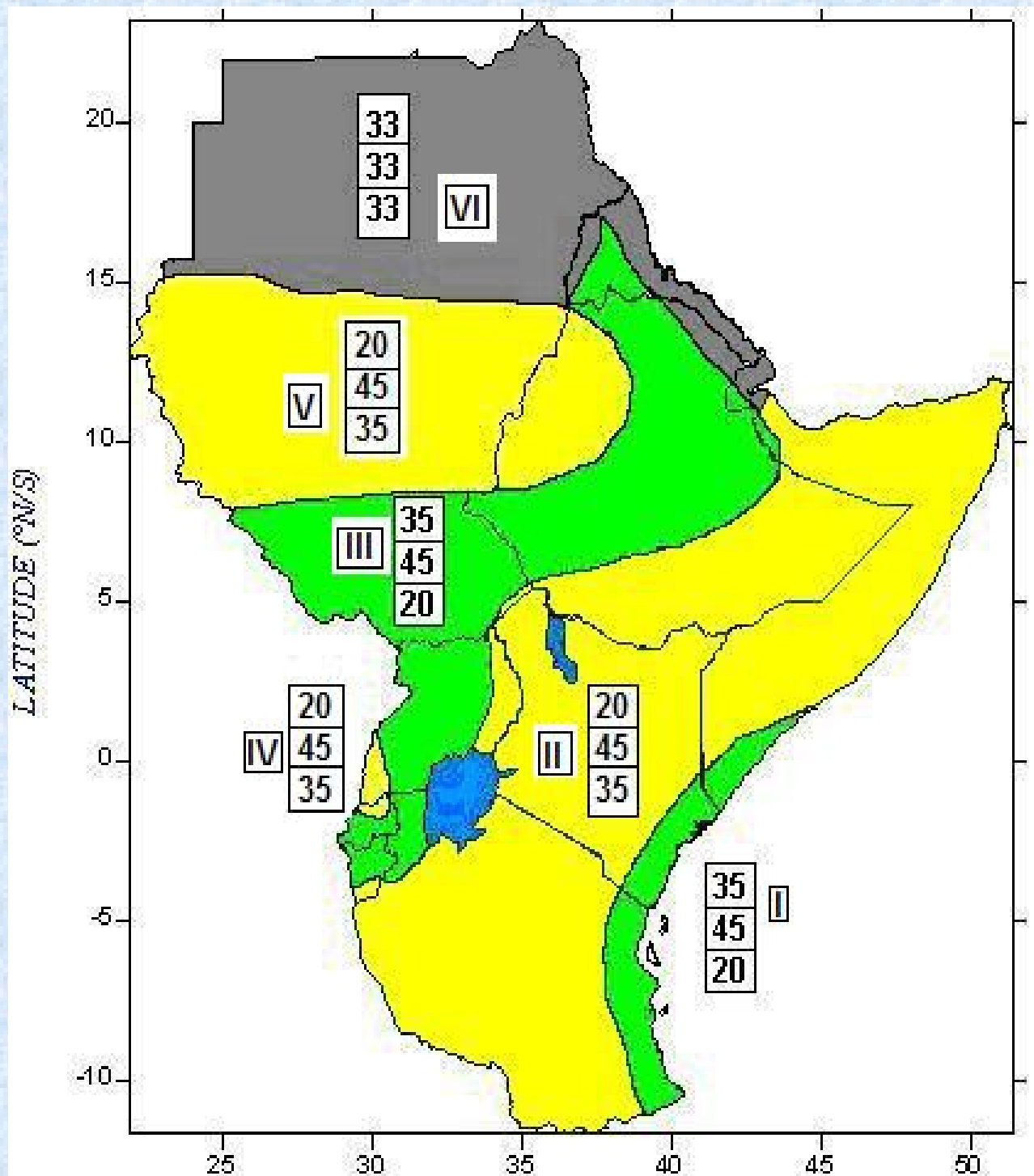
SST FOR PREDICTION



Correlation between Dagoretti rainfall
and gridpoint SST



MAM 2007



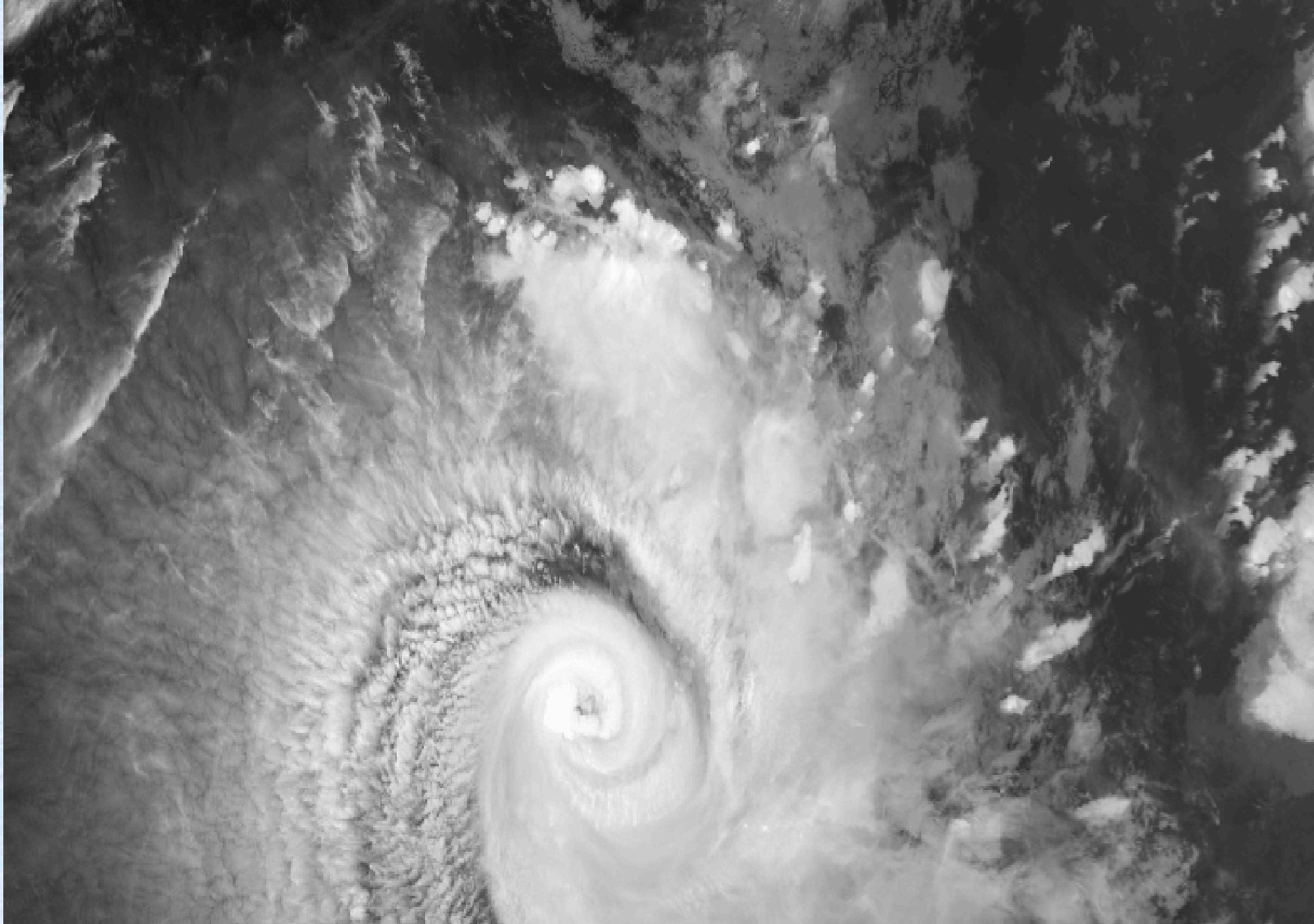


Monitoring tropical cyclones

- Tropical cyclone
An area of low pressure which develops over tropical or subtropical waters
- Tropical depression
A weak tropical cyclone in which the maximum surface wind is 38 mph (62 km/h or 33 kt) or less

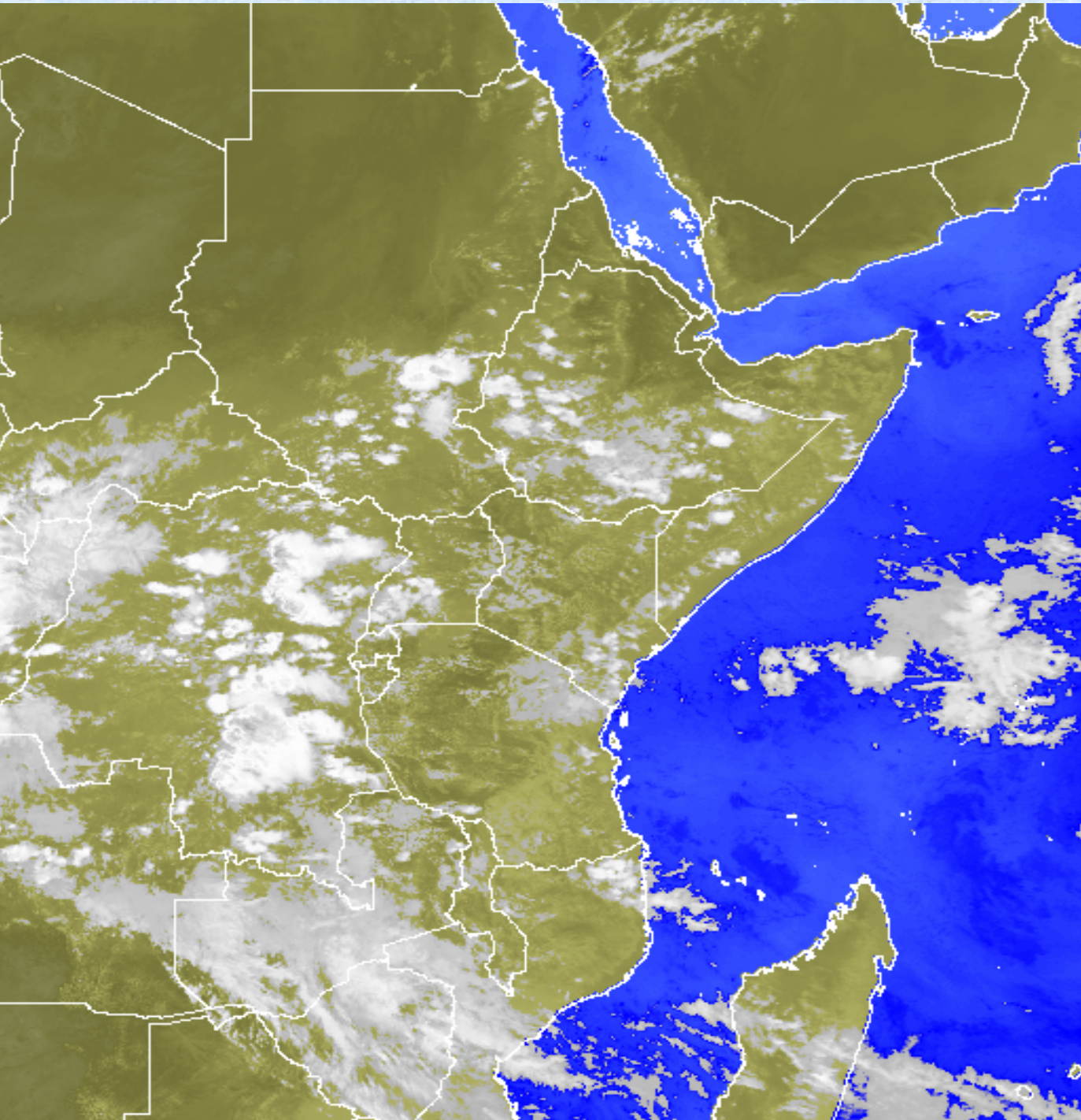


Satellite imagery of a tropical cyclone





Monitoring cloud patterns



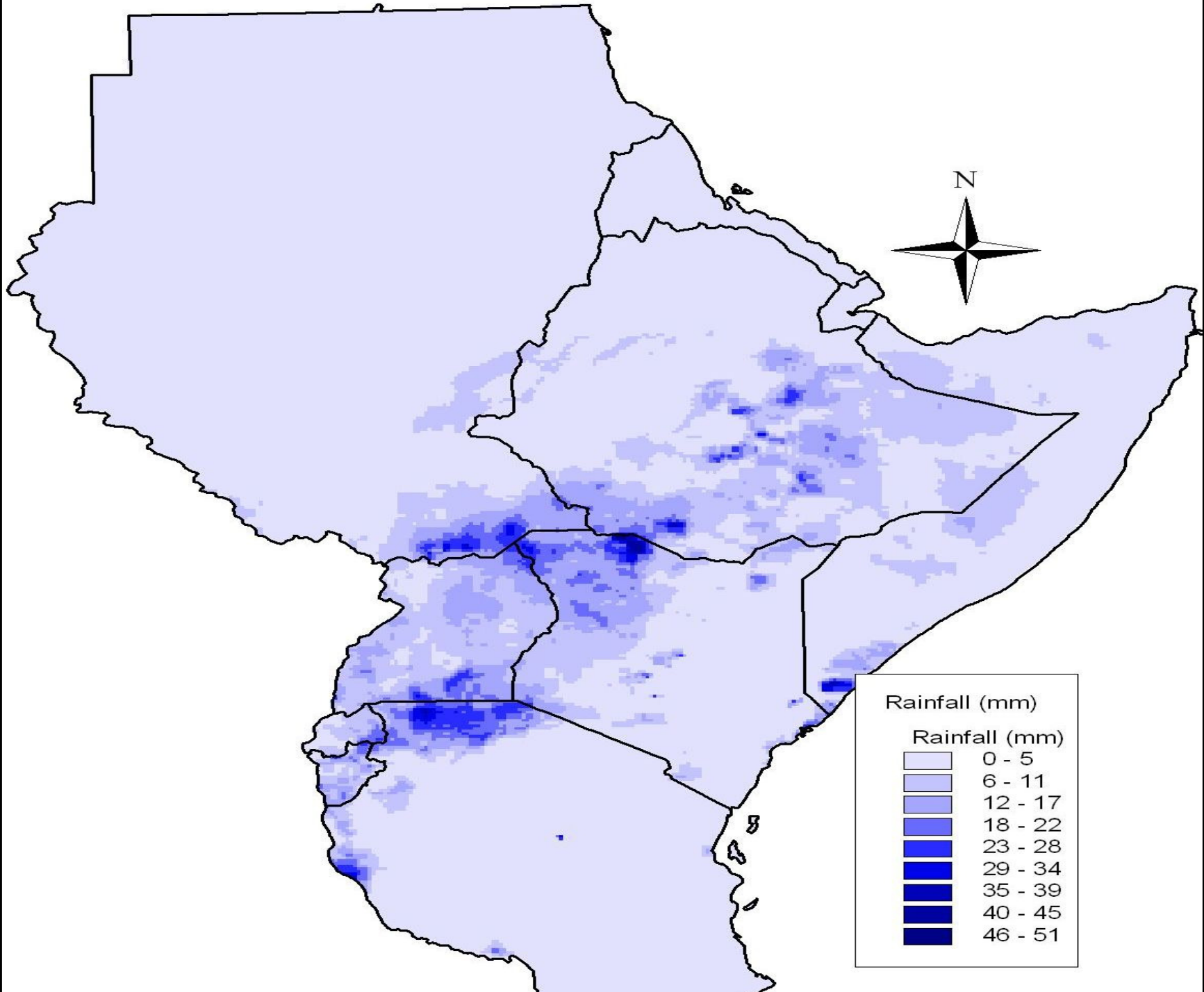
- **CLOUDS AND POTENTIAL RAINING AREAS.**

Clouds tracking:

Image-2004-10-14-
1130GMT

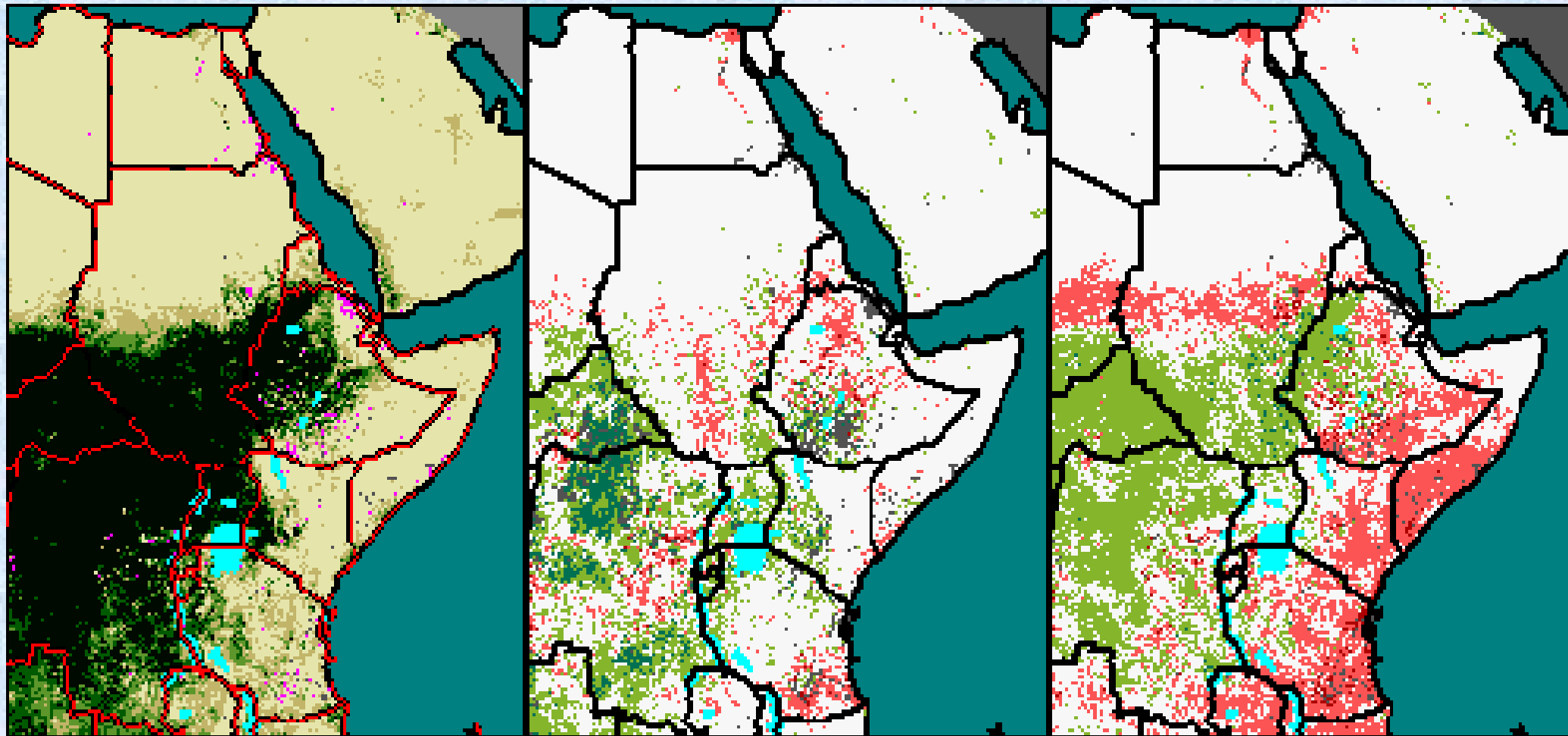
:MSG-Courtesy of
PUMA

Satellite Rainfall Estimate





Vegetation monitoring



NDVI Oct 1-10 2004

vs Previous

vs Average

Challenges

- Capacity to interpret space information
- Capability to store space information/data
- computing capacity
- Education and awareness





CONCLUSION

- Meteorological Satellite and other space technology are used:
 - severe weather developments are monitored closely
 - Early warning information are given in good time to avert potential disasters
 - Research for sustainable socio-economic development



*THANK YOU
FOR LISTENING*