Africa Adaptation Programme

Climate Data and Information Management

Joseph D. Intsiful

AAP Data and information Management Expert

AAP-ICTP Workshop on Climate Data Servers, Trieste, 16 May 2011

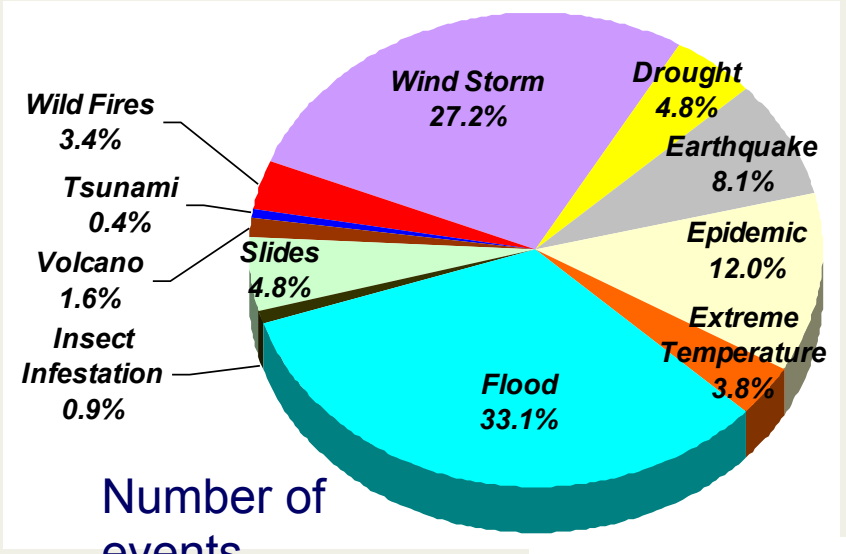
Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa

content

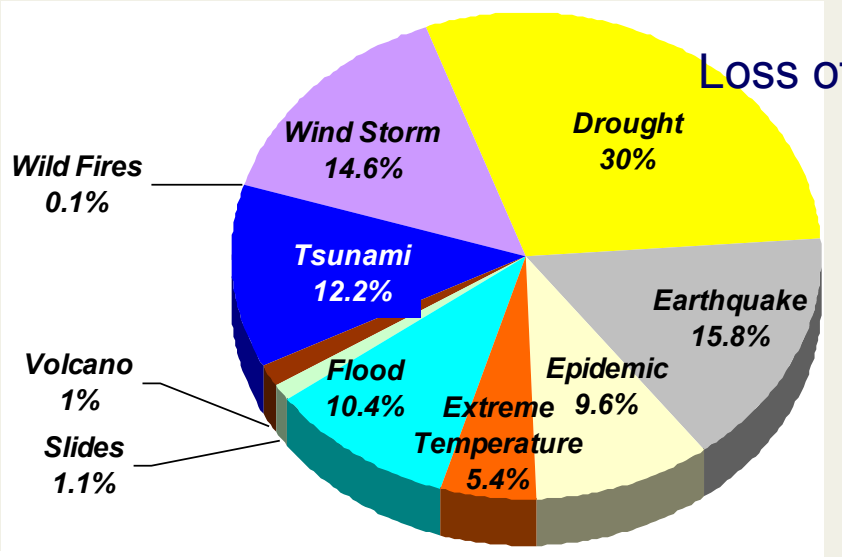
- Background:
  - Trends in climate-related disasters
  - Data and information requirements for long-term adaptation planning
  - State of climate data and information in Africa
- AAP Data and Information Management Approach
- What has been achieved so far
- Summary and outlook for future activities

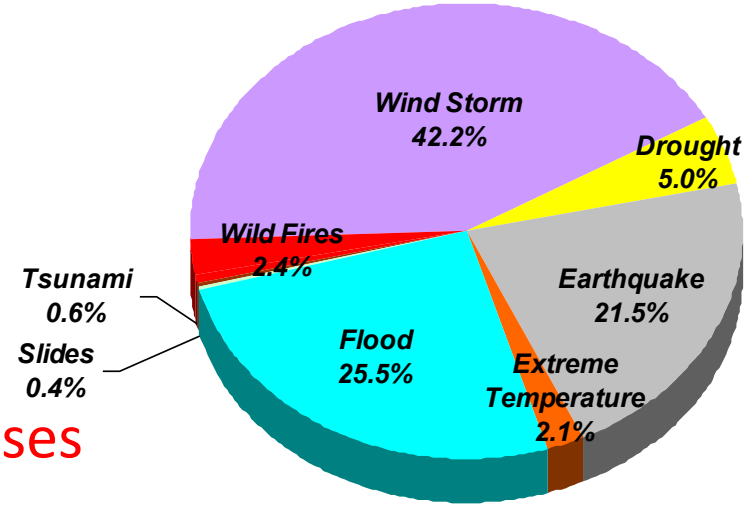
Background

Global Distribution of Disasters Caused by Natural Hazards and their Impacts (1980-2007)



Number of events





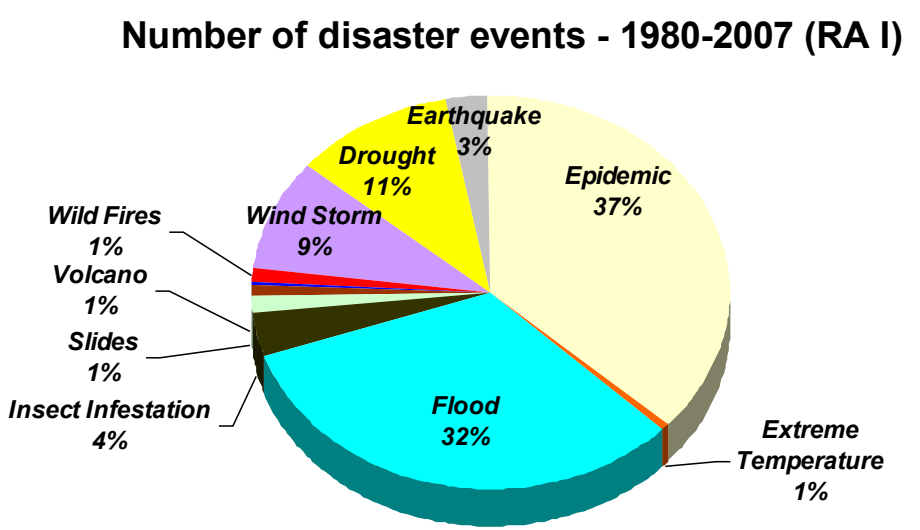
Economic losses

90 % of events
70 % of casualties
78 % of economic losses

are related to hydro-meteorological hazards and conditions.

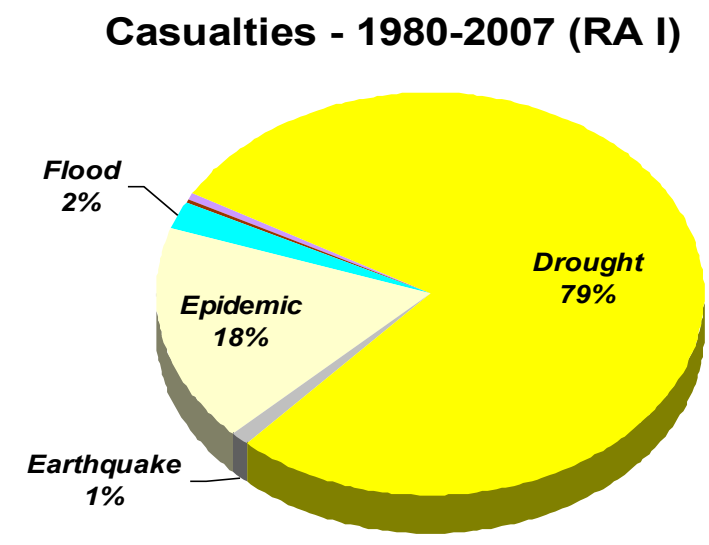
Source: EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels - Belgiumc

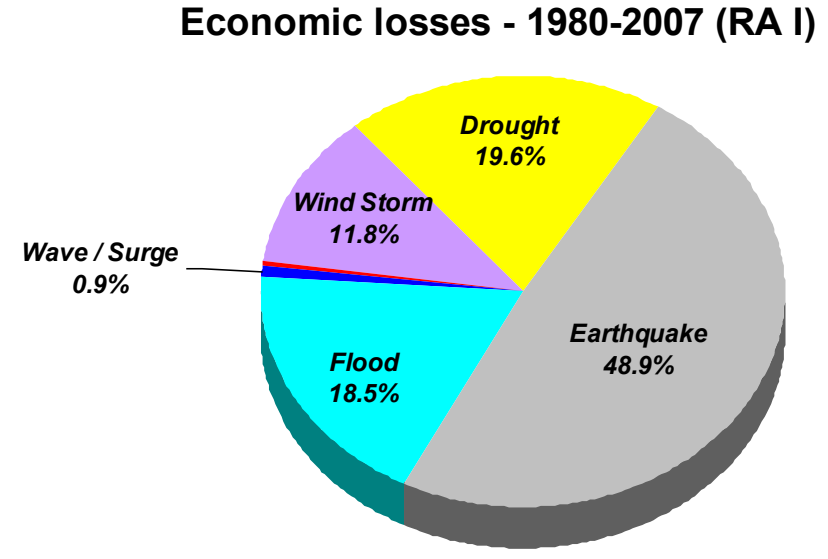
Disasters Caused by Natural Hazards and their Impacts in Africa (1980-2007)



96 % of events
99 % of casualties
50 % of economic losses

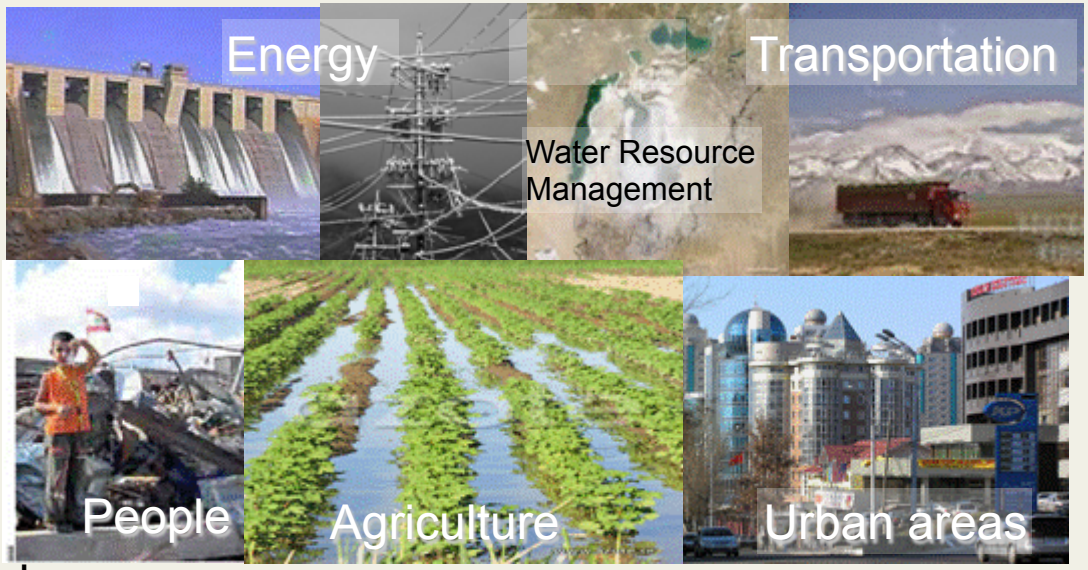
are related to hydro-meteorological hazards and conditions.

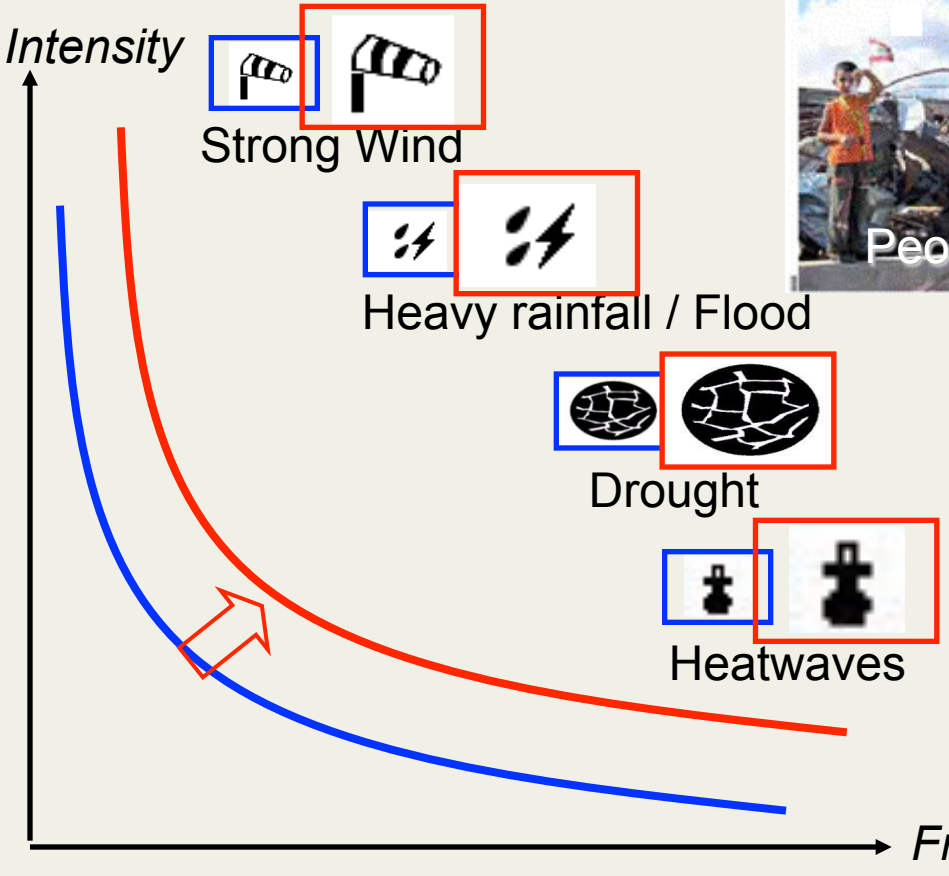




Impacts of Climate-Related Extremes on the Rise !

Hazard intensity and frequency increasing linked to climate variability and change!





Vulnerability and exposure on the rise !

Need for long-term planning to manage multi-sectoral risks

Source: 2006 WMO DRR report

Data and Information for Climate Risk Management and Adaptation Planning

Short to medium term weather forecasts	Seasonal to inter-annual climate forecasts	Decadal climate trend analysis	Climate change scenarios
Next hour to 10 days	Season to year	Decade	Long term climate change
✓Short-term planning ✓ Emergency Preparedness	✓Medium-term operational planning ✓Risk assessment and management	✓Long-term strategic planning ✓Infrastructures planning, retrofitting ✓Land zoning	✓International negotiations with national policy implications

Decision-making Timelines

Challenges to the delivery of products and services to support Disaster Risk Management

- Over 88 % of NMHS in Africa, are challenged in delivering climate products and services to support DRR
- 92% lack appropriate application software
- 96% need upgrading of operational infrastructure to support DRR
- 92% need technical training on production of climate products and services
- 85% say lack of effective co-ordination with other agencies involved in DRR impacts negatively on operations

Source: 2006 WMO Country-level DRR survey http://www.wmo.int/pages/prog/drr/natRegCap_en.html)

AAP Approach to Data and Information Management

Need for Innovative Approaches

- Requires supporting African countries to develop Integrated and Comprehensive Approaches to Climate Change Adaptation – AAP Approach

- Data and information management support to countries to enable long-term Adaptation Planning

Key Functions

Facilitating access to the best available data and information on climate variability and impacts to support dynamic, long-term national planning and decision-making mechanisms.

Through:

- Assisting in the early analysis and design of national projects and, as those projects are being initiated and implemented.
- Providing assistance to countries in accessing, collecting and analyzing best available data on climate change and its impacts.
- Building capacities of countries - establishment and use of e-infrastructure (ICT, data, network of institutions), early warning systems and decision support tools.

Providing best available data for long-term Adaptation Planning

In Africa

Climate products and services for Climate Risk Management and Adaptation Planning

Local and national emergency service Governmental authorities Public	Local and national emergency service Construction companies Food suppliers	Urban planners Local to national govt Banks Companies	Legislators
emergency planning activation and response Eg: evacuation	Urban & coastal areas seasonal preparation of Stocking of constrution materials	Long-term strategic planning Infrastructure development Land use zoning and planning Building codes	
Short to medium term weather forecasts Eg tropical cyclone, storm surge, flood	Probabilistic seasonal to inter annual forecast eg: probabilities of severity and intensity of extreme events	Decadal climate trend analysis	Climate change scenarios

USERS

APPLICATION

SERVICE

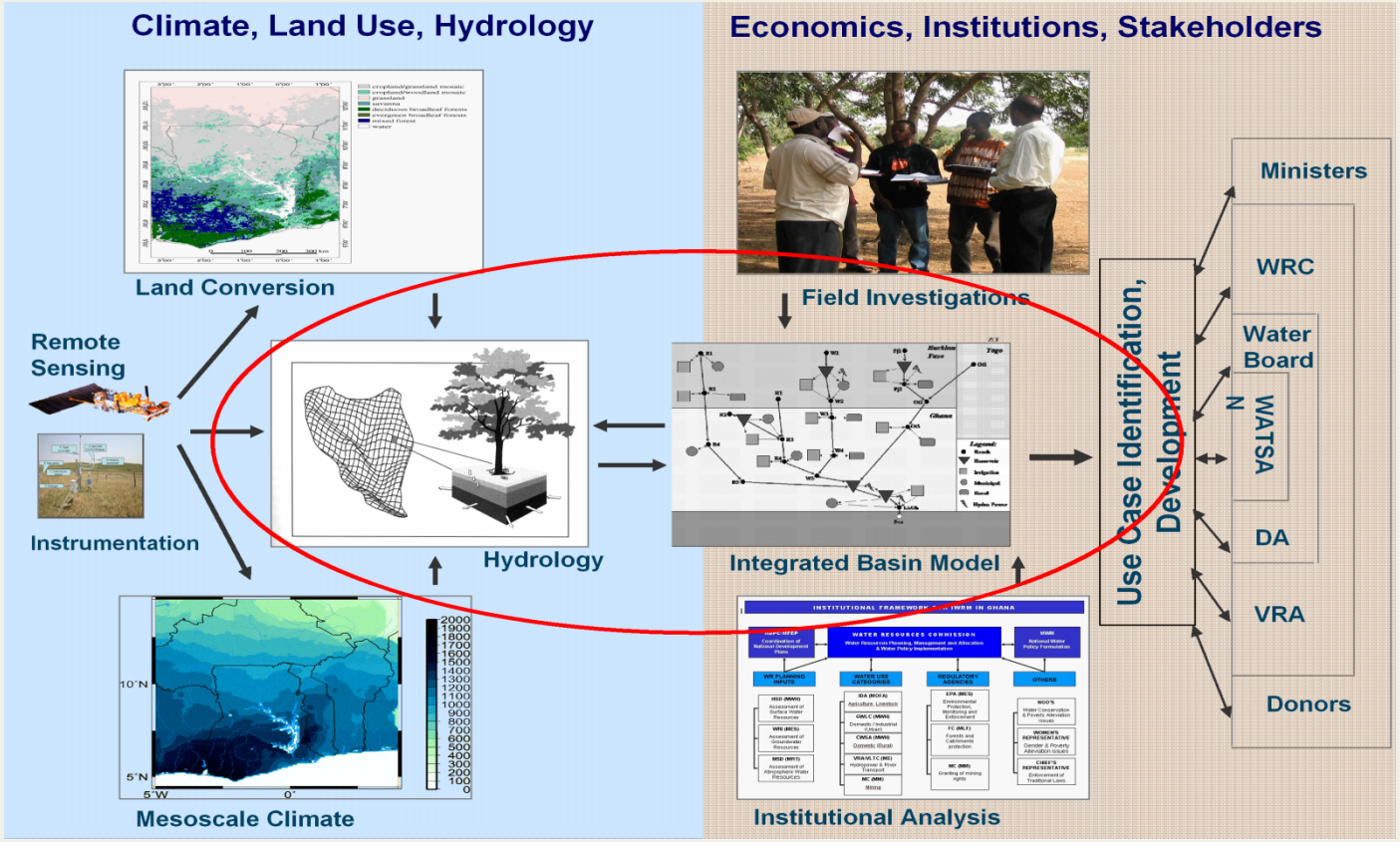
Next hour to 10 days

Season to year

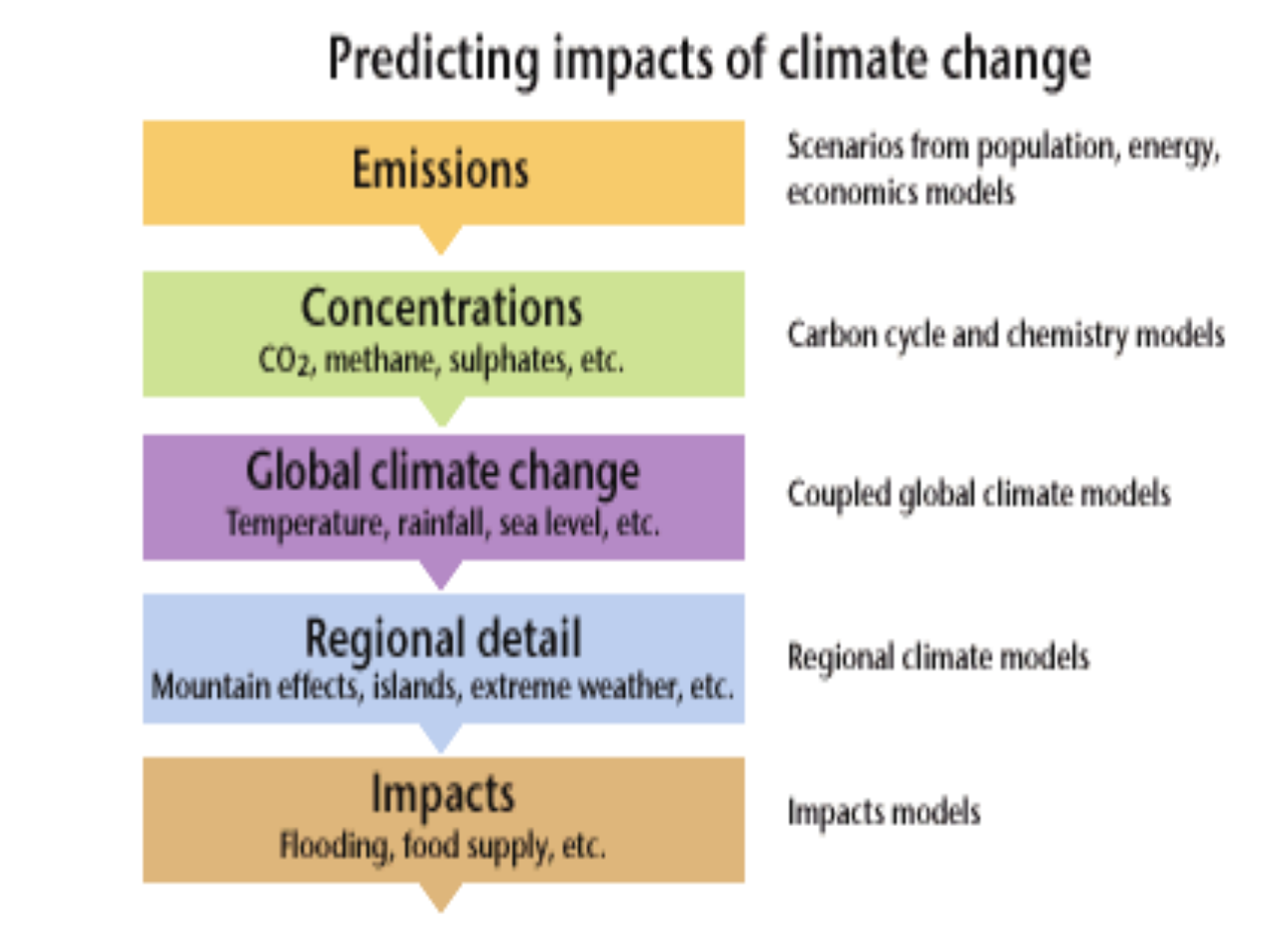
Decade

Long term climate change

Integrated Data Collection Framework for Adaptation Planning

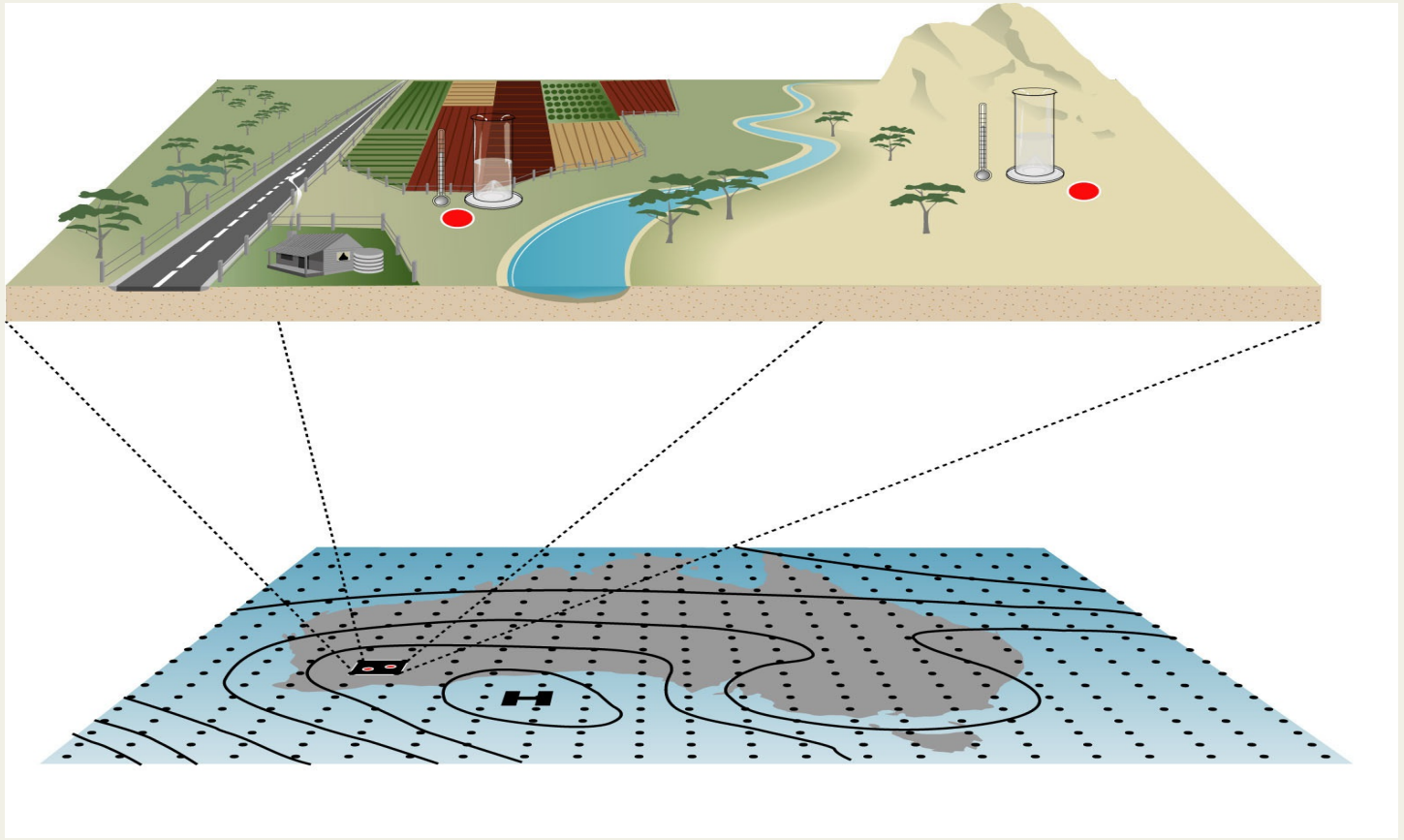


Stages required to provide climate scenarios



© Crown copyright Met Office

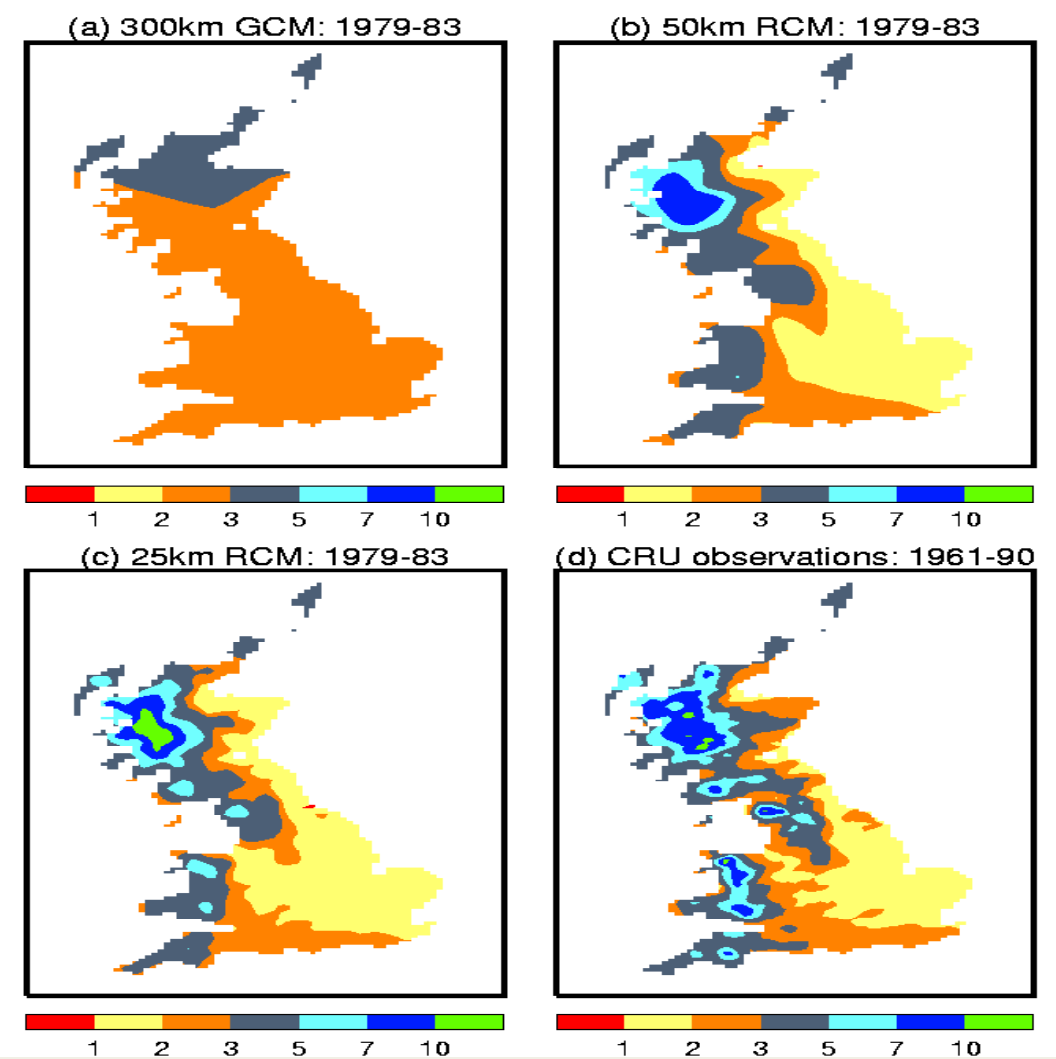
From global to local climate …



… from a global climate model (GCM) grid to the point of interest.

© Crown copyright Met Office

Winter precipitation over Britain



300km Global Model

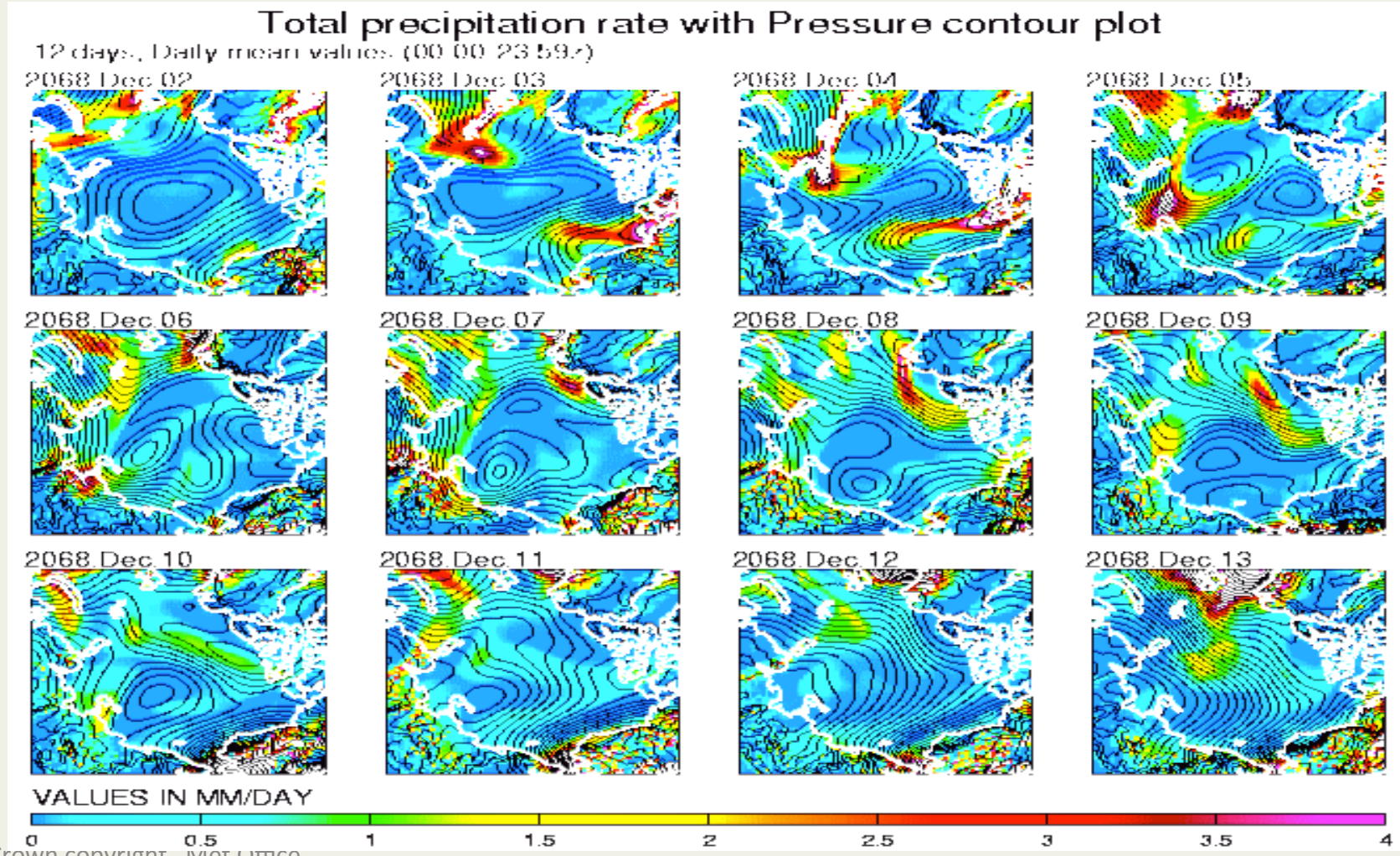
50km Regional Model

25km Regional Model

Observed 10km

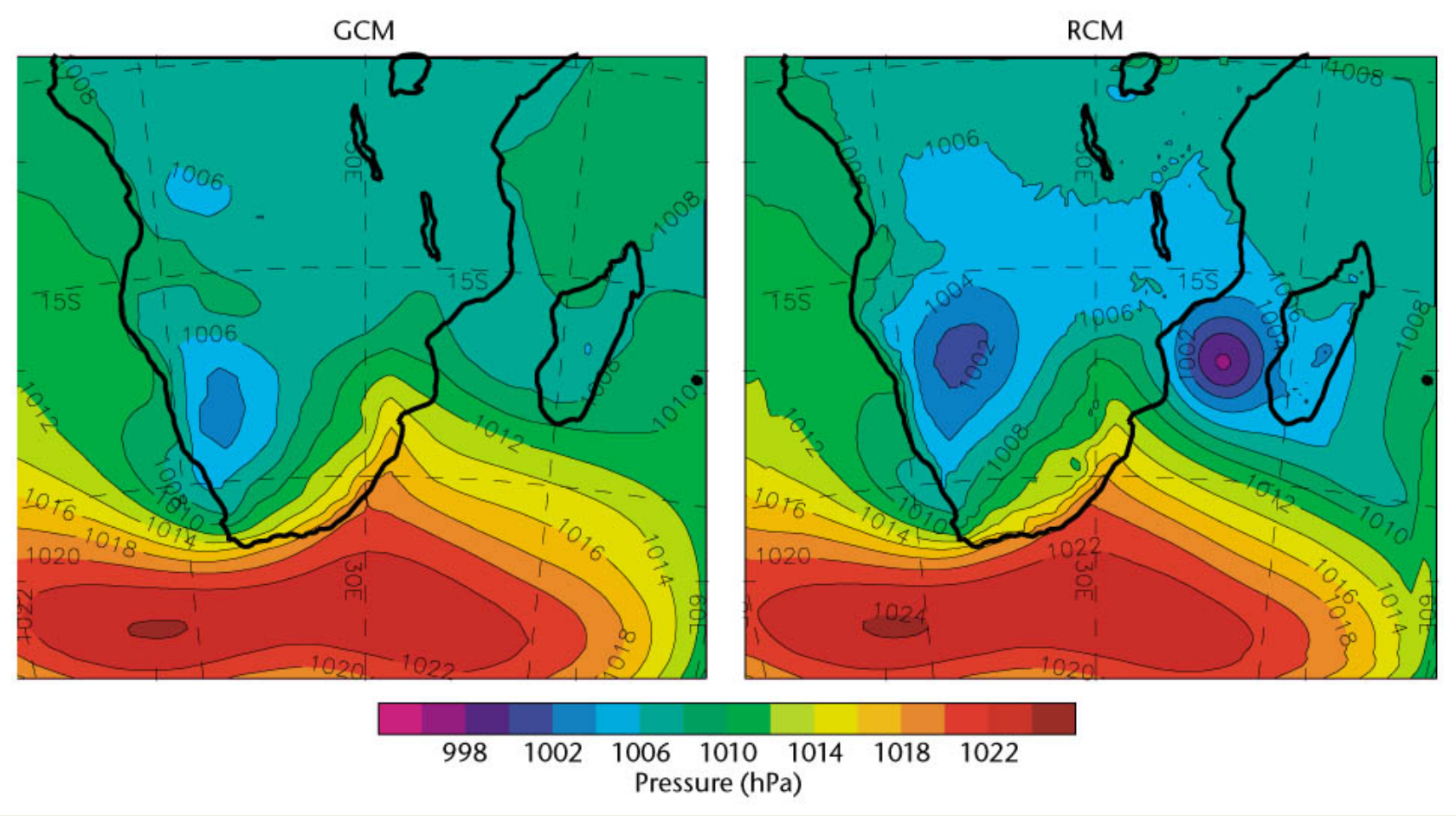
© Crown copyright Met Office

Regional climate models (RCMs) simulate high resolution weather



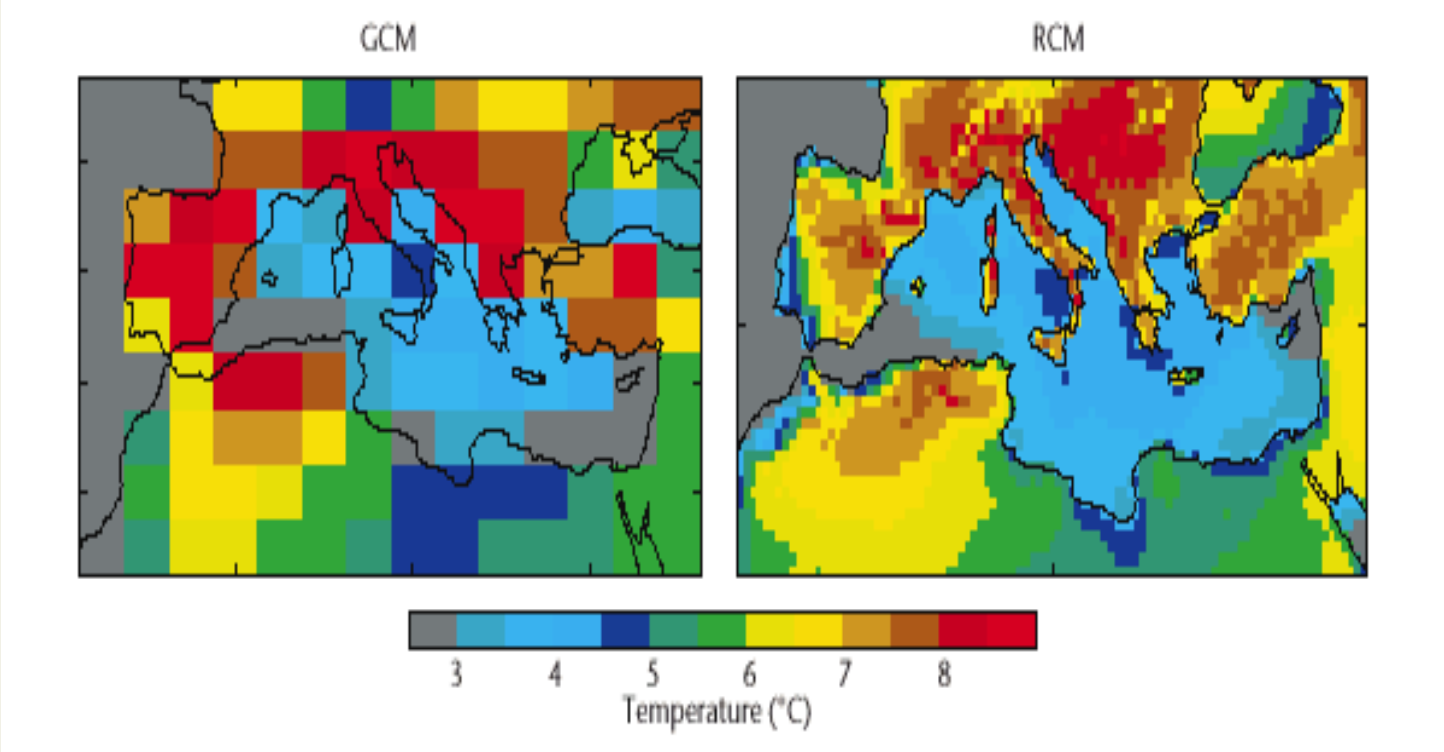
© Crown copyright Met Office

RCMs simulate extreme events e.g. tropical cyclones



© Crown copyright Met Office

Represent smaller islands



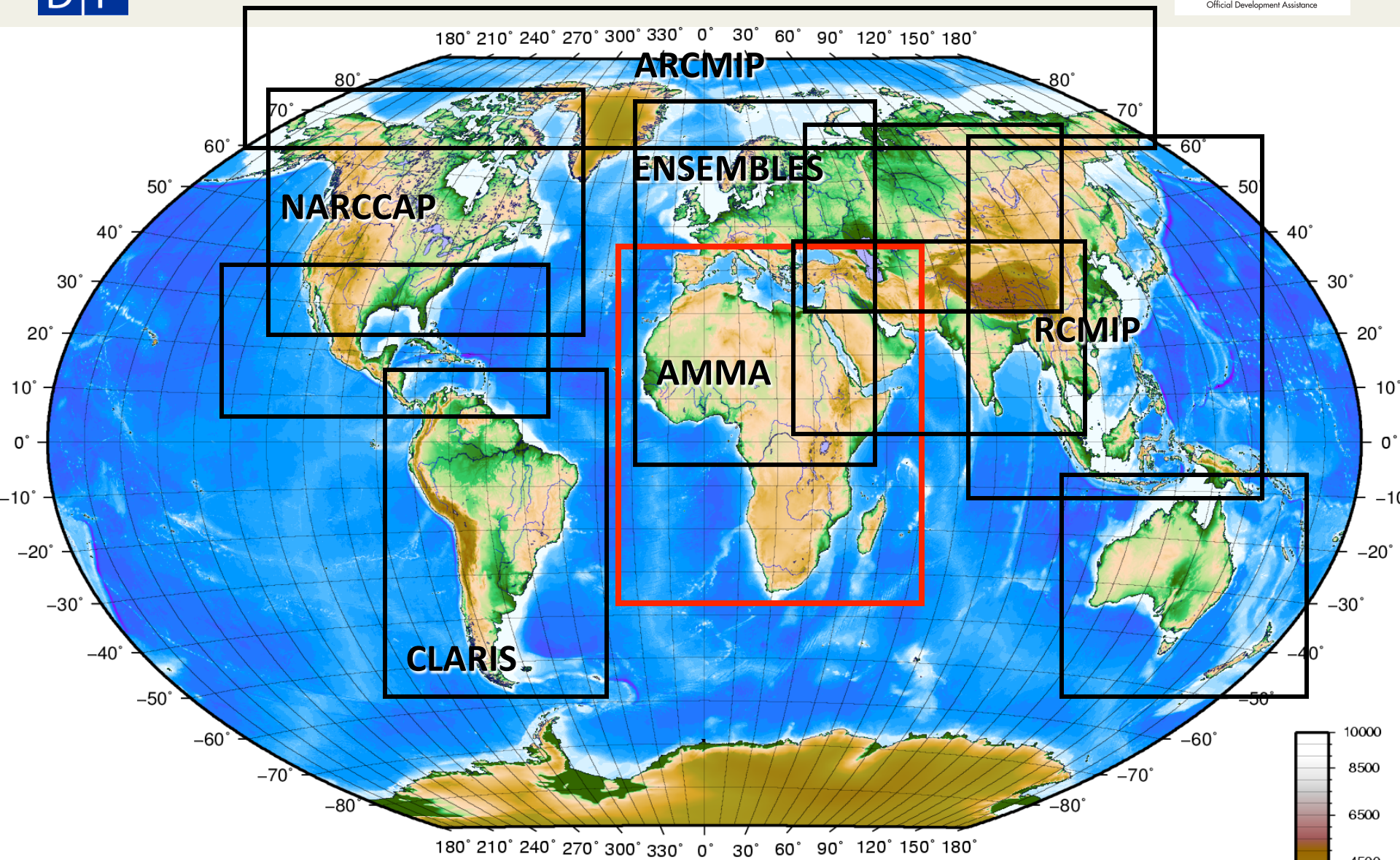
Projected changes in summer surface air temperature between present day and the end of the 21st century.

© Crown copyright Met Office

Several climate data and information initiatives exist

- African regional and country specific data
- AMMA (West Africa) - Biophysical and socio-economics
- Hadley (Global) Climate
- GCOS (Global) Climate
- CRU (Global) Climate
- ECMWF (Global)
- NCEP (Global) - Climate
- NCDC (Global) - Climate
- NASA (Global) - Climate
- ENSEMBLES (Europe & West Africa) - Climate

CORDEX Initiative



CORDEX experiment design

Model Evaluation Framework

Climate Projection Framework

Multiple regions **(Initial focus on Africa)**
50 km grid spacing

ERA-Interim LBC
1989-2007

Climate scenarios
1951-2100 or timeslices

Decadal predictions
1980-2010, 1990-2000, 2005-2035

Regional Analysis
Regional Databanks

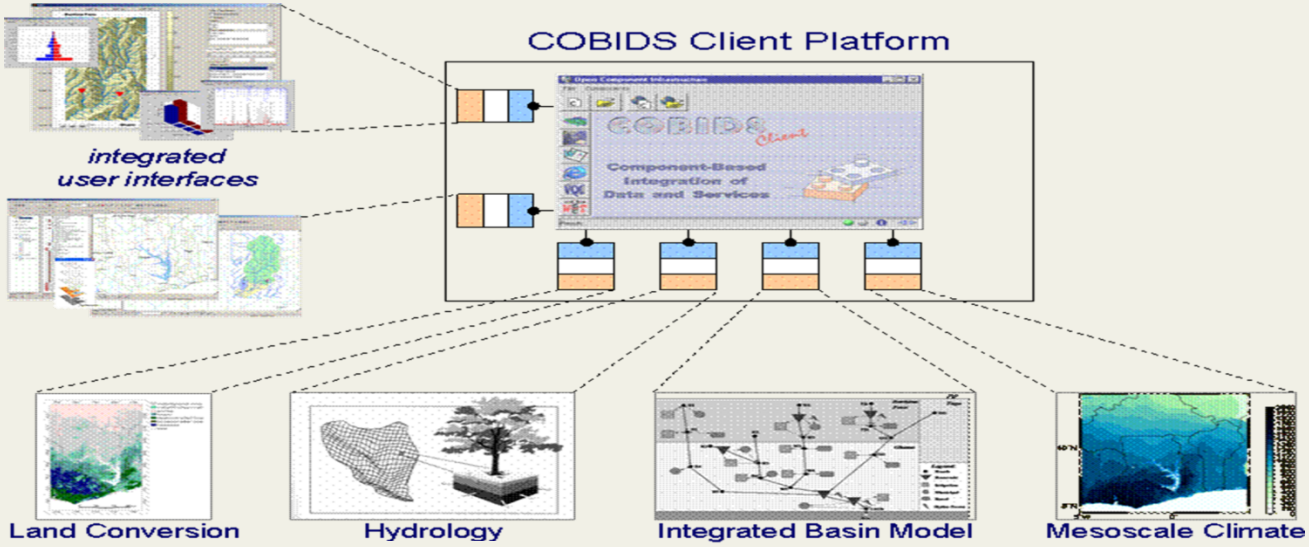
Multiple RCMs

CORDEX activities

- Formation of regional diagnostics/evaluation teams
  - Compile suitable metrics for model evaluation
  - Gather relevant observational datasets
- Commitment by global modeling groups to provide fields for model nesting for the selected experiments
- Standardized output format following (as closely as possible) the IPCC protocol
- Creation of CORDEX databanks (DMI, KMA)

Establishment of E-infrastructure, Early Warning and Decision Support Tools for long-term Adaptation Planning

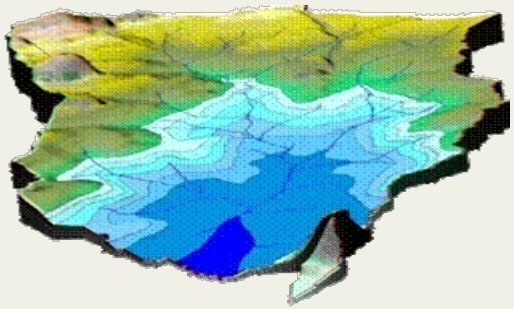
Integrated Early Warning and Decision Support Systems



- Decision Support Tools for multi-sectoral impact assessment and adaptation solutions for MDGs and PRS (T21 model)
- Support for development of Early Warning Systems (Automated hydro-met stations and remote-sensing apps.)

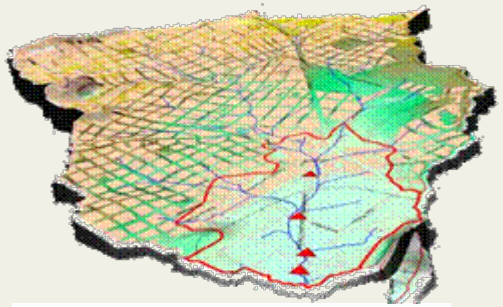
Understanding the processes and data requirements is Fundamental!

Hazard Analysis and Mapping → Exposure and Vulnerability → Potential Loss Estimates → Can Support Emergency Management and Sectoral Planning and Risk Management



Heavy Precipitation and flood mapping

Need for historical and real time meteorological, hydrological data, analysis tools and weather and climate forecasts



Impacts:
- ✓ population
- ✓ agricultural land
- ✓ urban grid
- ✓ Infrastructure
- ✓ Businesses

Need for Socio-economic impacts data and analysis tools

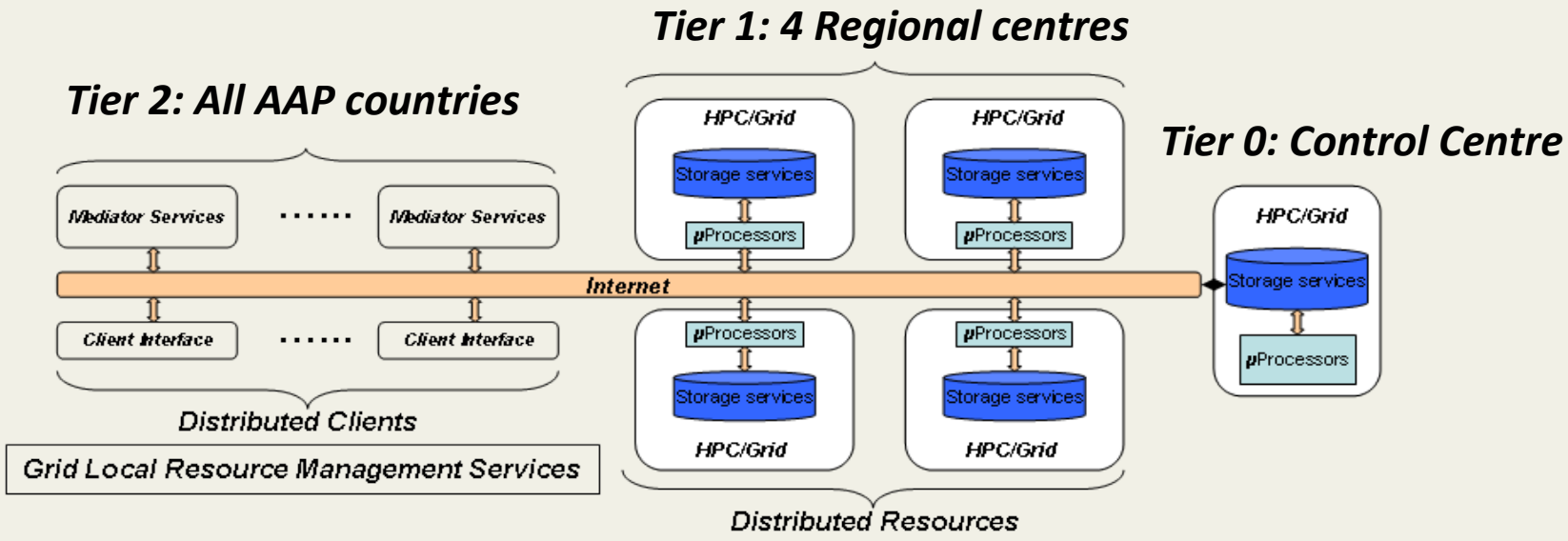
Number of lives at risk

$ at risk

- ✓ Destruction of buildings and infrastructure
- ✓ Reduction in crop yields
- ✓ Business interruption

Need for risk assessment tools combining hazard, asset and exposure

AAP Climate Data storage and computational infrastructure



1. Tier 0: A central computer that is large enough to host considerable amount of data (potentially at ICTP)
2. Tier 1: Consist of four African Regional Centres and it will be large enough to guarantee that combined data created and stored is similar to Tier 0.
3. Tier 2: Consist of all AAP Countries that will access the infrastructure by means of an of internet - web interface.

What has been done so far

Establishing and strengthening strategic networks

- Built/strengthened network at different levels:
  - in-country linkages between climate products and services providers, policy/decision makers and end-users (disaster management institutions, NGOs, private and public sectors institutions).
  - strategic networks with key African regional centres (ACMAD, AGRHYMET, ICPAC and SADC-DMC) and International Climate Centres (UK Hadley, Earth Simulator, etc).
  - strategic networks with key international institutions (WMO, UNFCCC, WFP, ACPC, IGAD, ECOWAS, UNEP, IFRC, ICTP, etc).

In-country technical assistance - mentoring, trouble shooting and advisory services

- Developed a Helpdesk to enable rapid response to problem resolution – established a local network of problem-solvers, mentors and advisors.
- In-country technical support for:
  - services on data and information management: data collection, analysis, e-infrastructure, tools and methods (Ghana, Kenya, Burkina Faso, etc).
  - acquisition, use and management of early warning systems and decision support tools (Malawi, Senegal, Congo, etc).

Capacity Building

- Workshop on the use of climate scenarios for Integrated Water Resources Management for the SADC and IGAD regions (20 participants from 10 countries) – ICPAC, Nairobi, Nov/Dec 2010.
- Workshop on generation of climatic extreme indices for Climate Risk Management in the IGAD region (Kenya, Rwanda, Tanzania and Ethiopia) – ICPAC, Nairobi, Feb/ March 2011.
- Workshop on use of T21 model for multi-sectoral impact assessment and adaptations solutions for attaining MDGs, Nairobi, March 2011.
- CORDEX –Africa data workshop, ICTP, Trieste, March

Special initiatives

- African Climate and Health initiative to highlight the importance of the theme, particularly at COP17 in Durban (AAP,ACPC, IRI, WMO,WHO).
- Engagement/support of African reps/negotiators at the UNFCCC processes (COP, LEG, SBSTA, NWP).
- Climate Information Centres/Adaptation Learning Centres (Ghana and Kenya).

Planned Activities

- Targeted Training on e-infrastructure for AAP countries – Trieste, May 2011.
- Extensive in-country visits to support implementation of AAP e-infrastructure - installations, training and mentoring.
- Workshop on CORDEX-Africa data analysis and visualization – Cape Town, July 2011.
- Workshop on climate scenario generation and analysis for West, Central and North Africa – Niger, July 2011.
- Workshop on Integrated Water Resources Management for West, Central and North Africa – Dakar, August 2011.

Summary and Conclusion

Summary and Conclusion

- Helpdesk for effective technical support and services established
- Data and information management strategy developed and being implemented.
- Relevant networks and partnerships to support data and information management established.
- Unprecedented data availability on Africa through the CORDEX initiative.
- Development of e-infrastructure for data and information management, early warning and decision support tools for adaptation planning.

Summary and Conclusion

Targeted hands-on training to address specific needs of countries.

Continuously improve the e-infrastructure, tools and methods as updates become available.

Joint initiatives with our partners to deliver products and services to support countries.

Summary and Conclusion

- This is the first time Integrated and Comprehensive Approaches to Climate Change Adaptation has been widely applied in Africa.
- e-infrastructure would enhance regional and North-South collaboration – improve delivery of technical support and services.
- Improved ICT infrastructure would enhance the capacity of countries to provide a wide range of robust climate products and services in a timely manner.

Thanks