

# **METEOROLOGICAL DROUGHT EARLY WARNING IN AFRICA**

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**IGAD Climate Prediction and Applications  
Centre (ICPAC) Formerly known as Drought  
Monitoring Centre - Nairobi (DMCN)**

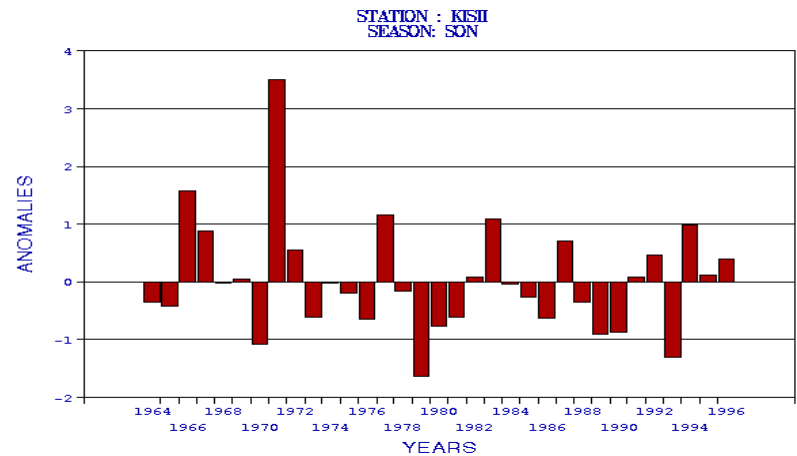
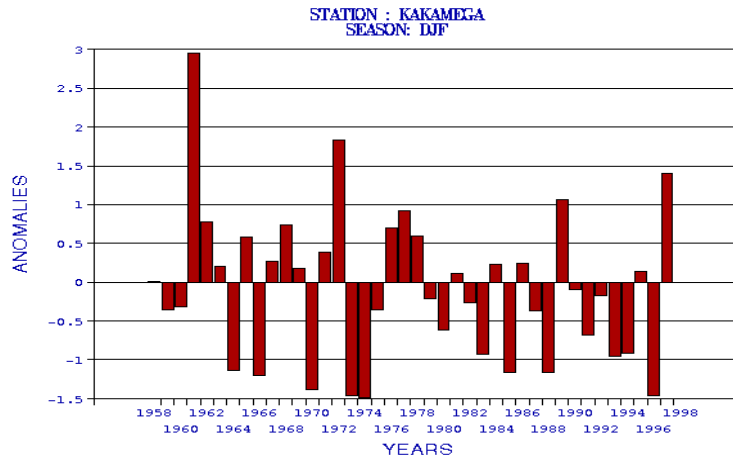
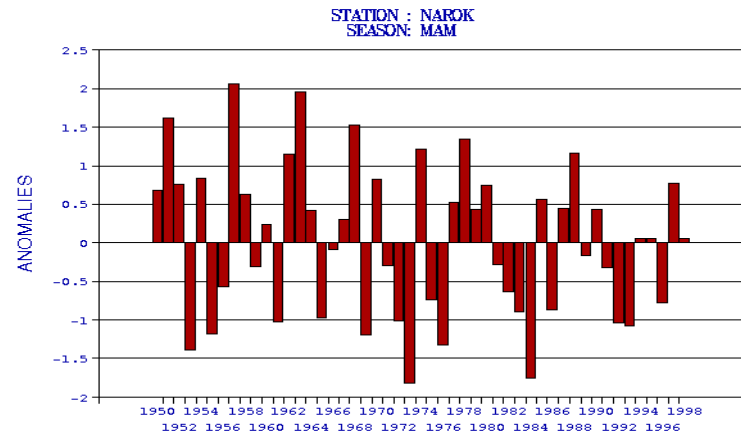
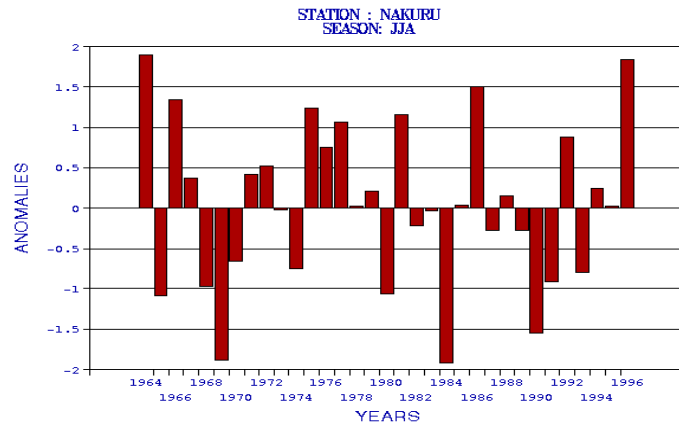
# INTRODUCTION

- **DROUGHT – IS A SLOW ONSET HAZARD YET ITS IMPACTS ARE STILL HIGHER THAN RAPID ONSET HAZARDS eg floods IN MANY COUNTRIES OF AFRICA**
- **STILL THREATENS THE BASIC LIVELIHOOD OF THE SOCIETY; NATIONAL / REGIONAL POVERTY REDUCTION / SUSTAINABLE DEVELOPMENT EFFORTS IN AFRICA**

# **DROUGHT CHARACTERISTICS IN AFRICA**

- **Droughts are very common**
- **No month or year** continent is drought free
- **Risk and Vulnerability of the society to drought is increasing in Africa YEAR AFTER YEAR**
- **NEED FOR SPECIFIC statement on drought form the conference**

# CLIMATE EXTREMES:



# THE CROPS DRIED UP IN RWANDA







# NOMADS MOVE ANIMALS TO CITIES, PRIVATE LAND, etc









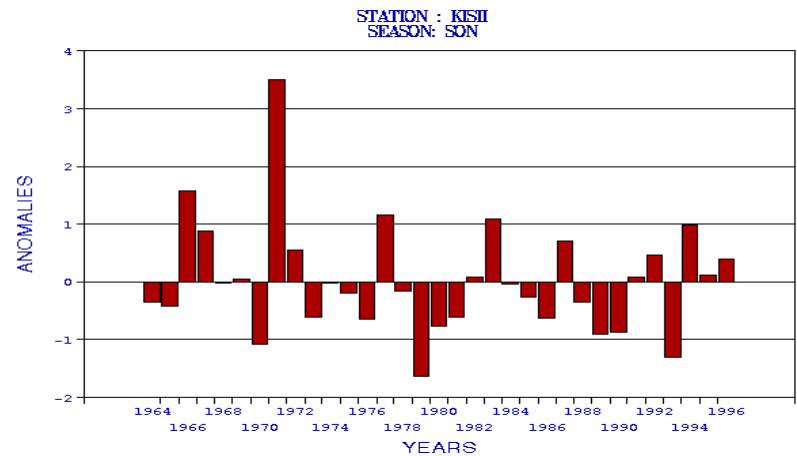
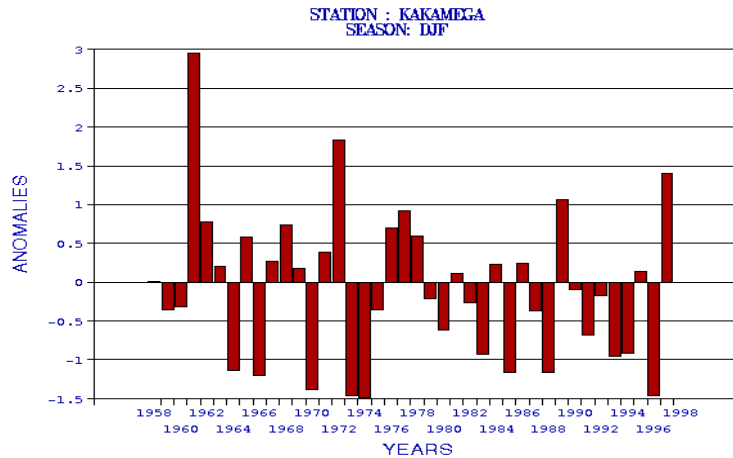
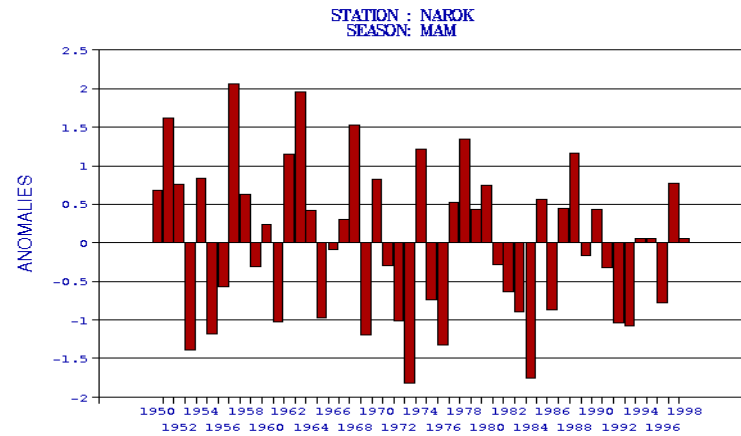
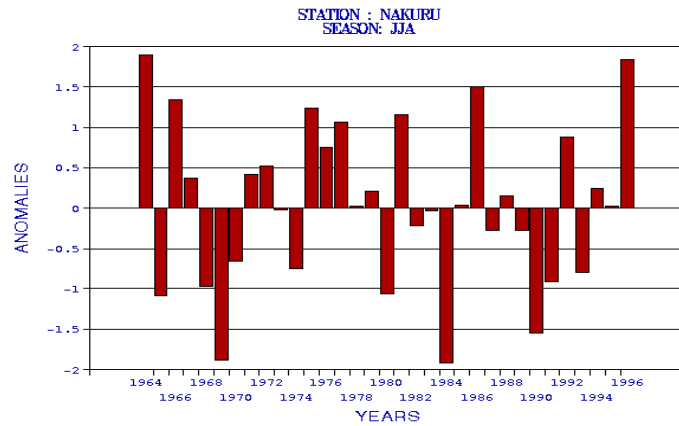




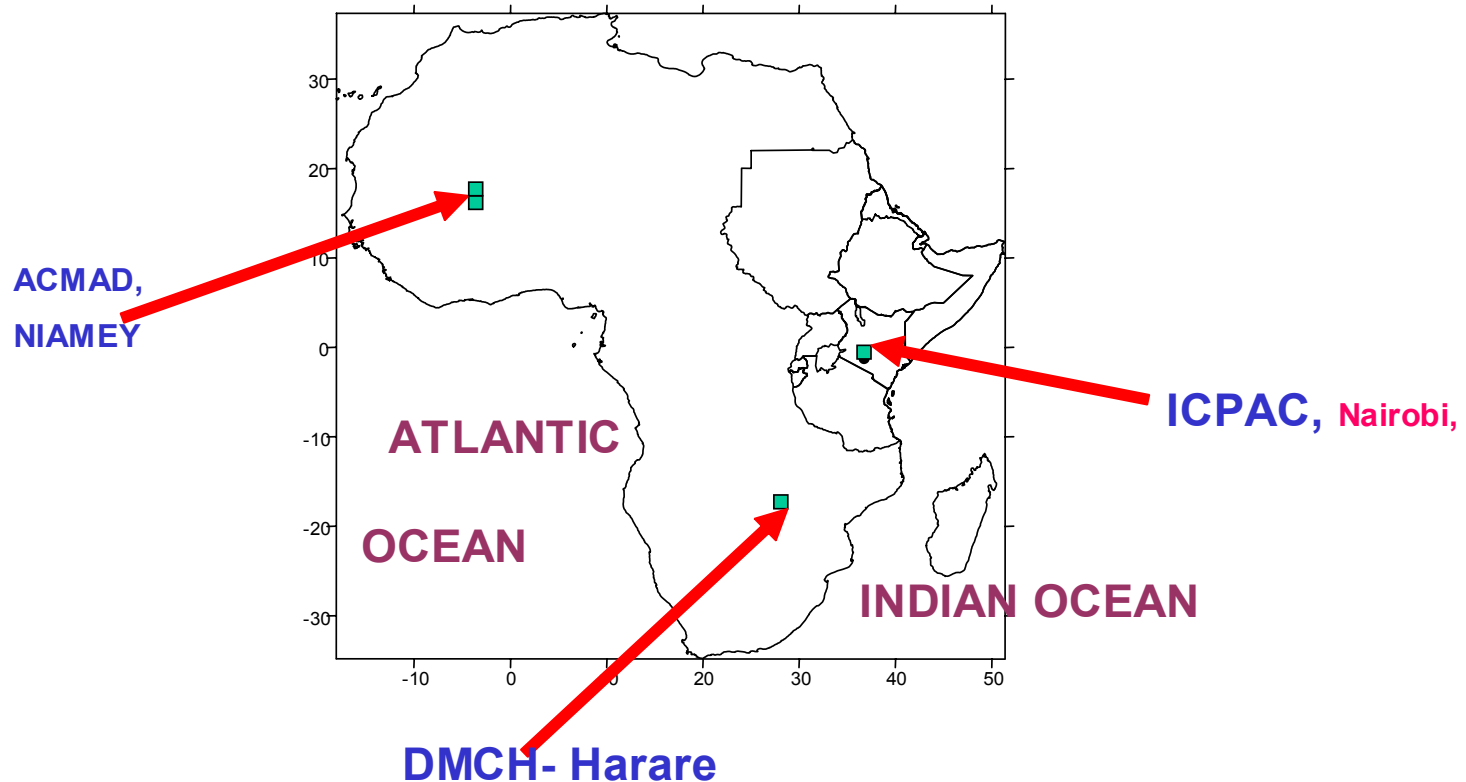


**FLOODS PRECEDE / FOLLOW MANY  
DROUGHTS**

# CLIMATE EXTREMES:



# EXPERINCES OF THE AFRICAN REGIONAL DROUGHT MONITORING CENTRES , and the (NMHSs)-NATIONAL METEOROLOGICAL and HY



# **EXPERIENCES OF ICPAC AND OTHER AFRICAN REGIONAL CENTRES**

- **ICPAC WAS ESTABLISHED IN 1989 BY THE MEMBER COUNTRIES THROUGH WMO / UNDP**
- **CURRENTLY HAVE 10 MEMBER COUNTRIES**
- **CURRENT MAJOR FUNDING OF IGAD / ICPAC is by USAID / OFDA and REDSO, NOAA / OGP (demonstration projects); implemented by WMO, major collaborator by IRI**



**METEOROLOGICAL DROUGHT  
MONITORING PRODUCTS AT THE  
AFRICAN CENTRES**

# **METEOROLOGICAL DROUGHT** products for **monitoring , prediction and early warning**

## Products of Regional Centres and NMHSs/ WMO

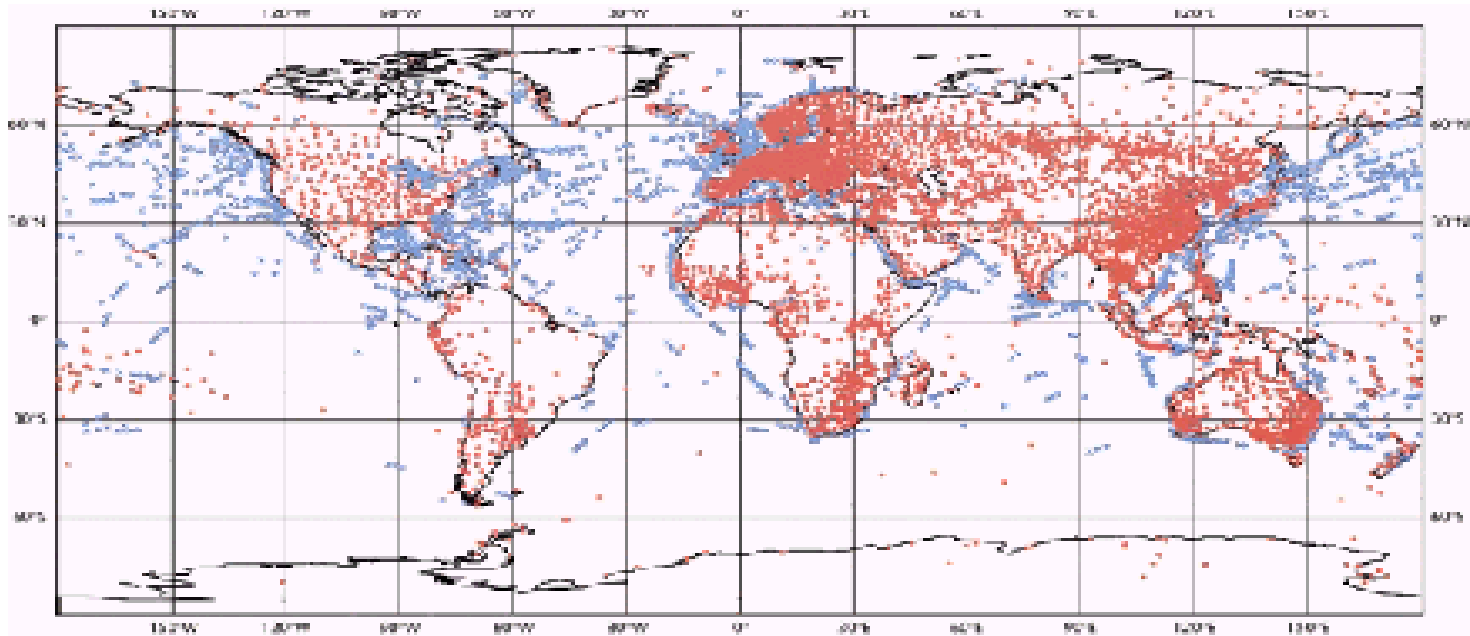
- **History of Past droughts from Met data archives for risk zoning and building of scenarios**
- **Causes of drought**
- **Drought characteristics: onset, end, duration, severity, hot spots, etc**
- **Real time / Current and near real time information**
- **Future expectation – Prediction and early warning**

OMM



WMO

# WMO / NMHSs observation network



Typical daily coverage of surface observations made at meteorological stations (red) and from ships (blue)

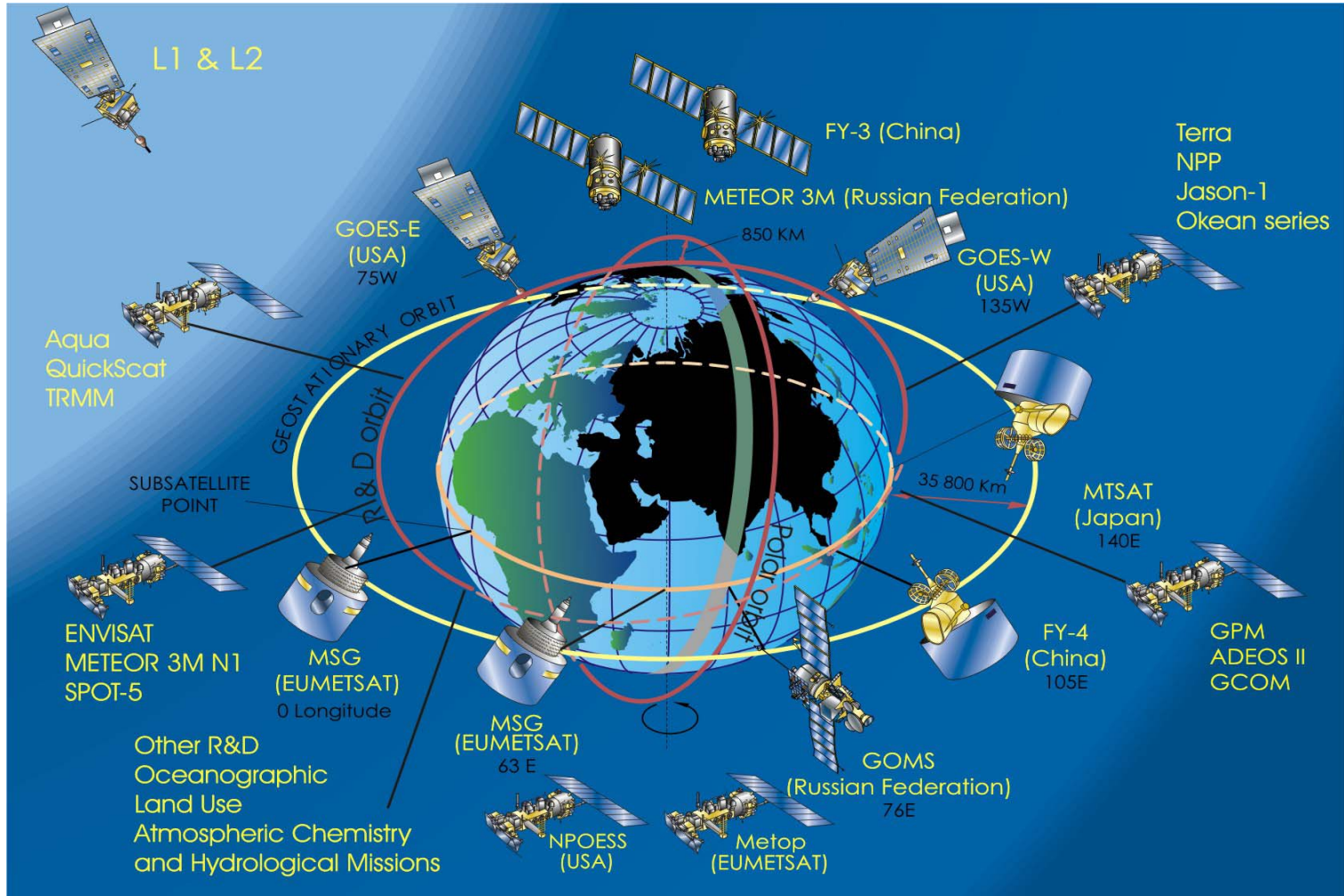
GOS includes 10 000 surface and 1 000 upper air stations; 700 buoys, weather radars, 7 300 ships and 3 000 aircraft.

OMM



WMO

# SPACE BASED OBSERVATION

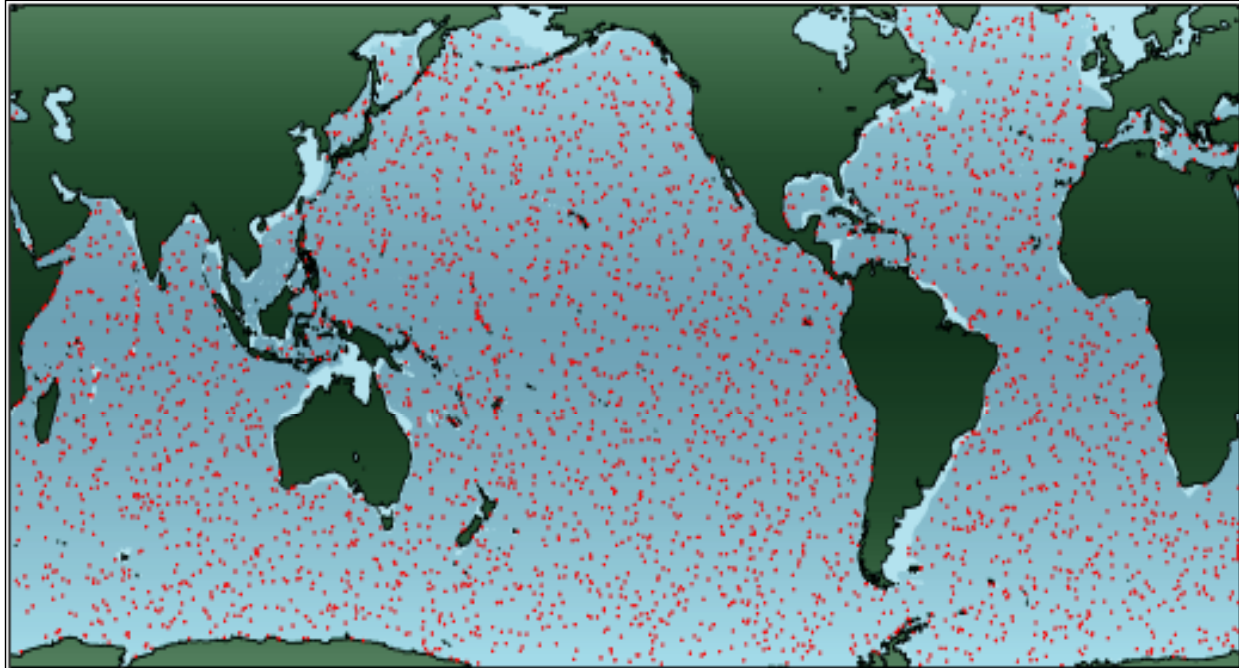


OMM



WMO

# NEW OCEAN OBSERVING SYSTEMS

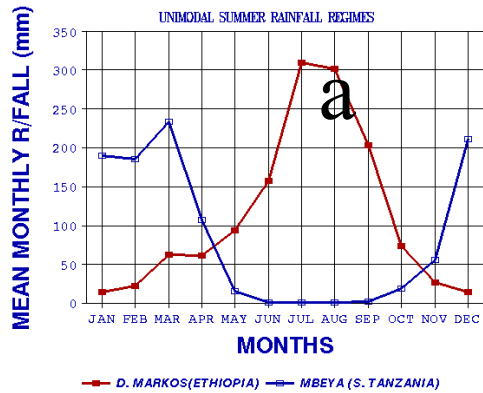


**Argo floats**

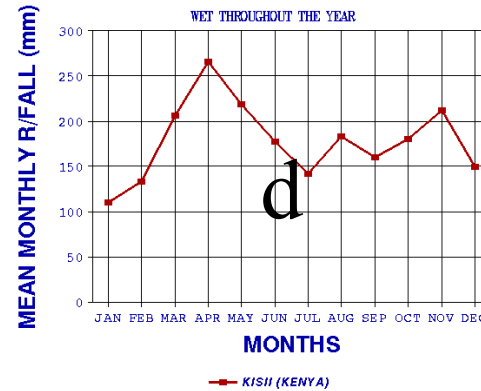
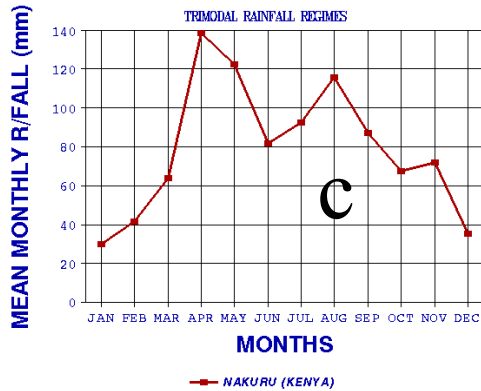
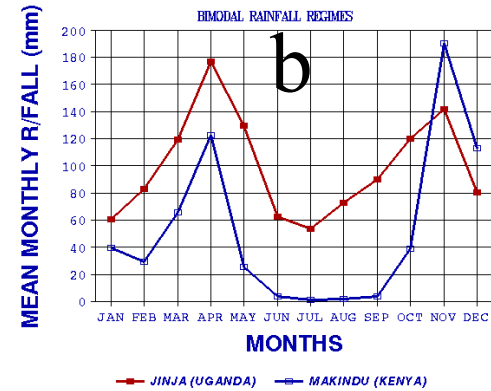
# CAUSES OF THE AFRICAN DROUGHTS

- **Understanding of the science of the African droughts improving**
- **African droughts are largely associated with precipitation deficits that components of the global / regional climate variability**
- **Rainfall anomalies in Africa have been linked to global / regional general circulation anomalies including those associated with *El Nino / La Nina events***

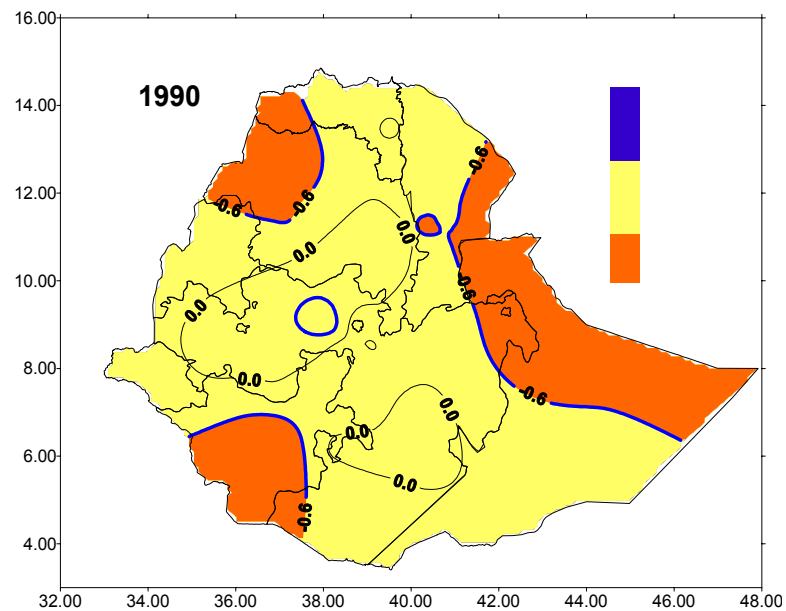
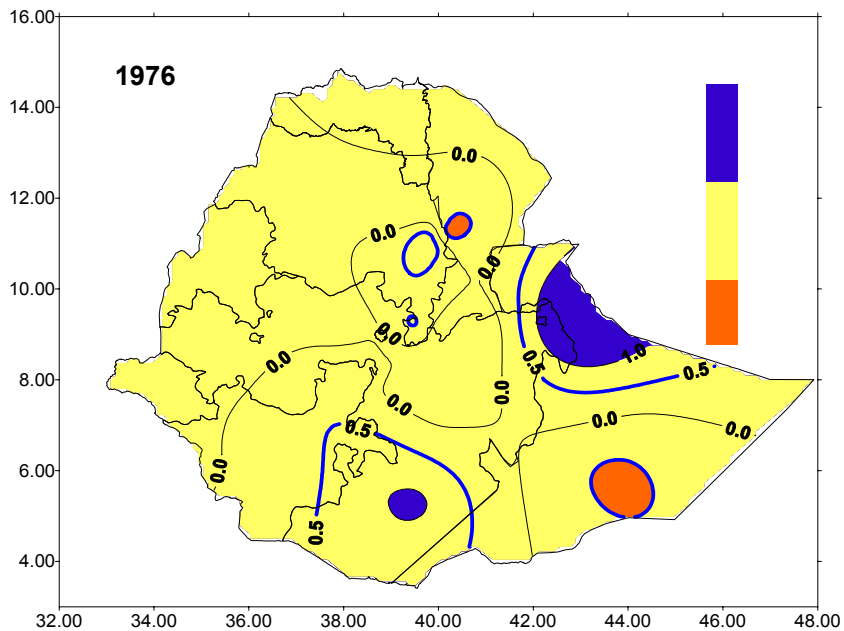
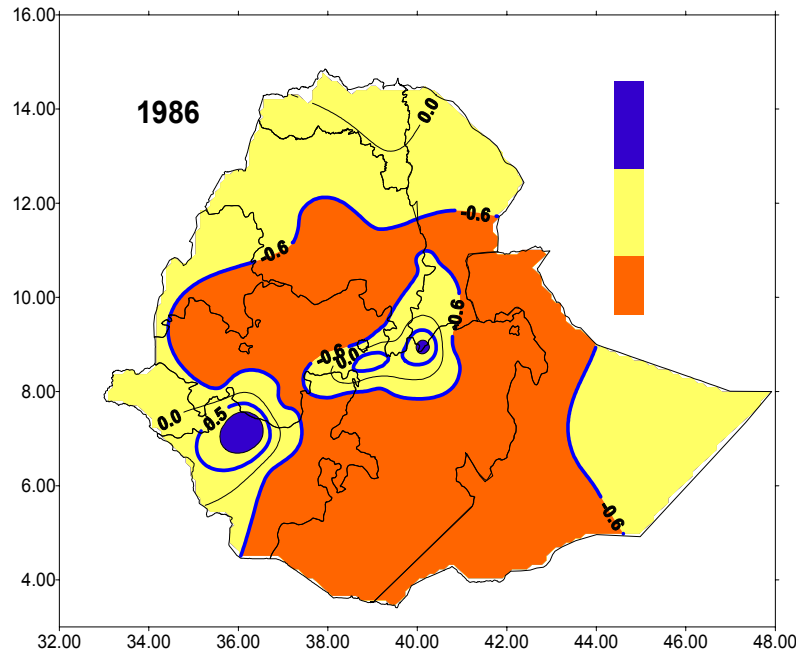
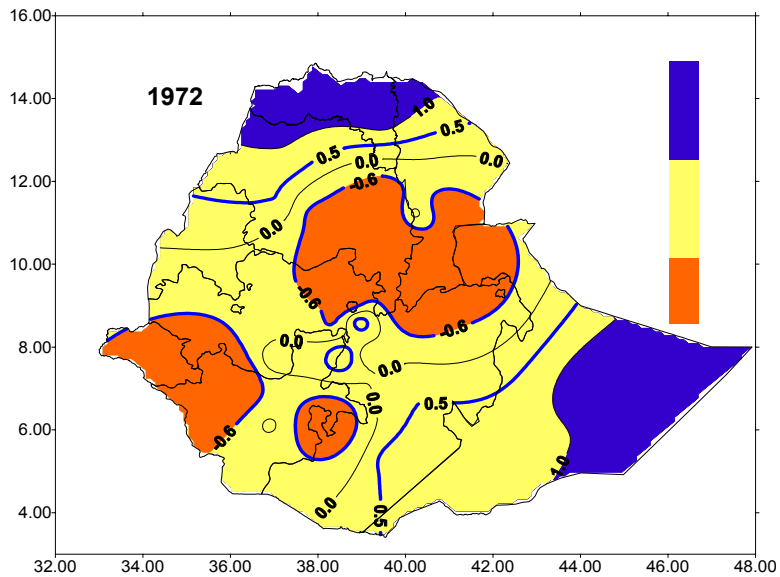
# SEASONAL RAINFALL IN GHA AND ENSO PHASES



- RAINFALL SEASONALITY
- ENSO PHASE- ONSET; PEAK OR CESSATION PHASE
- ROLES OF TOPOGRAPHY; INDIAN /ATLANTIC; INLAND LAKES;

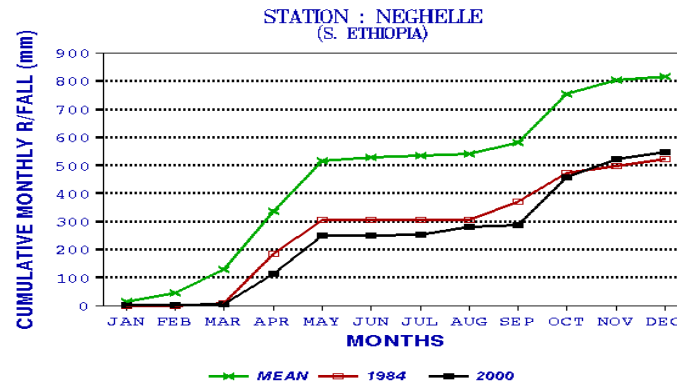
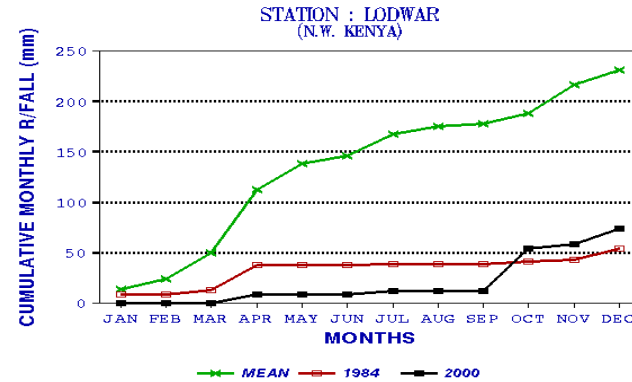
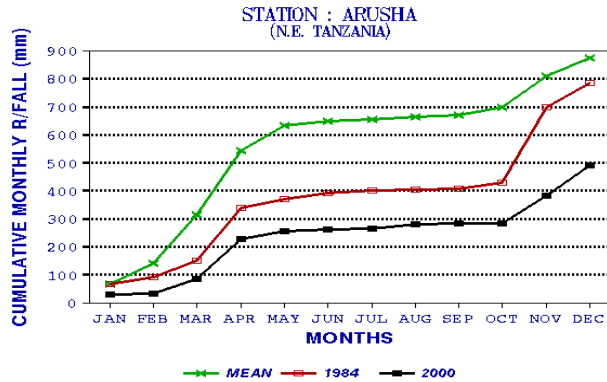


# The most Common analogue years

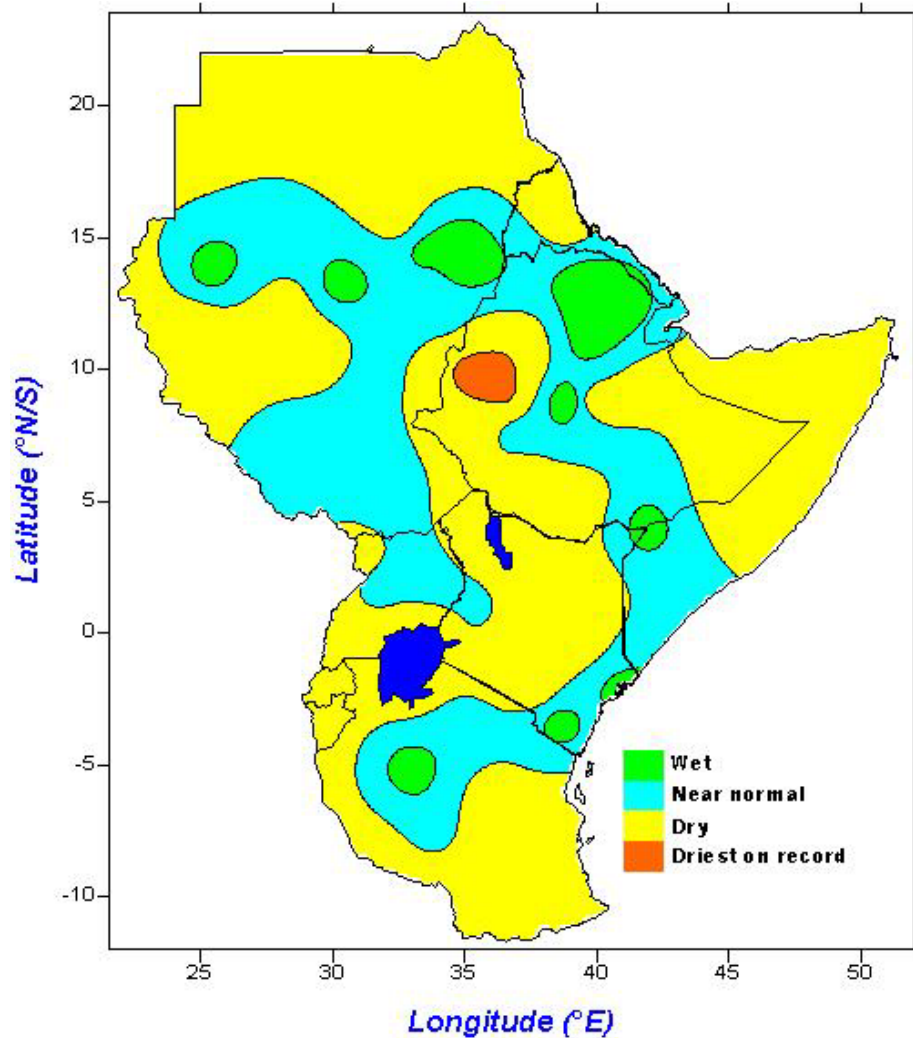




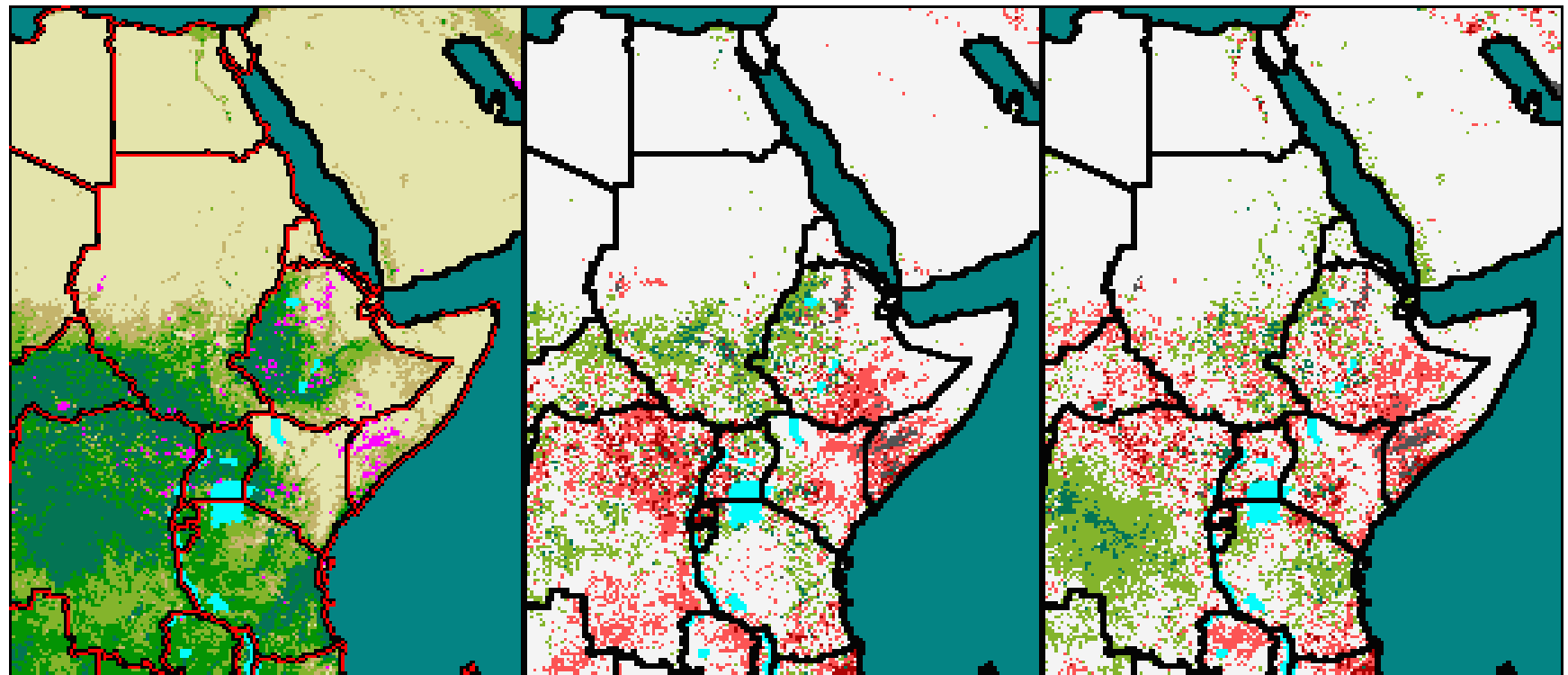
# Cumulative rainfall performance



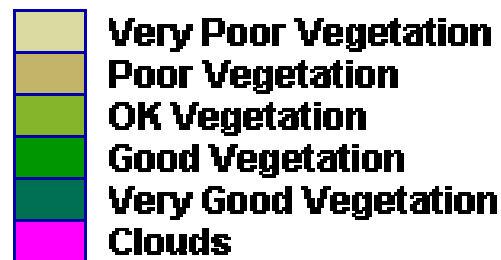
# Drought Severity Index for June 2004



# NOAA Satellite vegetation imagery showing rainfall performance over the GHA



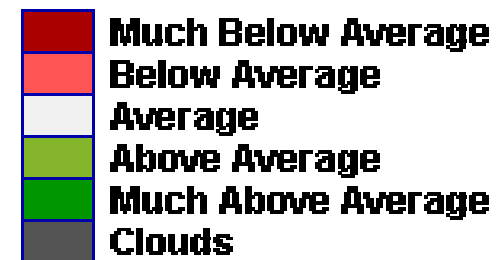
**NDVI Jun 11-20 2001**



**vs Previous**



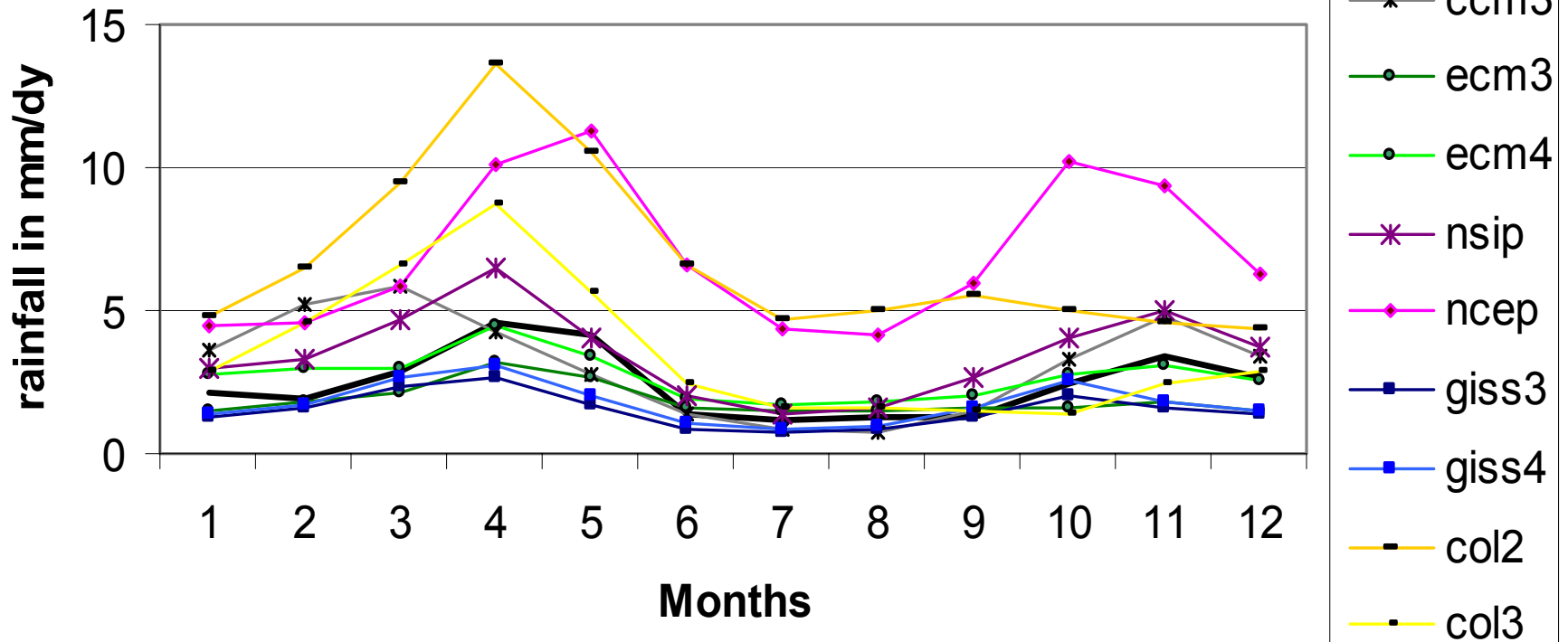
**vs Average**



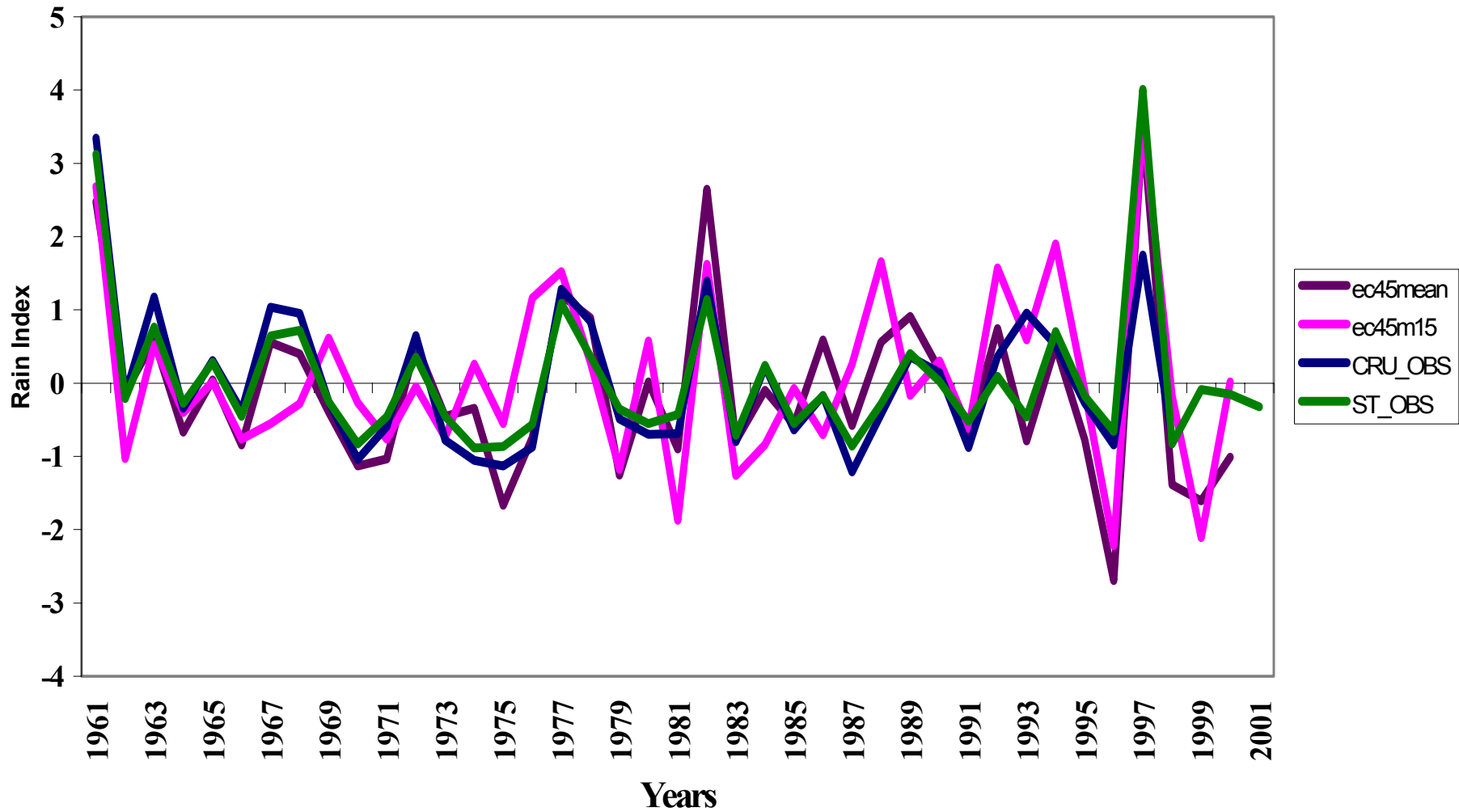
# **DROUGHT PREDICTION AND EARLY WARNING**

- **SIMPLE EMPIRICAL METHODS**
- **DYNAMICAL METHODS**

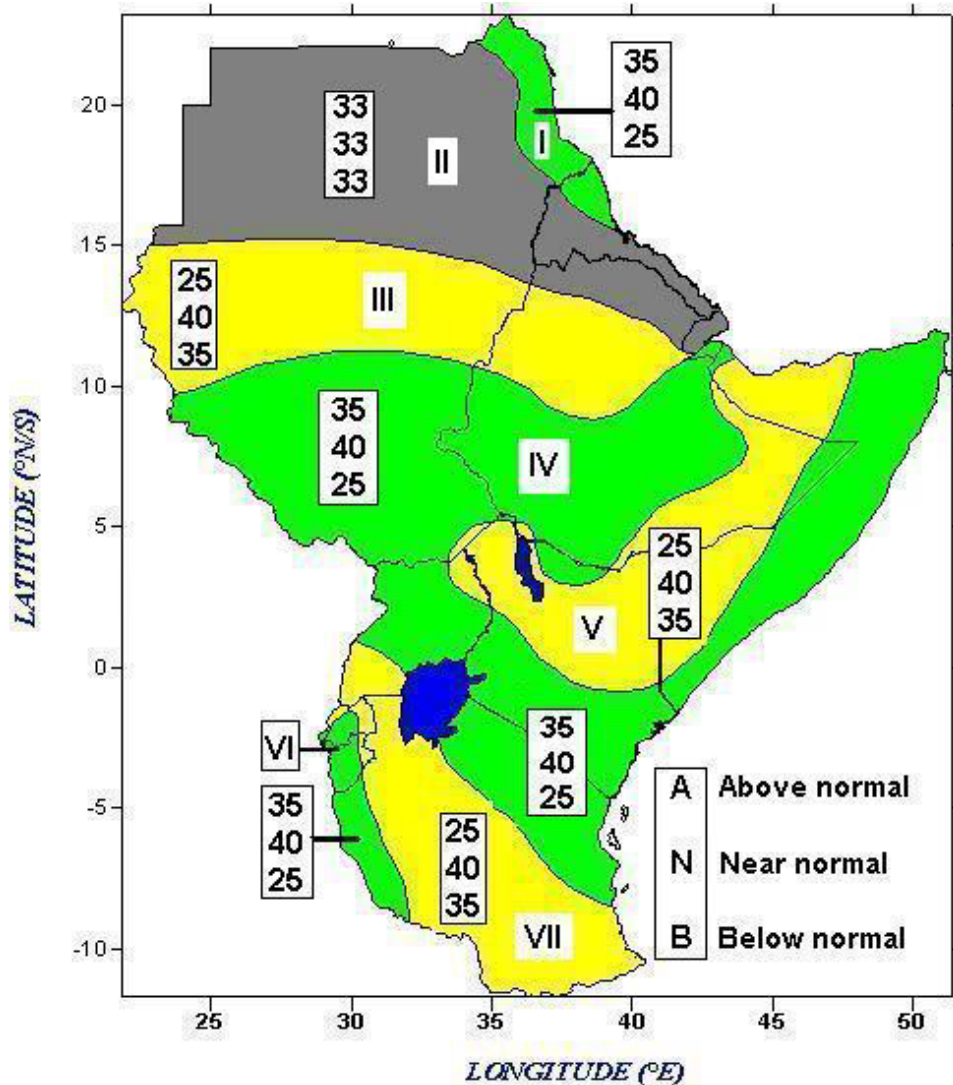
# Annual cycle during 1979-1999



**The ECHAM4.5 model simulation of Interannual variability during the season October to December over Eastern Africa.**



# Climate Outlook for September to December 2004



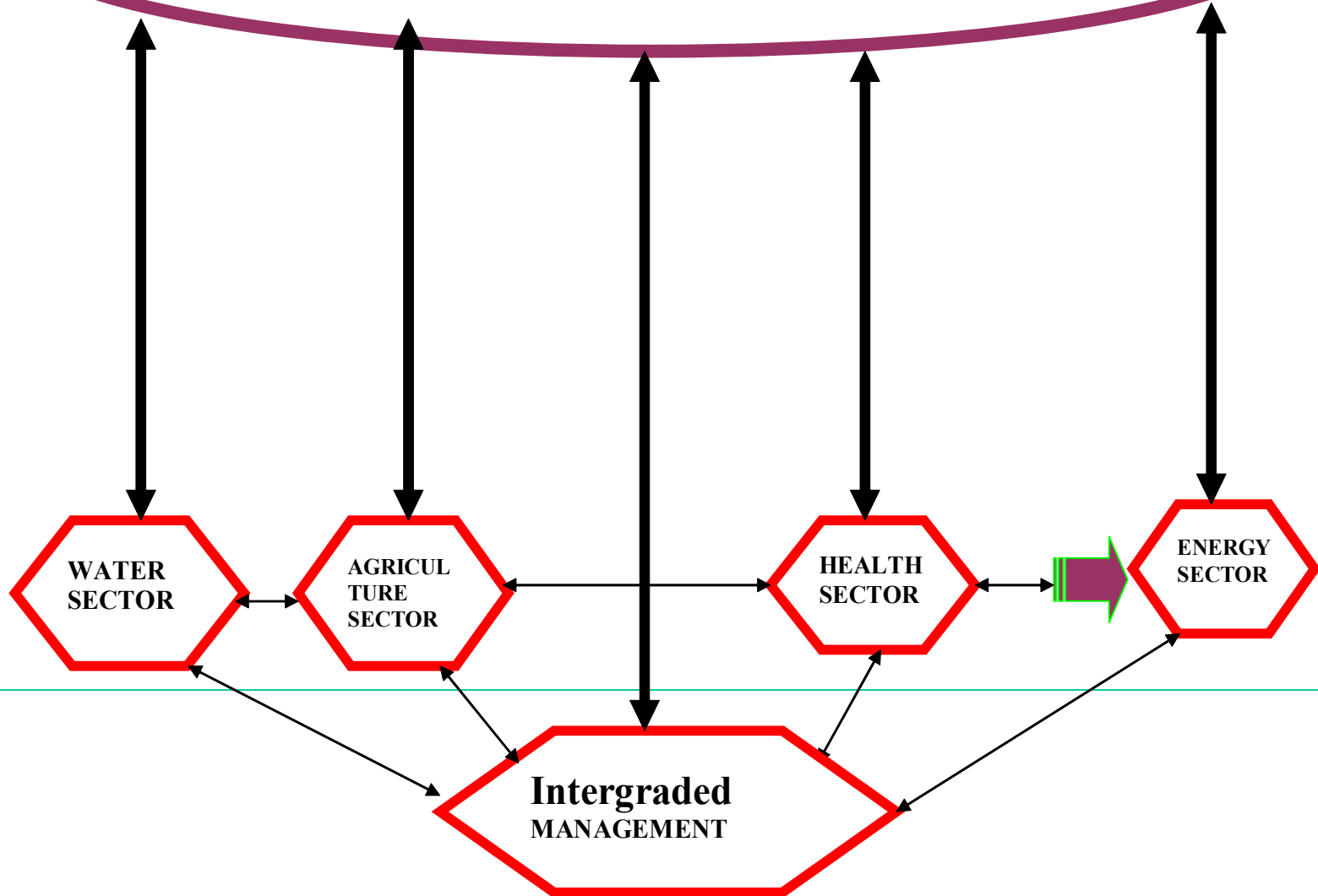
# **METEOROLOGICAL MONITORING , PREDICTION AND EARLY WARNING**

- **DROUGHT Creeps in very slowly ; IT IS very difficult to QUANTIFY ALL DROUGHTS WITH MET. DEFINATION**
- **Integrated Drought Early Warning systems still lacking in most African countries**
- **NEED FOR multidisciplinary variables / indices**





**WEATHER / CLIMATE INFORMATION & PREDICTION PRODUCTS**

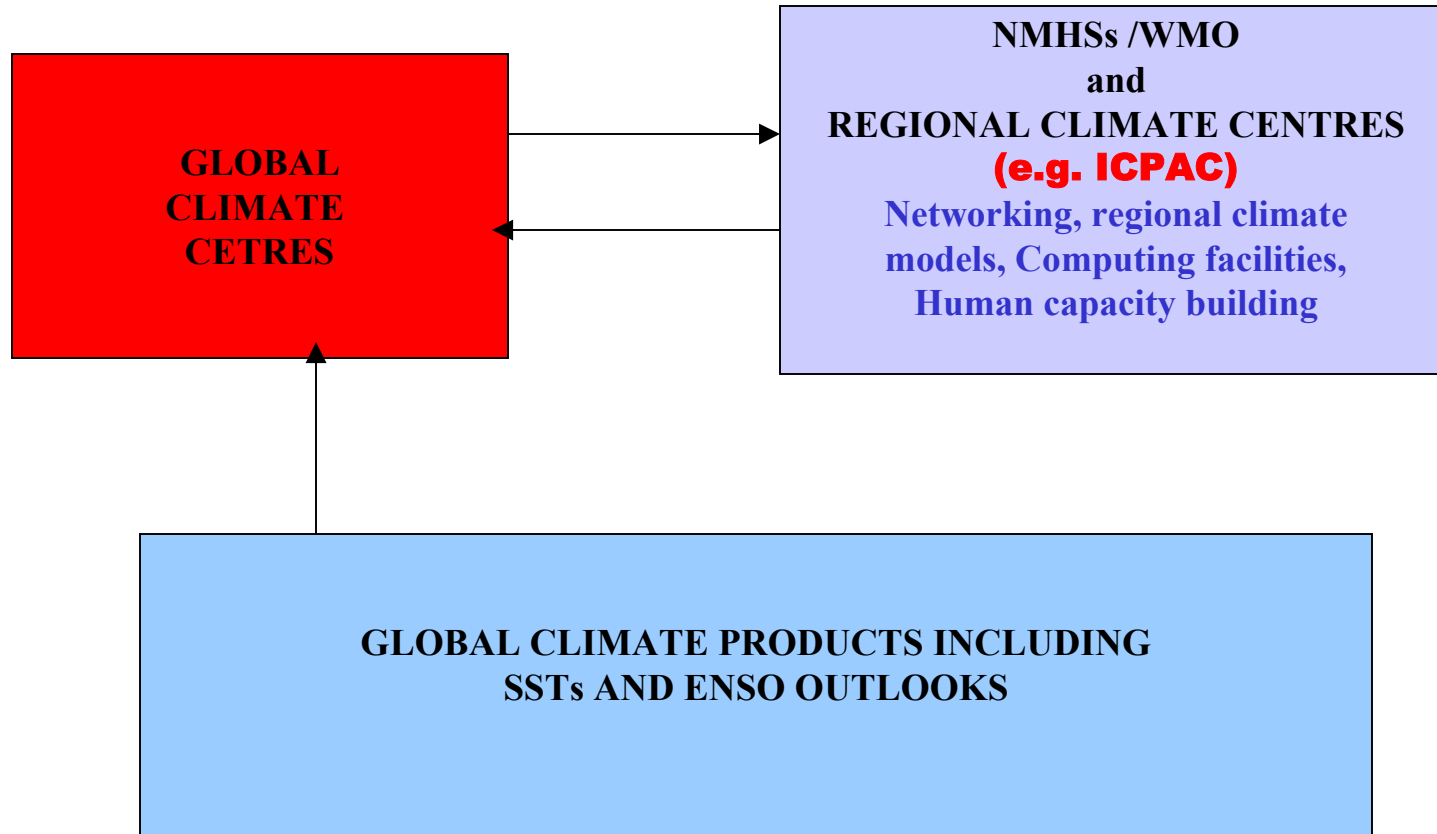


# RECOMMENDATIONS

- Need for SPECIAL RESOLUTION addressing drought challenges in Africa from the conference:
- Recognize the coming UNDP drought meeting
- NEED FOR Sustainable drought Early warning funding
- Availability of some locally based **multi disciplinary drought indices** / tools that could capture the complex cumulative slow onset drought impacts- eg UNDP drought project in Kenya.
- Skilled multi disciplinary human resources
- Strengthening of regional / national capacities to observe, receive, interpret and process basic data including remotely sensed data
- Improvement of the current communication systems for timely information dissemination / feedback

- **Enhance community awareness and education**
- **Need to integrate some of the good traditional practices** Many African countries have had traditional drought coping strategies that have been used to cope with droughts for several generations- **UNEP Project**
- Development of national, sub-regional and regional drought / disaster management policies
- Such policies should be integral component of regional / national poverty reduction / sustainable development strategies
- Strengthen linkages with Regional/ International centres

# GLOBAL / REGIONAL CLIMATE MONITORING



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