



World Meteorological Organization

Working together in weather, climate and water

Overview of WMO Disaster Risk Reduction Programme progress, and implementation plan for 2012-2015

Dr Wenjian ZHANG, Director, Observing and Information Systems Department

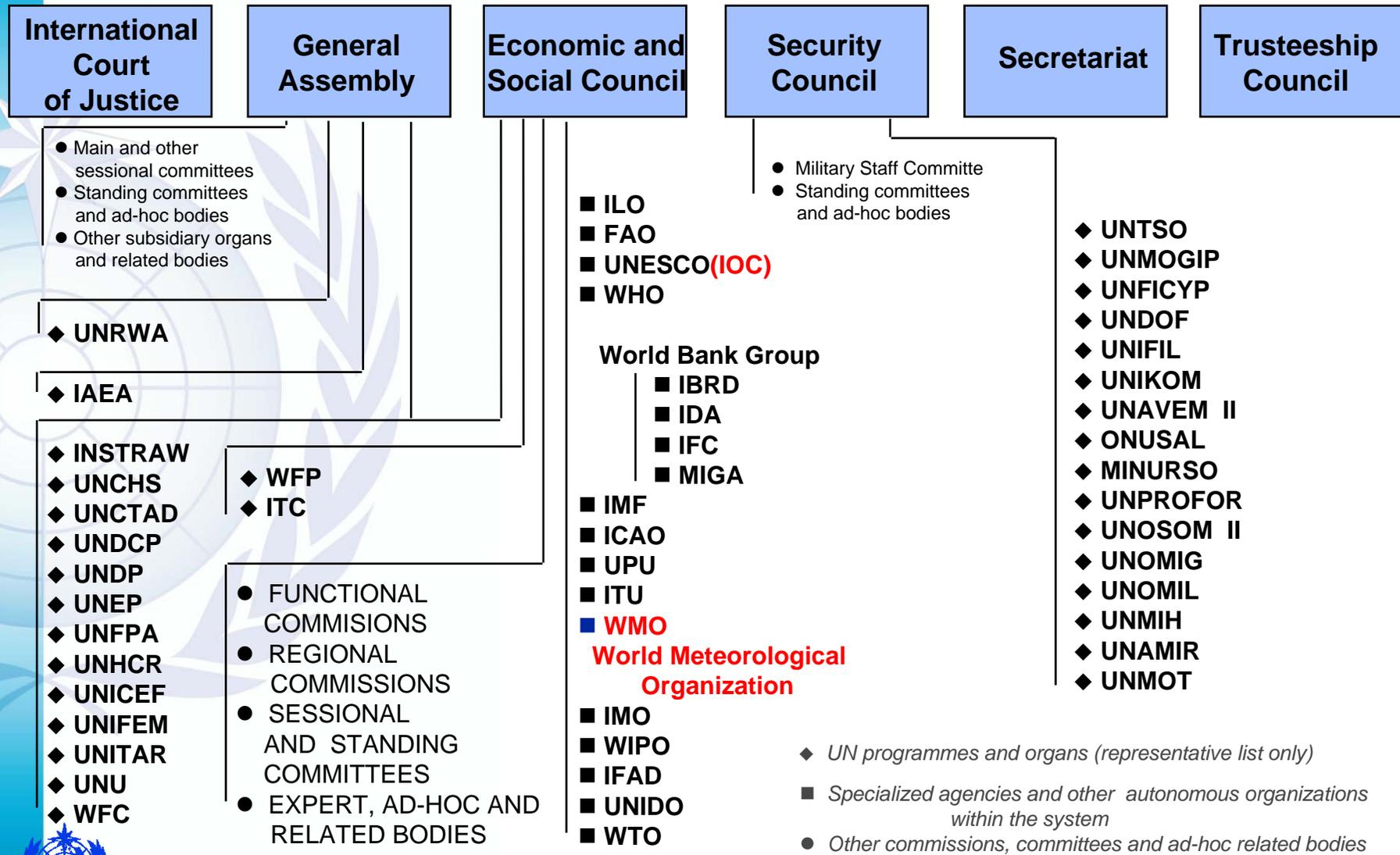
Dr. Maryam Golnaraghi, Chief, WMO Disaster Risk Reduction Programme

World Meteorological Organization (WMO)



I: WMO Introduction

WMO in The United Nations System



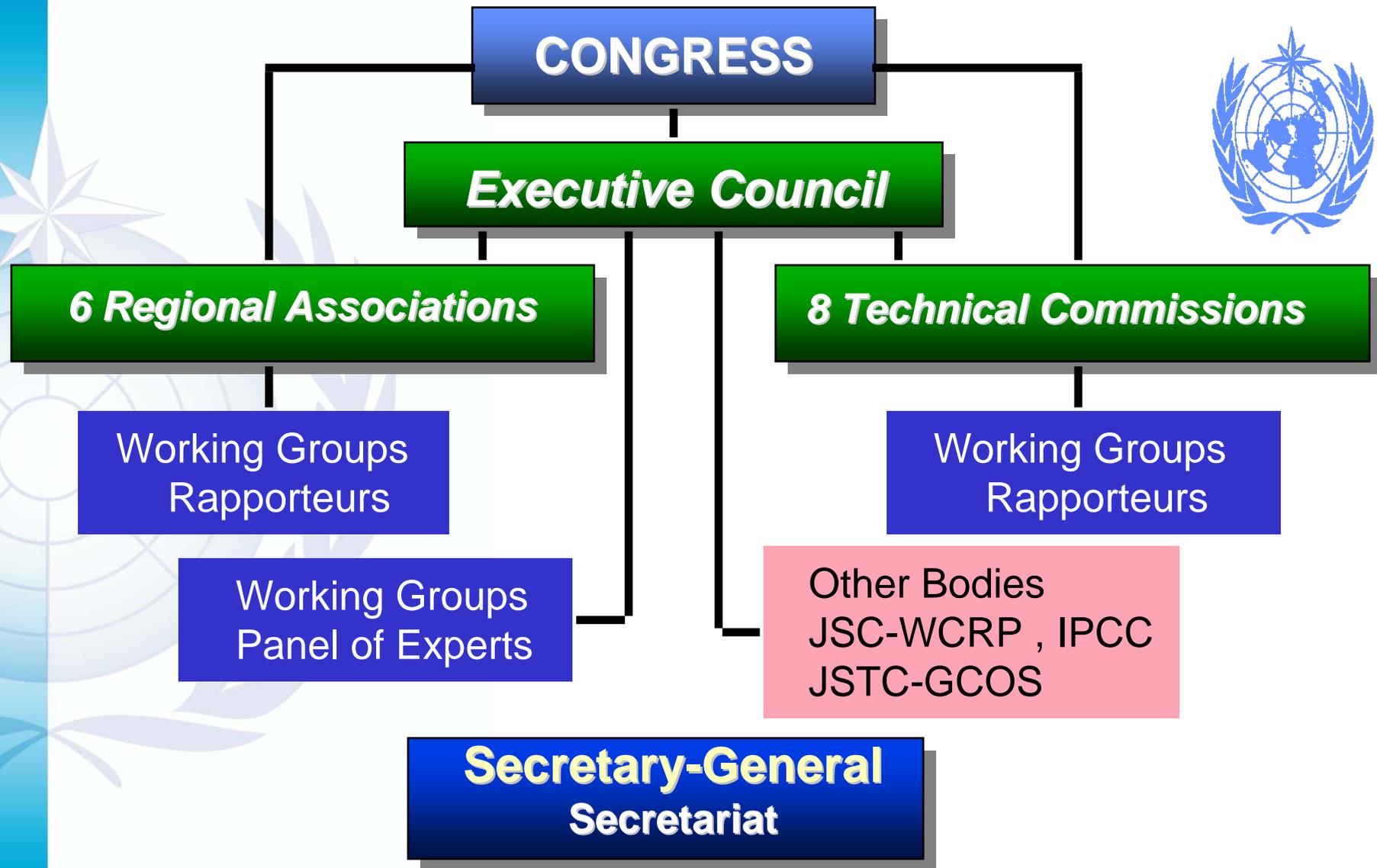
The Vision of the WMO

To provide world leadership in expertise
and international co-operation in

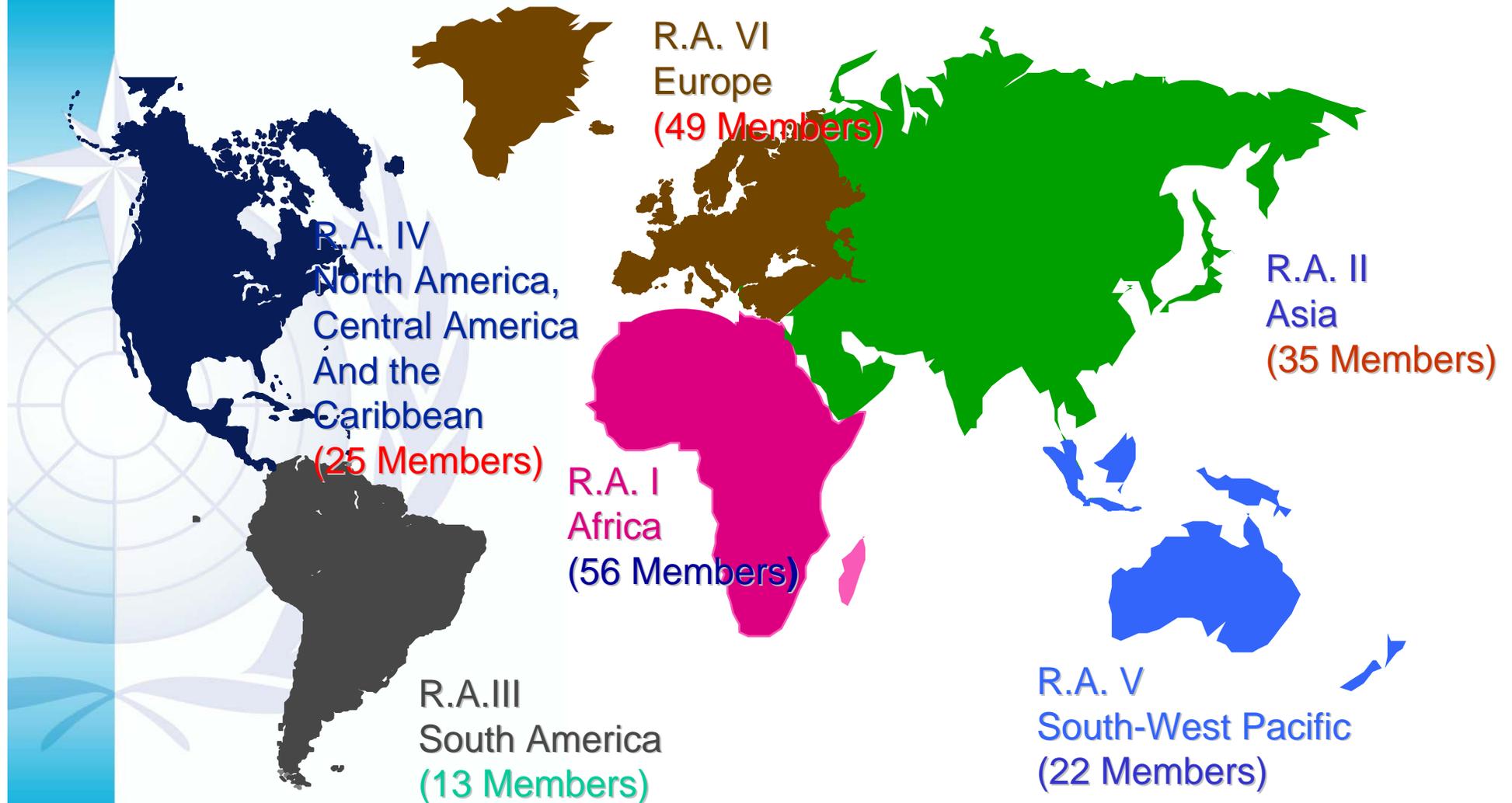
- Weather,
- **Climate,**
- Water,
- and related environmental issues,

and thereby to contribute to the safety
and well being of people throughout the
world and to the economic benefit of all
nations.

Organizational Structure of WMO (*189 Members*)



Six Regional Associations



8 Technical Commissions

Basic Commissions

- Commission for Basic Systems (**CBS**)
- Commission for Instruments and Methods of Observations (**CIMO**)
- Commission for Hydrology (**CHy**)
- Commission for Atmospheric Sciences (**CAS**)

Applications Commissions

- Commission for Aeronautical Meteorology (**CAeM**)
- Commission for Agricultural Meteorology (**CAgM**)
- Joint WMO/IOC technical Commission for Oceanography and Marine Meteorology (**JCOMM**)
- Commission for Climatology (**CCI**)

10 Major WMO Programmes

World Weather Watch Programme

WMO Space Programme

Natural Disaster Prevention and Mitigation Programme

**World
Climate
Programme**

**Atmospheric
Research
and
Environment
Programme**

**Applications
of
Meteorology
Programme**

**Hydrology
and
Water
Resources
Programme**

**Education and Training Programme
Technical Cooperation Programme
Regional Programme**

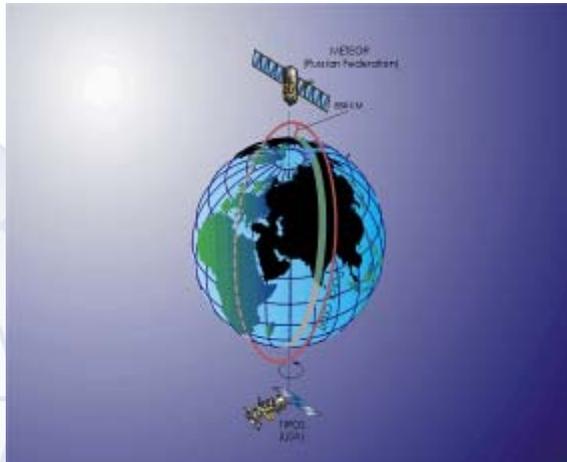
WMO
OMM



WMO/OMM

WMO Space Programme development

1961



1978

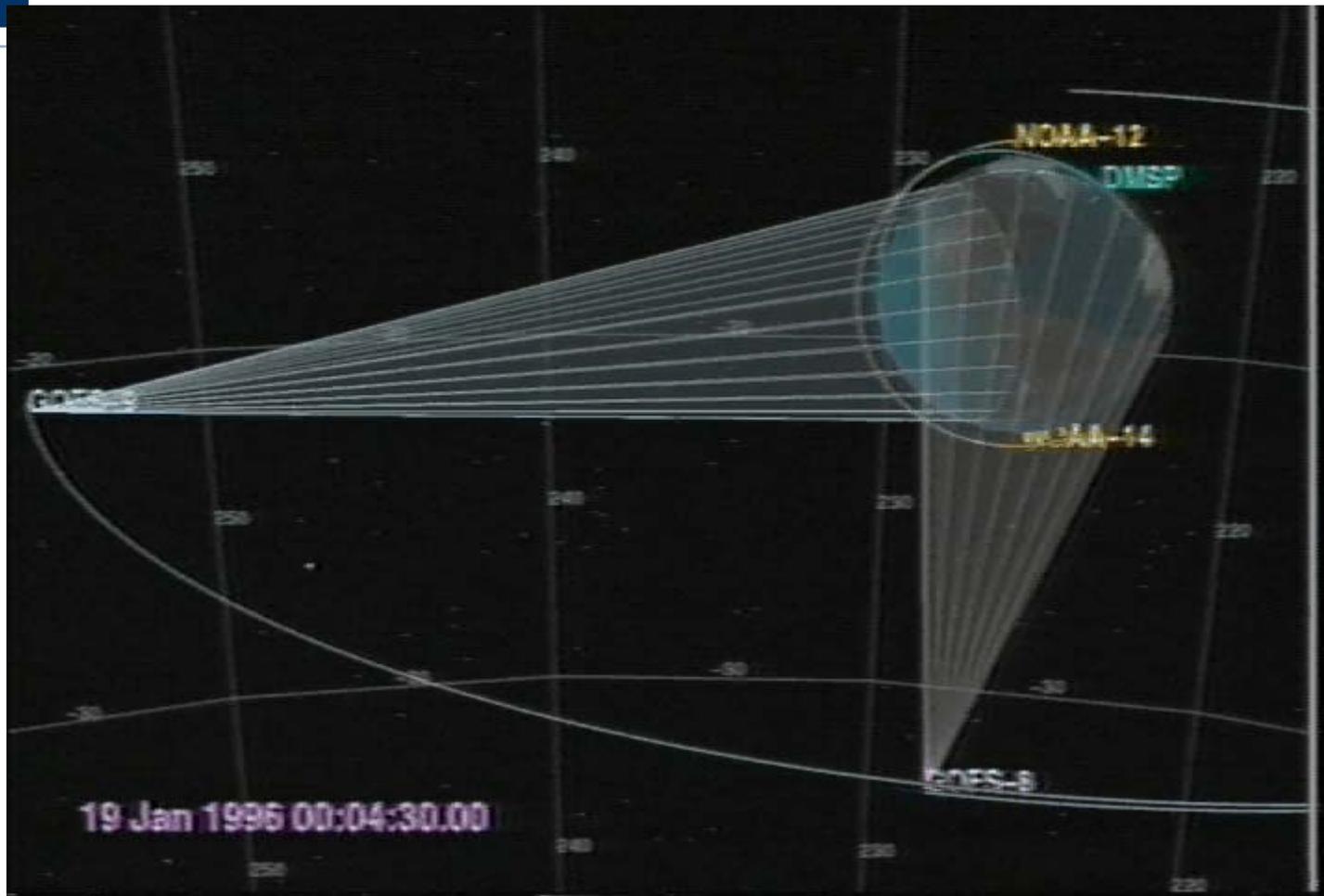


1990

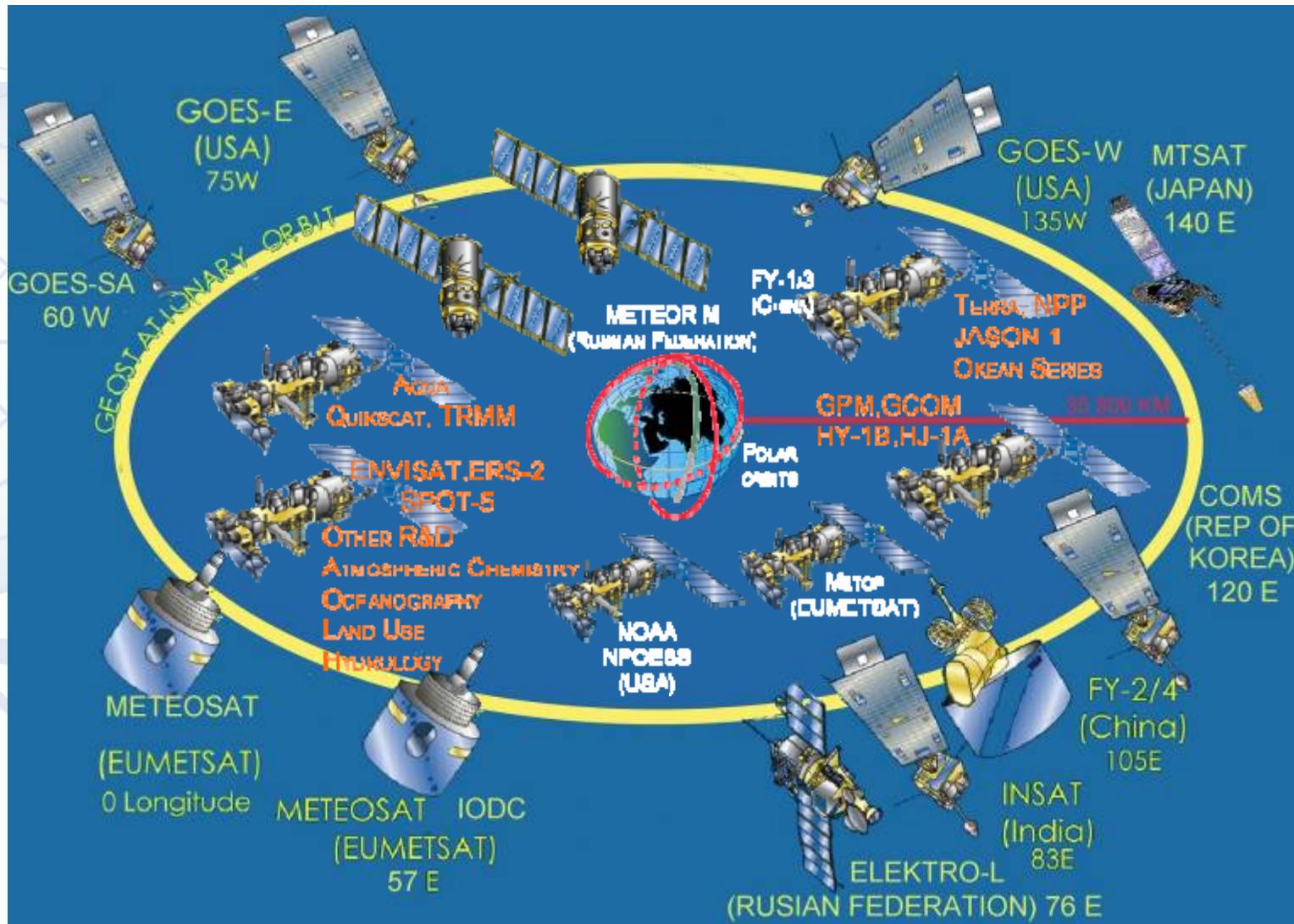


2011



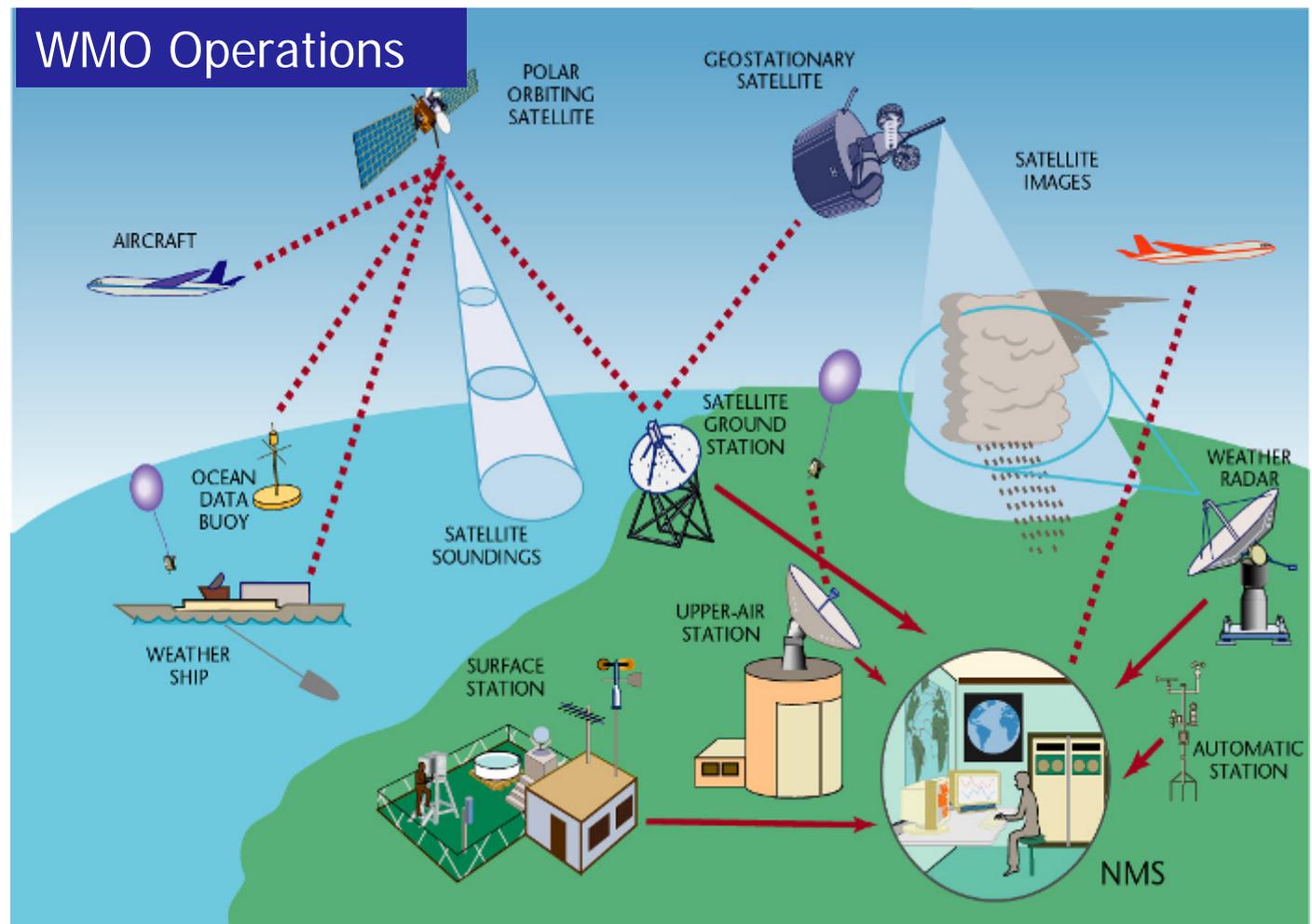


The Space-Based component of the Global Observing System (GOS)

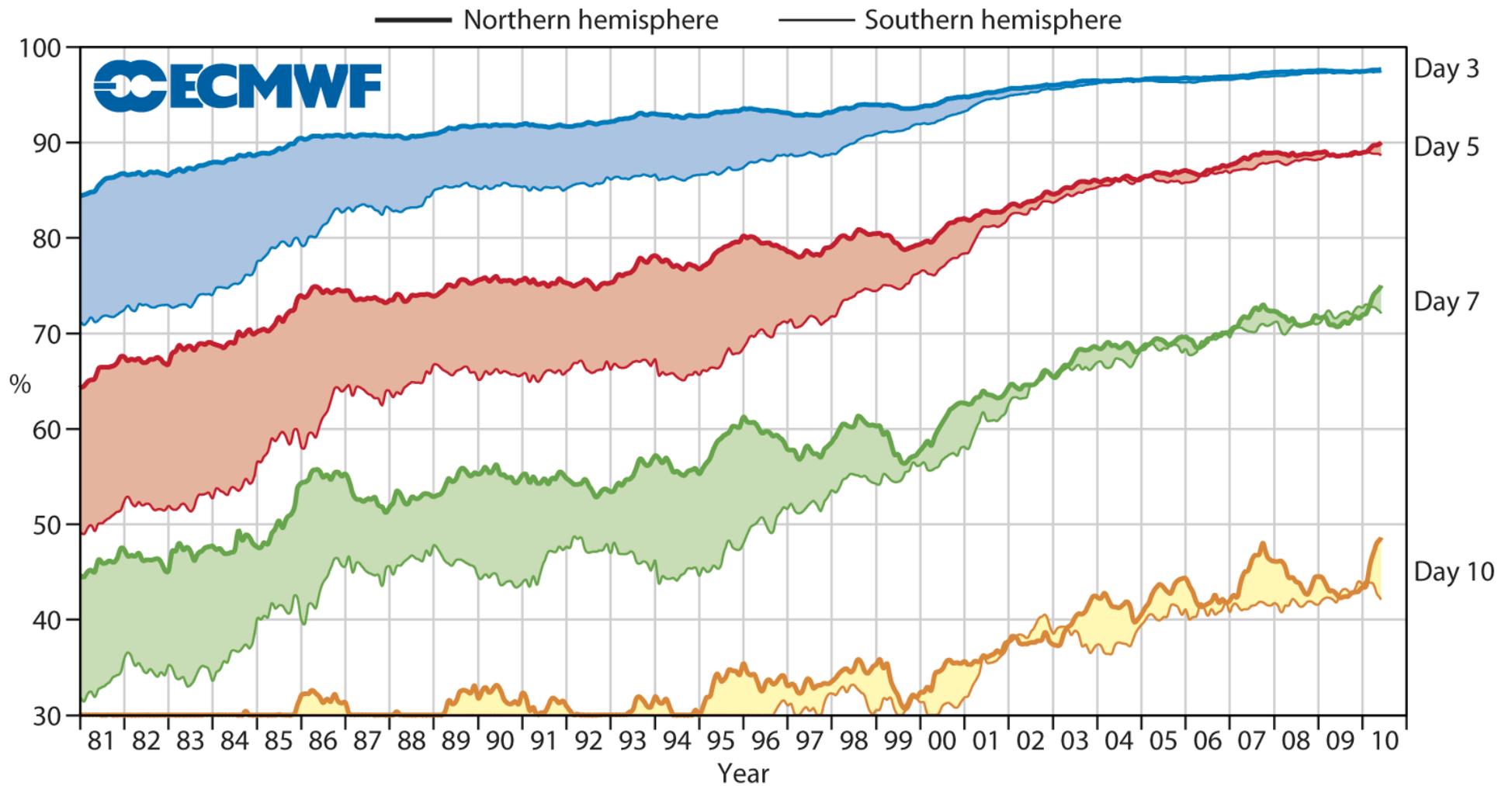


The operational system:

- Supported by research, routinely collects and exchanges data and information, supports service provision at global, regional and national levels.
- Continuously improving



Anomaly correlation of ECMWF 500 hPa height forecasts



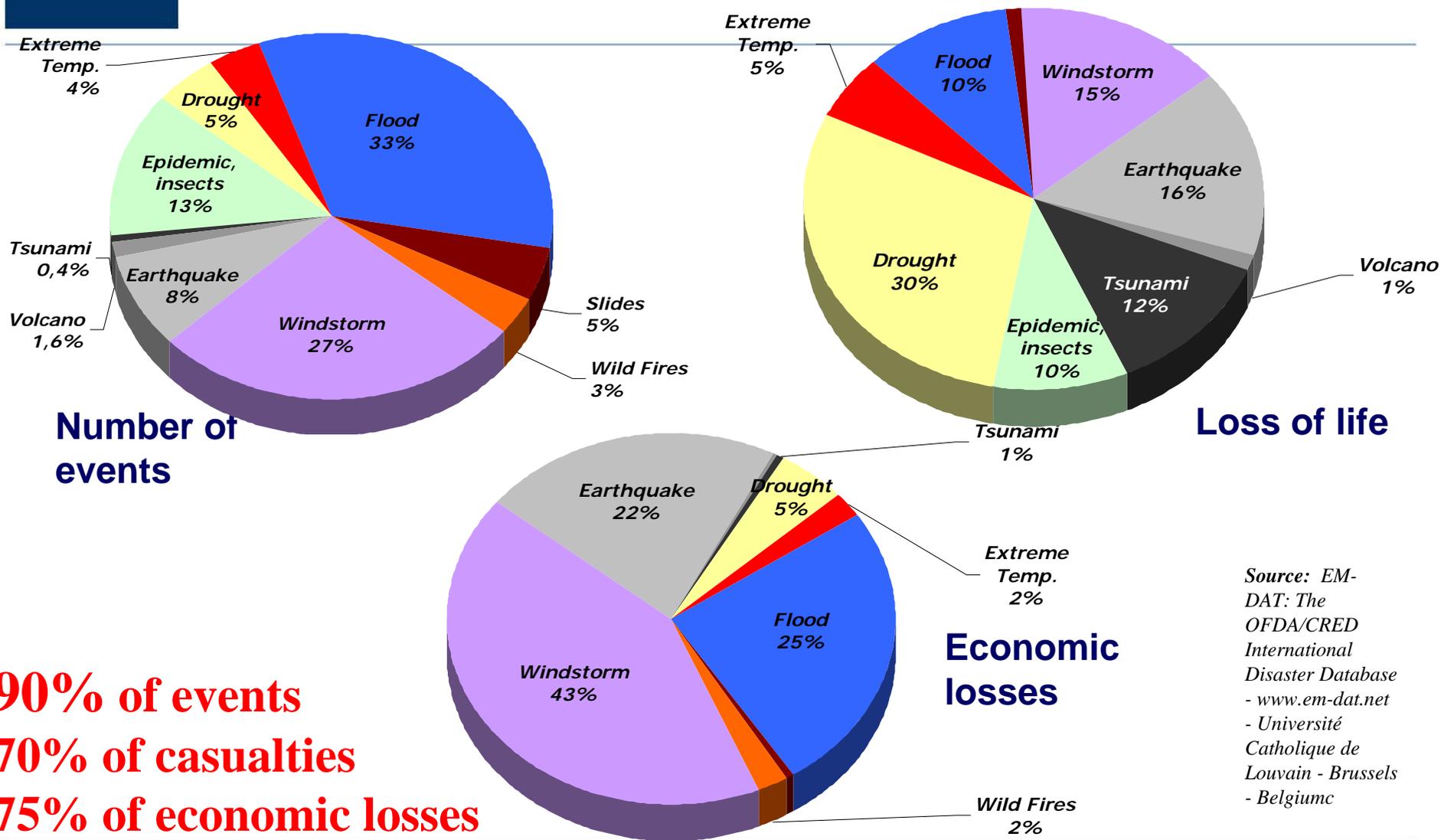
Courtesy of ECMWF. Adapted and extended from Simmons & Hollingsworth (2002)



II: The role of WMO in Disaster Risk Reduction and the Meteorological, Hydrological and Climate related Hazards



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



90% of events
70% of casualties
75% of economic losses

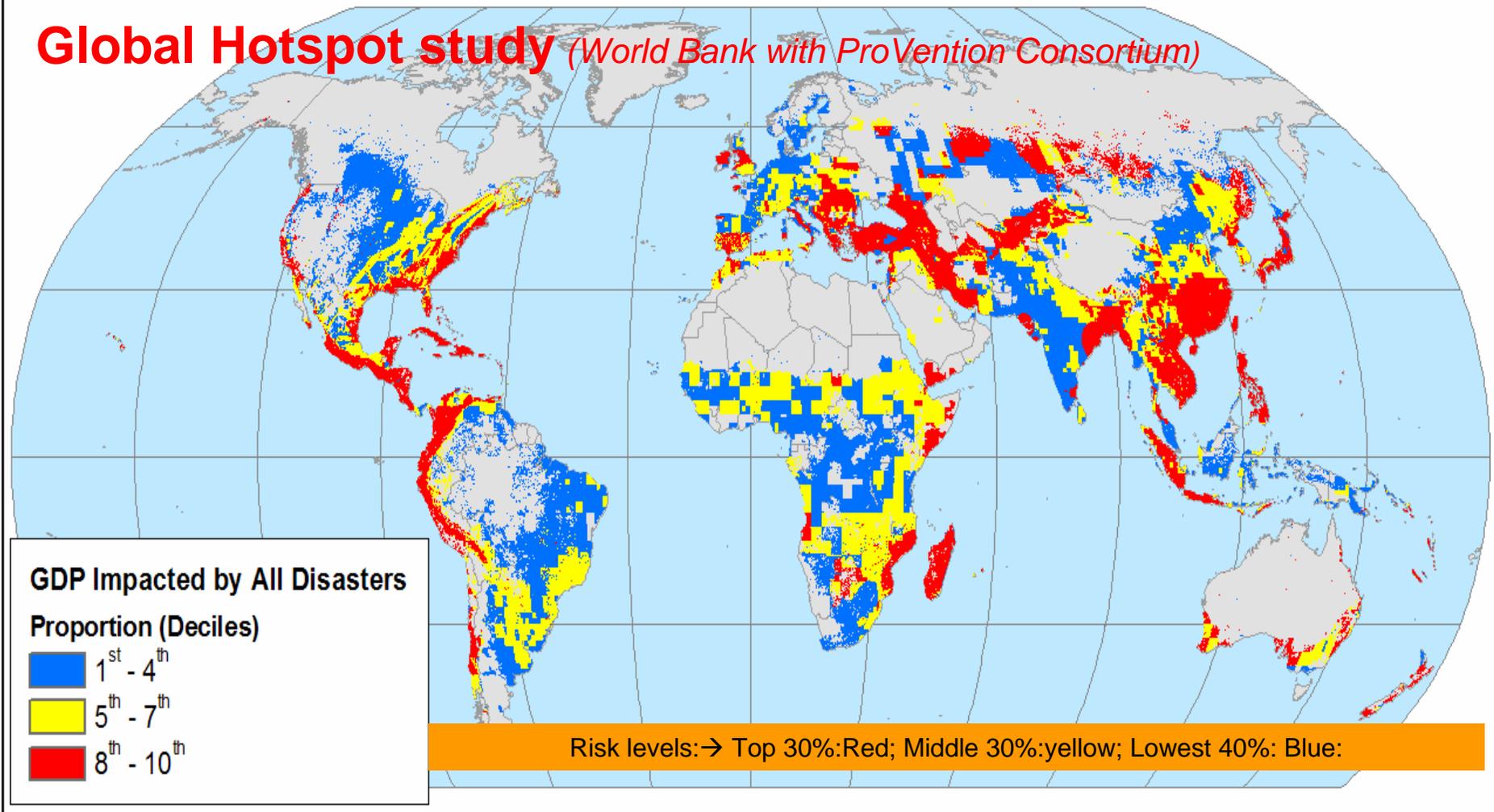
are related to hydro-meteorological hazards and conditions.

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

Global Challenges We Share

As society becomes more complex we become more sensitive to natural and human induced variability.

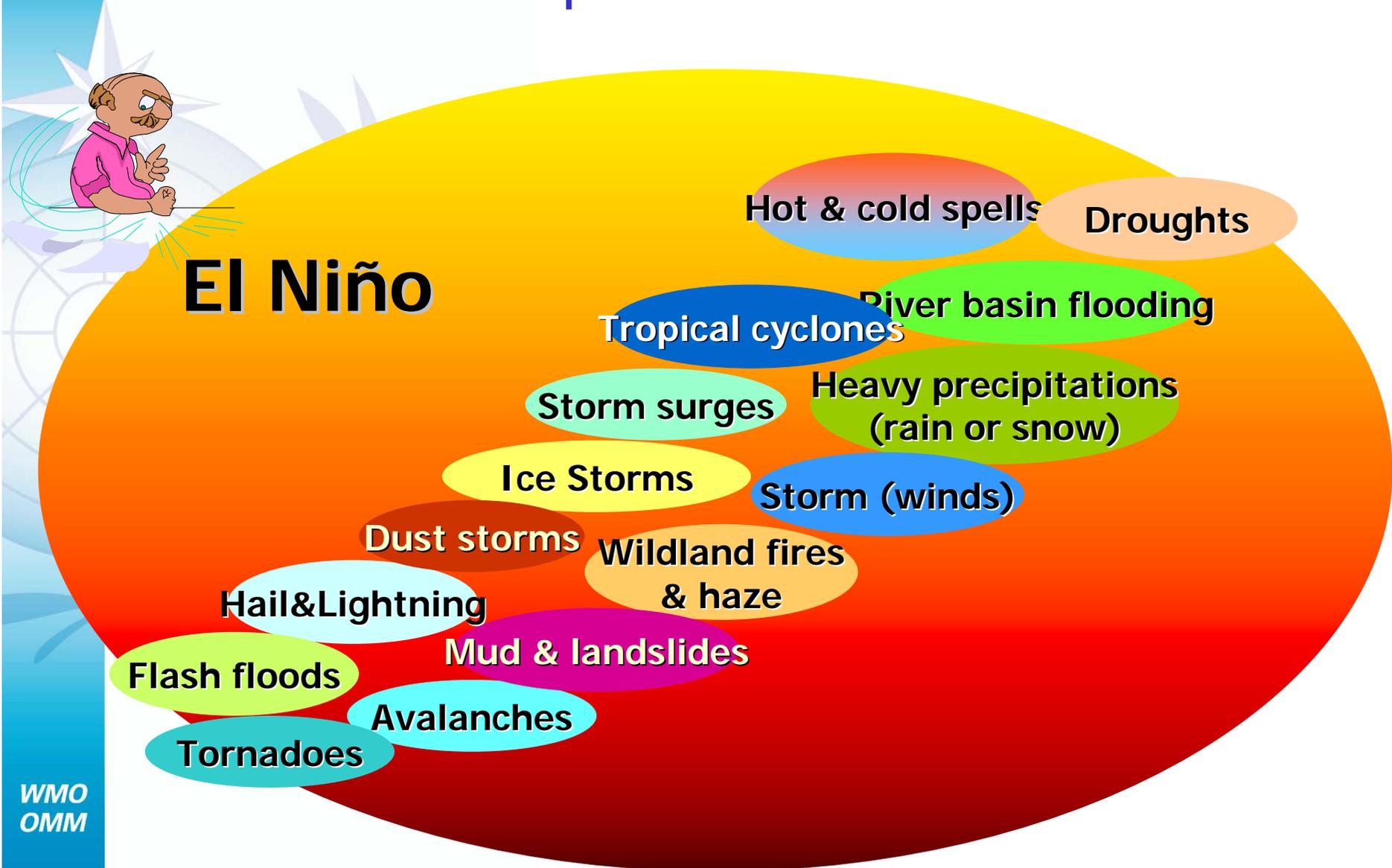
Global Hotspot study (World Bank with ProVention Consortium)



WMO
OMM

35 countries have more than 5% pop in areas at risk from three or more hazards
96 countries have more than 10% pop in areas at risk from two or more hazards
160 countries have more than 25% pop in areas at risk from one or more hazards

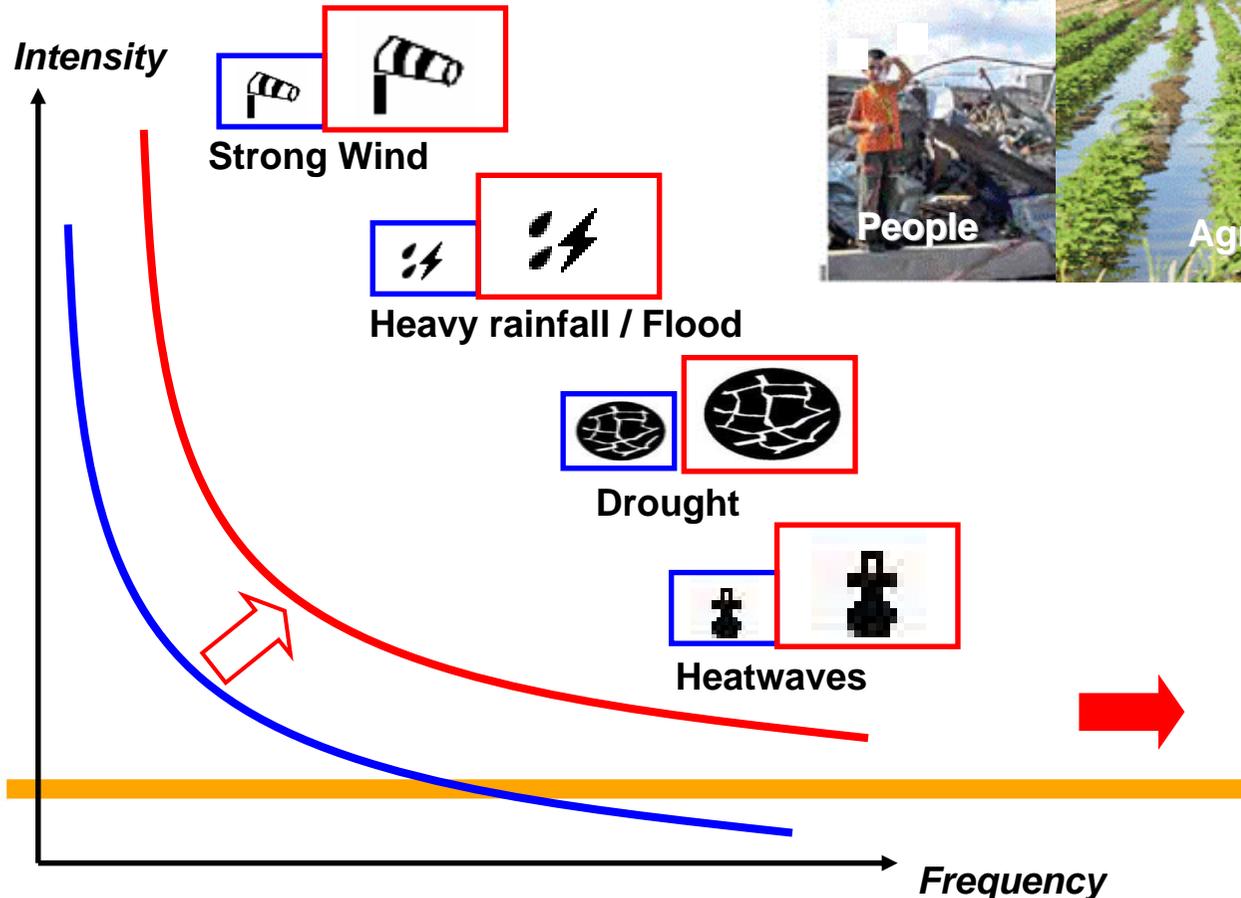
Challenges: Climate Change and severe disasters, increasing society needs for improved services





Socio-economic 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 !

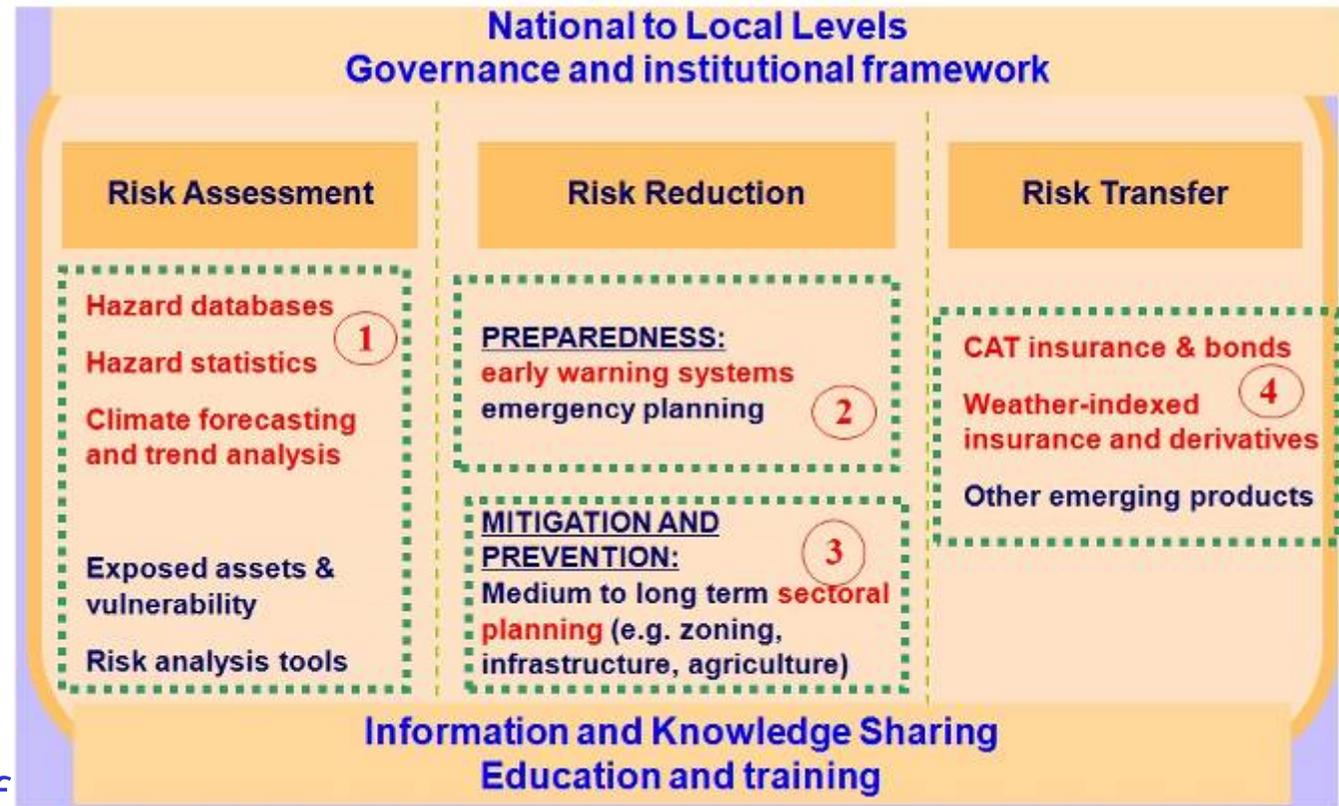


Need for Multi-sectoral risk management



DRR-related activities:

All Commissions have some disaster-related activities;
Work with ISDR and WMO Members towards the implementation of the Hyogo Framework;





Adoption of Hyogo Framework for Action: A Paradigm shift....

- **Traditionally**, disaster risk management has been focused on **post disaster response** in **most** countries!
- **New paradigm** in disaster risk management - Investments in **preparedness** and **prevention** through **risk assessment, risk reduction** and **risk transfer**
 - Adoption of Hyogo Framework for Action in 2005-2015 by 168 countries (Kobe, Japan)

Implementation of the new paradigm in DRR would require meteorological, hydrological and climate information and services!



DRR Programme's Strategic Foundation

**Hyogo Framework
for Action**

2005-2015

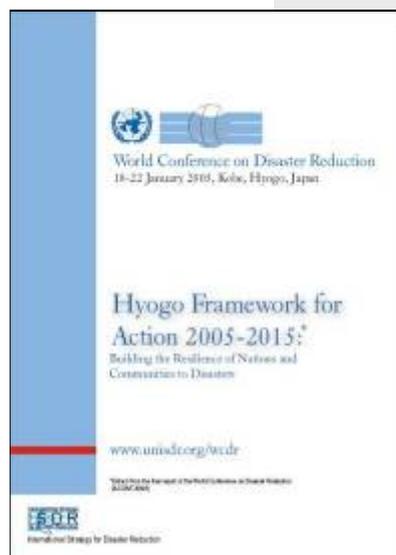
(World Conference on
Disaster Reduction)

WMO

Strategic Plan

2008-2015

(Top Level Objectives and
Five Strategic Thrusts)



Consultations with WMO governing
bodies, Regional and National
network and partners

**WMO strategic priorities
in Disaster Risk Reduction**



WMO DRR Crosscutting Programme Approach

To leverage expertise, resources and capacities of WMO Members, technical programmes and operational network and to build alliances with the UN, international and regional partners to support capacity development for disaster risk reduction decision-making at all levels.



National Factors

- Disaster Management is “slowly” evolving from post disaster response towards preparedness and preventions
 - Multi-Sectoral, Multi hazard, risk-based” approach to planning and decision making
 - DRR policy, legal and institutional frameworks are evolving (both developed and developing countries)
 - “Traditional” perception of NMHS role in DRR: “disseminate hazard warnings to the public”
 - DRR Programme offers “New opportunities” for meteorological, hydrological and climate services
 - NMHS roles are expanding and evolving as critical providers of tailored services for Risk Assessment, Risk Reduction and Risk Management
-



WMO Operational network

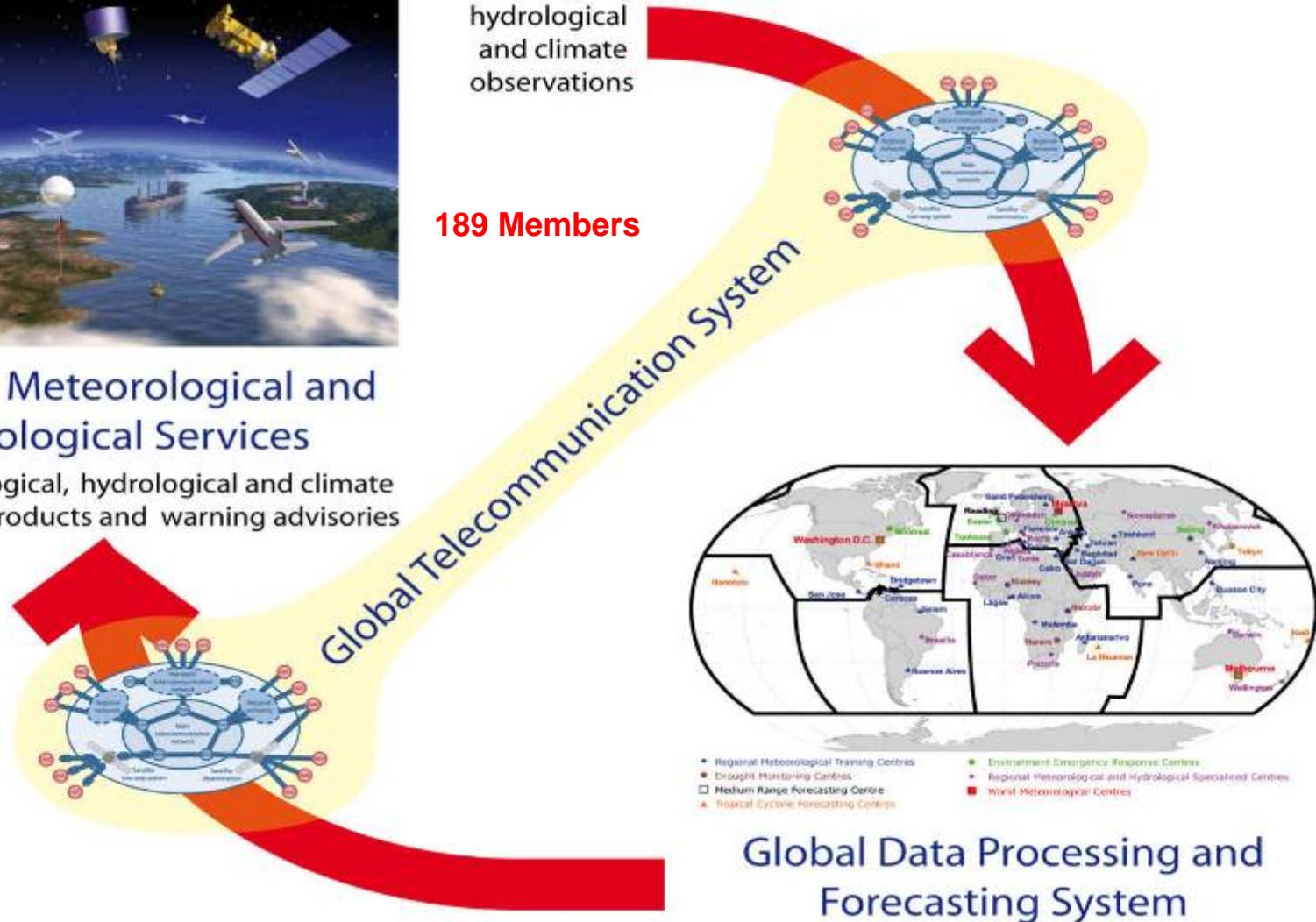


National Meteorological and Hydrological Services

Meteorological, hydrological and climate value-added products and warning advisories

Meteorological, hydrological and climate observations

189 Members





Example of how the Operational WMO Network Supports National Early Warning Systems

Bangladesh Cyclone Preparedness Programme

The collage illustrates the Bangladesh Cyclone Preparedness Programme. On the left, a man in a white uniform and cap uses a megaphone to broadcast warnings. The top center shows a satellite view of a cyclone. To the right, a map of Bangladesh highlights Dhaka with a red arrow, and another map shows the regional meteorological network. A legend below the maps identifies various centers: Regional Meteorological Training Centres, Drought Monitoring Centres, Medium Range Forecasting Centres, Regional Meteorological and Hydrological Specialised Centres, and the World Meteorological Centre. On the bottom right, a flagpole displays three red flags, labeled with signal numbers: SIGNAL NO 1-3, SIGNAL NO 4-7, and SIGNAL NO 8-11. The bottom center shows a large crowd gathered in front of a building, likely a cyclone shelter.



Building Capacities of NMHS to serve different components of DRR decision-making

Governance and Institutional Framework (Multi-sector, Multi-level, Multi-Hazard)

Risk Assessment

Risk Reduction

Risk Transfer

Hazard databases

1

Hazard statistics

Climate forecasting
and trend analysis

Exposed assets &
vulnerability

Risk analysis tools

PREPAREDNESS:

early warning systems
emergency planning

2

PREVENTION and
MITIGATION:

3

Sectoral Risk Management
Medium to long term
planning (e.g. zoning,
infrastructure, agriculture...)

CAT insurance & bonds

Weather-indexed
insurance and derivatives

4

Other emerging products

Information and Knowledge Sharing
Education and training



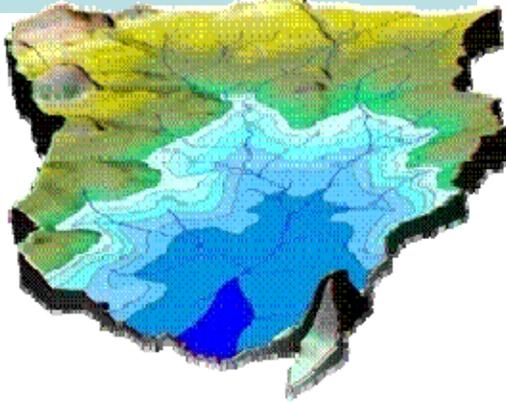
Need for services and technical advice on a number of priority Hazards of WMO Members as establish by 2006 DRR Survey

- **Top hydro-meteorological hazards of concerns to Members (in alphabetical order):**
 - Droughts
 - Flash and river floods
 - Forest and wild land fires
 - Heat waves
 - Land- and mud-slides
 - Marine and aviation hazards
 - Strong winds and severe storms
 - Tropical cyclones and storm surges
-



Good Practices and Guidelines in Hazard/Risk Assessment with Multi-Hazard Approach

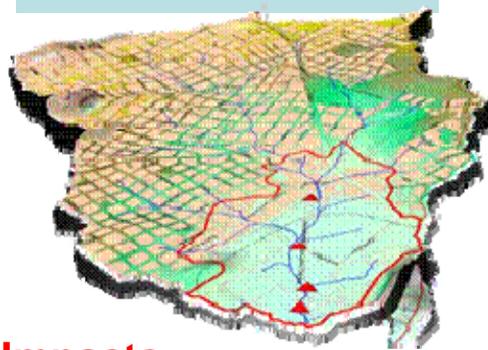
Hazard Analysis and Mapping



Heavy Precipitation and flood mapping

Need for historical and real time data
Statistical analysis tools
climate forecasts and trend analysis

Exposure and Vulnerability



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

Need for Socio-economic impacts data and analysis tools

Potential Loss Estimates

Number of lives at risk

\$ at risk

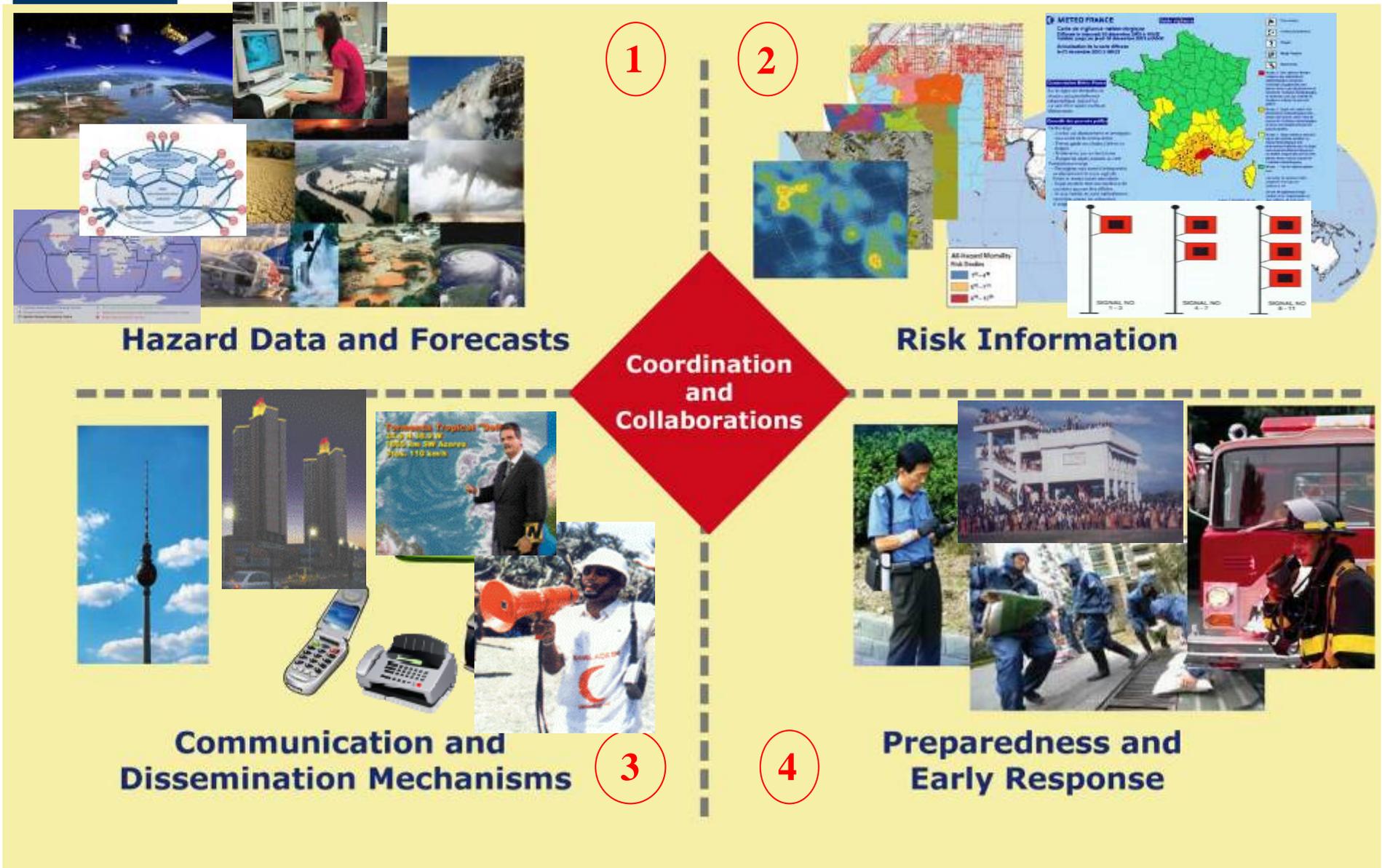
✓ Destruction of buildings and infrastructure
✓ Reduction in crop yields
✓ Business interruption

Need for risk assessment tools combining hazard, asset exposure and vulnerability information

This information is critical for decision-making and development of strategies to reduce the risks



Volume II Guidelines on EWS: Integrated approach to end-to-end Service Delivery for Multi-Hazard EWS with principles of Quality Management Framework





Good Practices and Guidelines in Climate Services for Financial Risk Transfer Markets

Which Risks?	What type of Financial tools?	Who Could Benefit?	Requirements for Hydro-Met Services?
<p>Financial risks</p> 	<p>CAT insurance & bonds</p> <p>Weather-indexed insurance and derivatives</p> <p>Regional Catastrophe Insurance Facilities</p> <p>Other emerging products</p>	<p>Government</p> <p>Companies</p> <p>Individuals</p> <p>Other</p>	<p>Historical and real-time data (Fundamental for development of these markets!)</p> <p>Seasonal to inter-annual climate forecasts</p> <p>Decadal climate trend analysis</p> <p>Long term trend analysis (long-term market strategy)</p>



WMO in cooperation with nearly 20 UN and international agencies and their network of experts has facilitated the documentation of Good Practices and Guidelines on Institutional Partnerships in Early Warning Systems with Multi-Hazard Approach

Guidelines on Institutional Aspects EWS with Multi-Hazard Approach
Planning, legislative, financing, Institutional Coordination and Roles of NMHS

Synthesis of First set of 7 Good Practices (4 more in the pipeline)
Role of National Metrological and Hydrological Services

Japan
Multi-Hazard
Early
Warning
System

Bangladesh
Cyclone
Preparednes
s
Programme

Cuba
Tropical
Cyclone
Early
Warning
System

**France
and FWI**
“Vigilan
ce
System
”

Shanghai
Multi-Hazard
Emergency
Preparednes
s
Programme

USA
Multi-Hazard
Early
Warning
System

Germany
The
Warning
Management
of the
Deutscher
Wetterdienst

“Guidelines on institutional partnership and cooperation in Multi-Hazard Early Warning Systems” being published in 2010

Next Phase: Concept of Operations



Guidelines and Knowledge Products

Multi-Hazard Early Warning Systems

- **Target Hazards:** Droughts, Flash and river floods, heat and cold waves, Marine and aviation hazards, Strong winds and severe storms, Tropical cyclones and storm surges, sand and dust storms, etc.
 - **Activities:**
 - Documentation of national good practices and lessons learned – **Completed**
 - Guidelines on institutional cooperation and coordination in EWS – **Completed**
 - Guidelines on operational monitoring, warning and service delivery (2012-2015)
 - **Partner agencies:** World Bank, UNDP, International Humanitarian agencies, IFRC, Regional and global specialized meteorological centers centers, National Met and Hydro Services, Disaster Risk Management agencies, etc.
 - **WMO Expert Advisory Group on Multi-Hazard EWS established in 2007** - will further expand and continue in 2012-2015
-



Guidelines and Knowledge Products

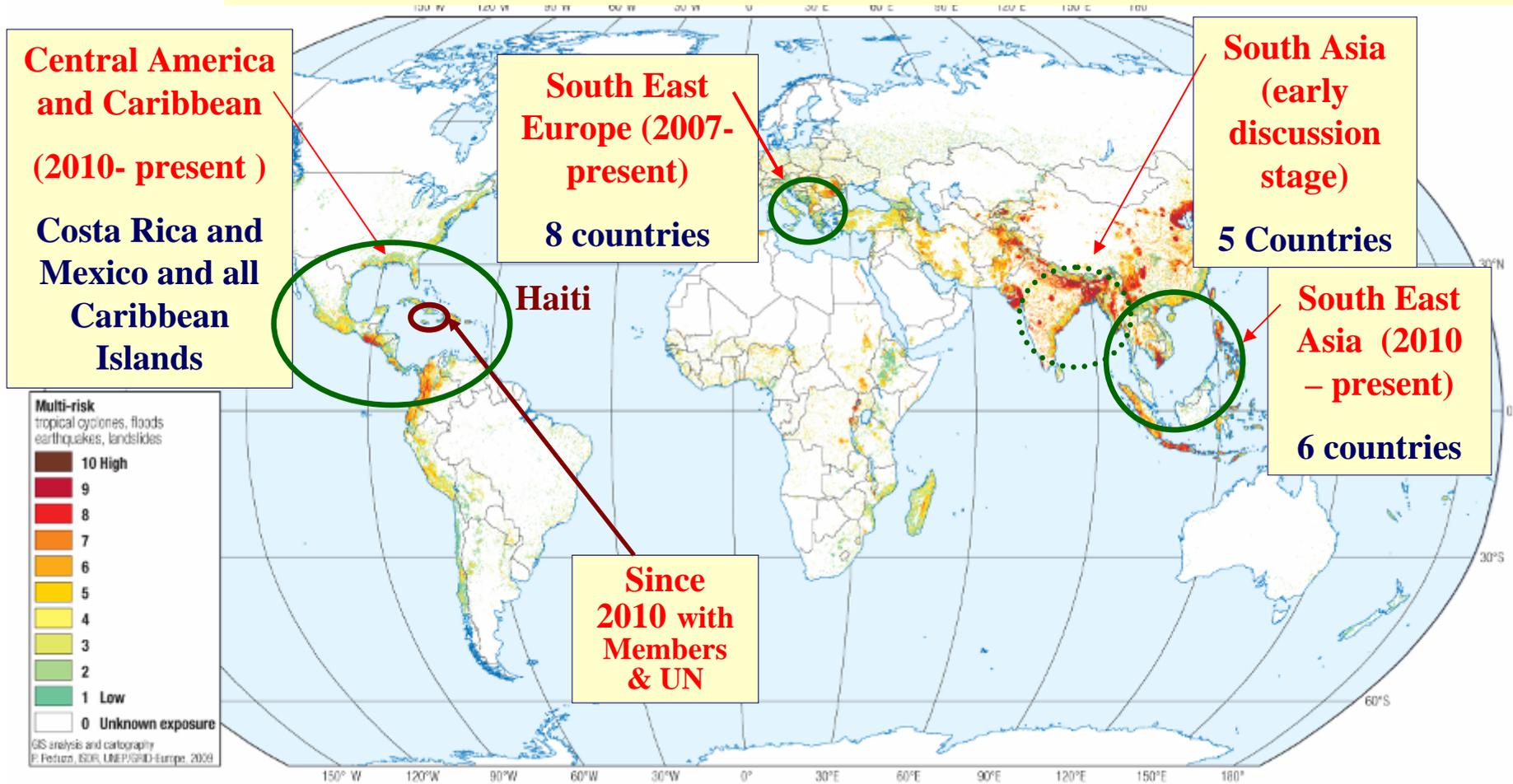
Met/Hydro/Climate Services for International Humanitarian Agencies

- **Activities:**
 - Identification of needs and requirements for meteorological, hydrological and climate services
 - Identification and development of the services
 - Pilot projects to develop operational cooperation between these agencies and the WMO operational network at regional and national levels
 - **Partner agencies:** UN-OCHA, UNOOSA, WHO, WFP, UN-HCR, IFRC, UNDP, UNITAR/UNOSAT, UNICEF and the WMO Operational network
 - **WMO Inter-commission Task Team on Services for Humanitarian Agencies established in 2009**
-



Comprehensive Capacity Development DRR and Adaptation Projects Underway

Partners: WMO, World Bank, UN-ISDR, UNDP, Regional Socio-economic Groupings and regional DRR agencies, Regional Centers, WMO Regional Association, NMHS, National DRM agencies and economic line ministries





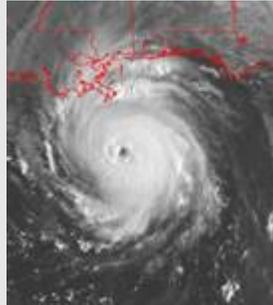
III: New challenges for WMO and International Partners on Disaster Risk Reduction and Management

Some examples

hours days weeks months seasons years



Thunderstorms



winter storms, hurricanes



floods



heat waves

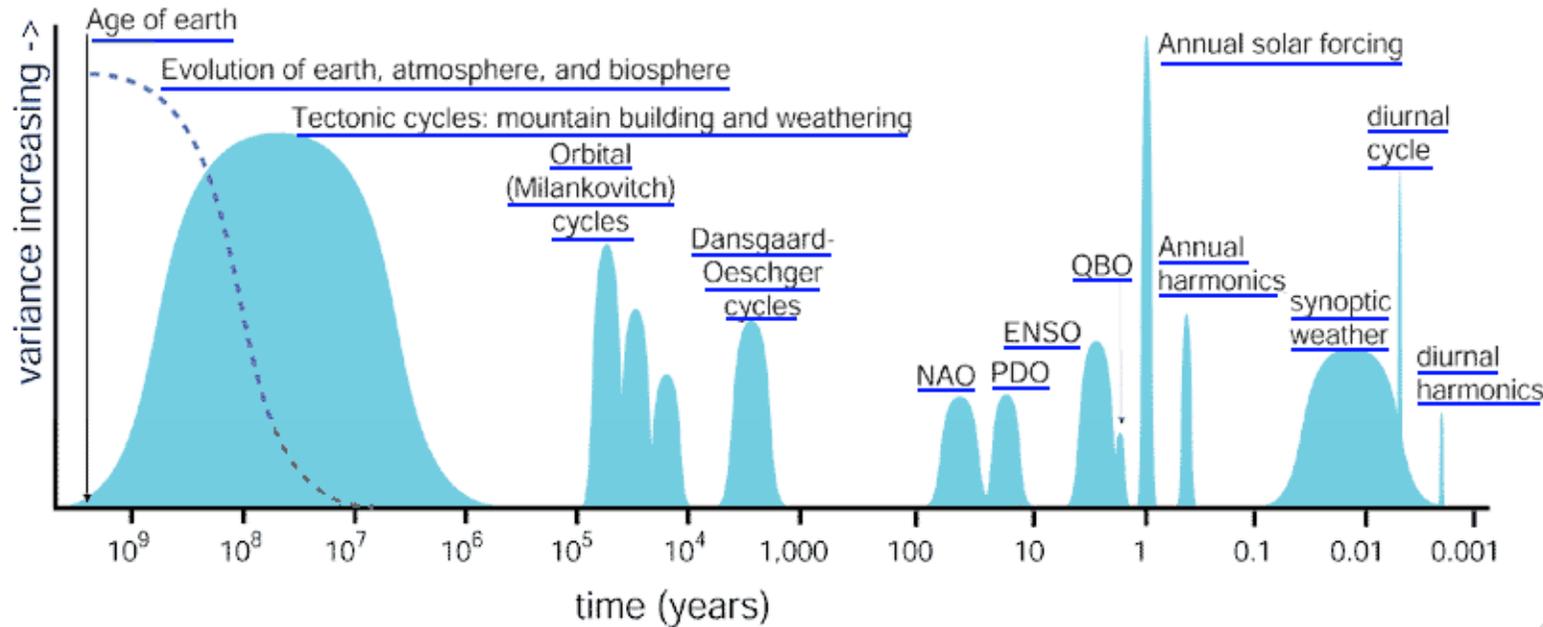


snow

From Gerhard Muller,
Federal Office of Meteorology and
Climatology MeteoSwiss

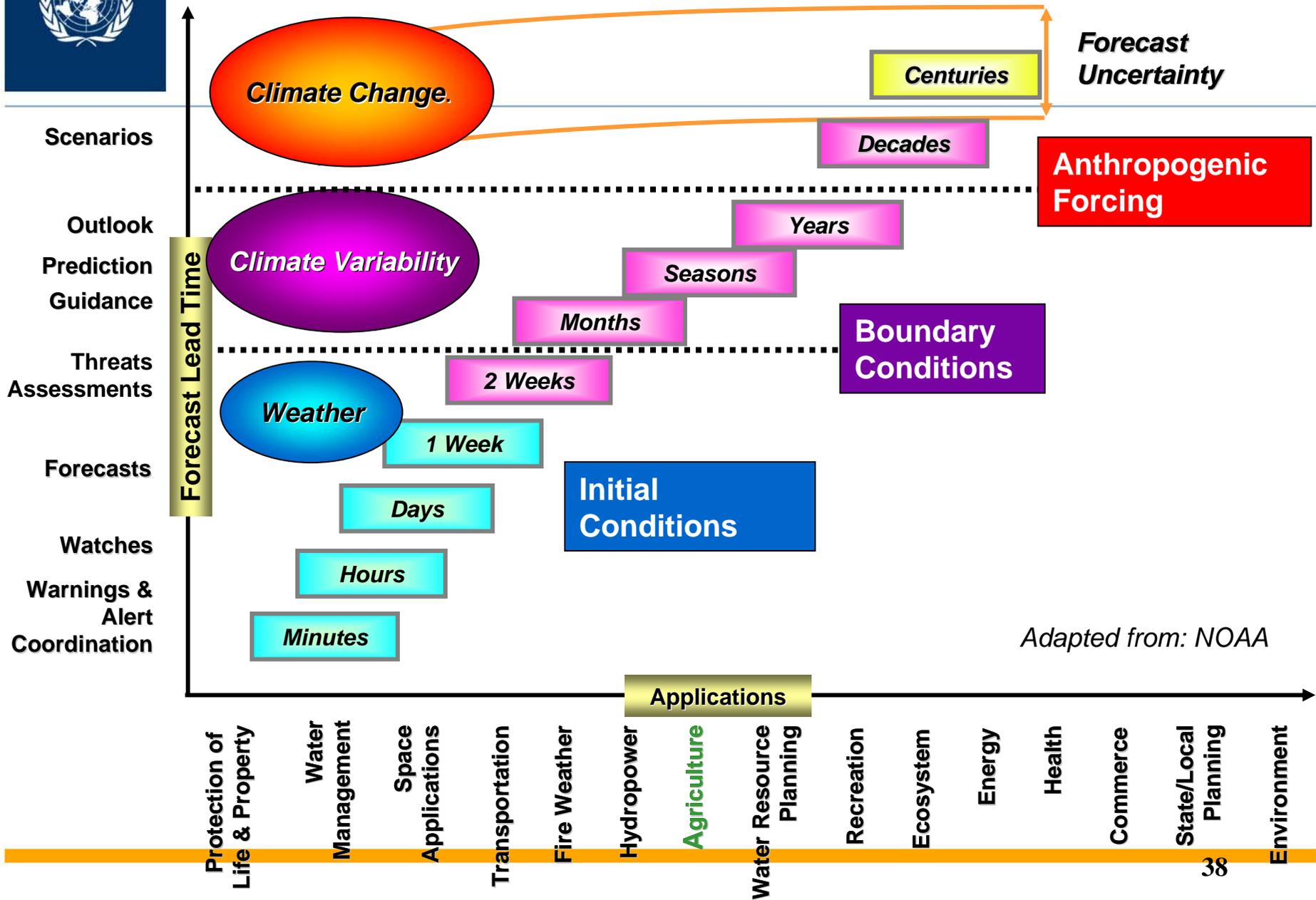


Global Change





WIGOS-support of Seamless Prediction and broader services Framework



The Perfect Storm



Sean R. Heavey

SAOMAI

2006-08-08-1657(UTC)

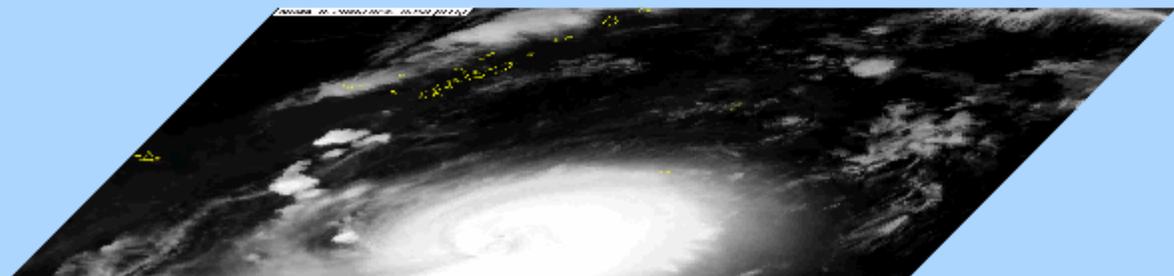
100hPa

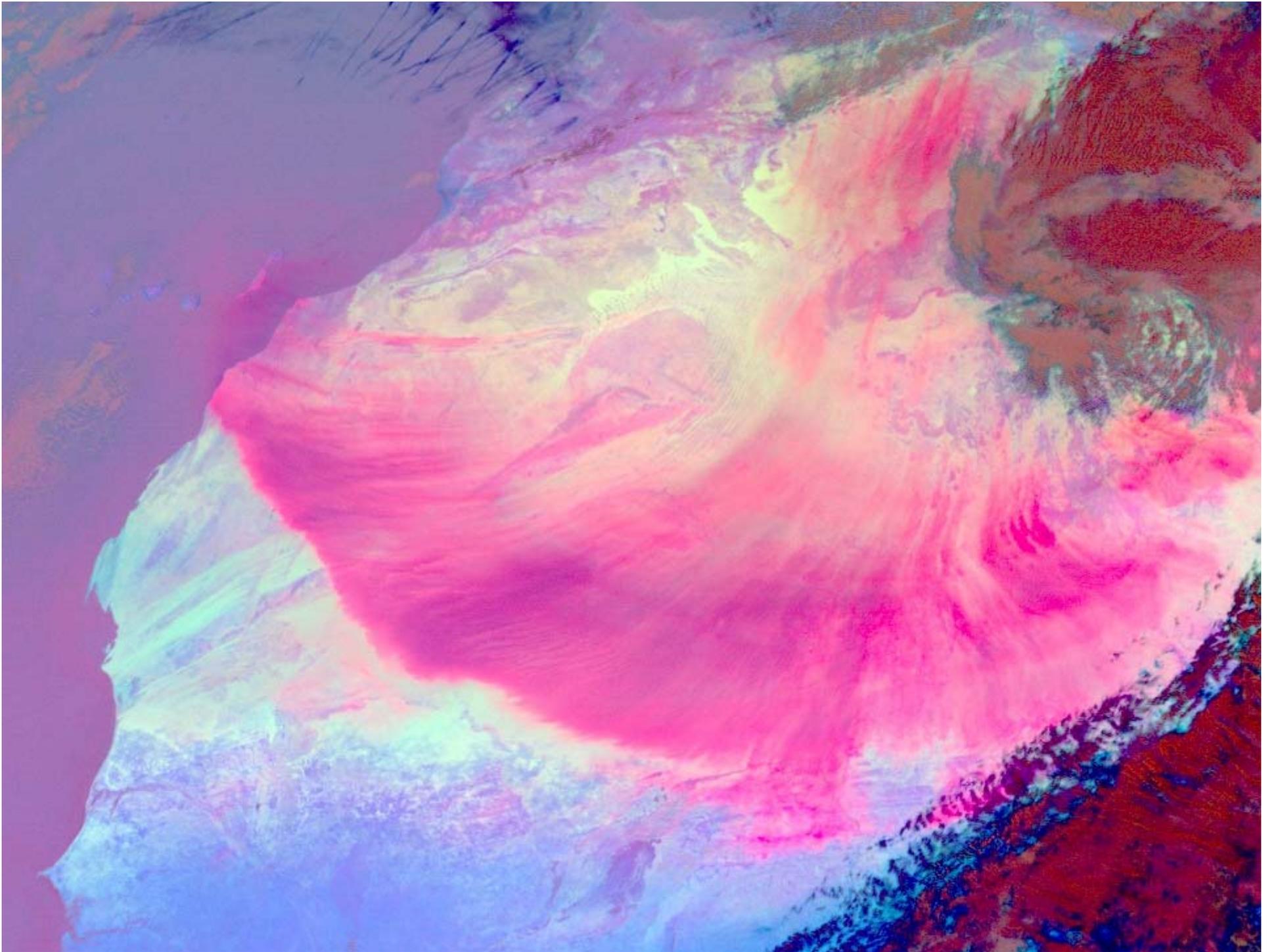
150hPa

250hPa

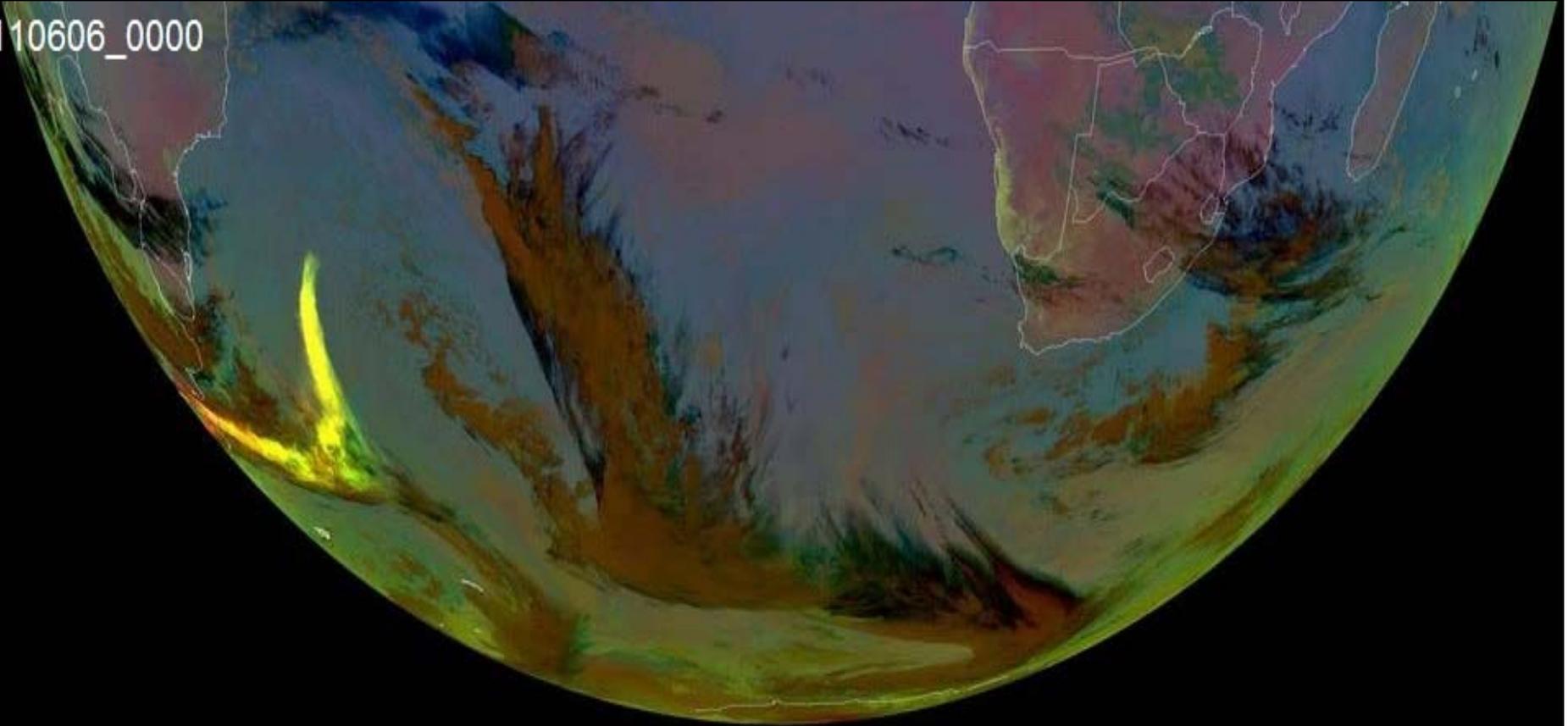
500hPa

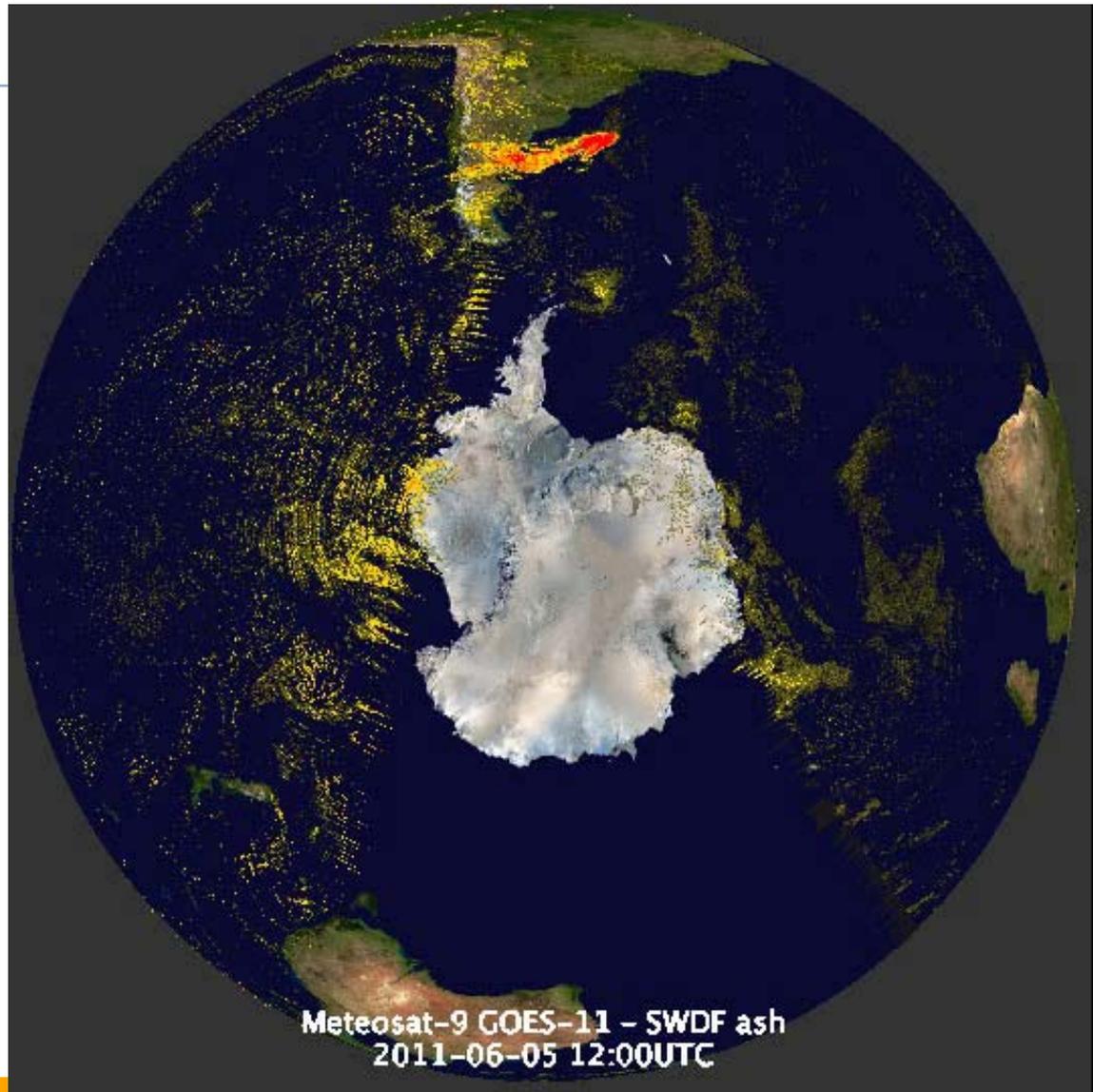
850hPa



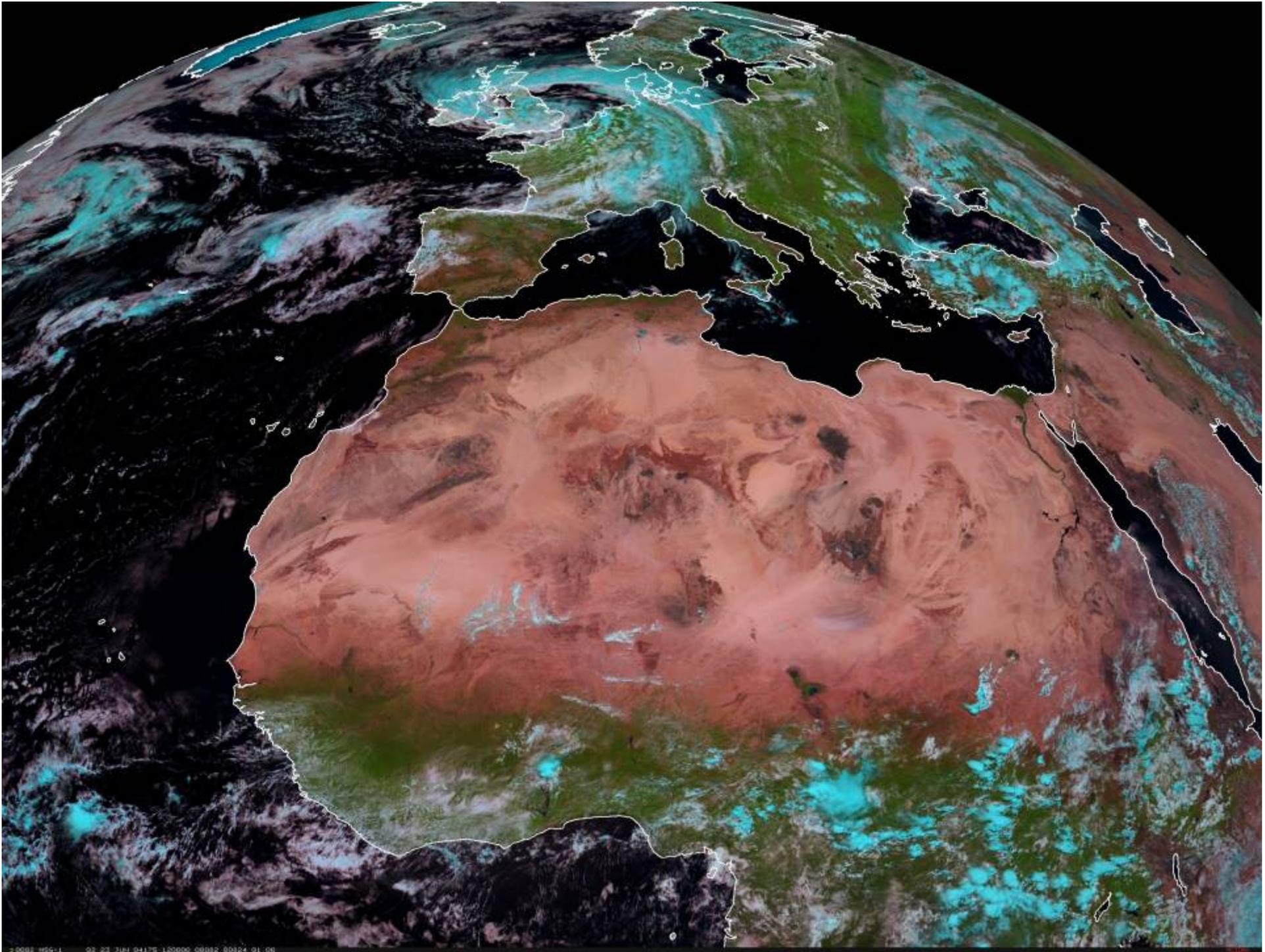


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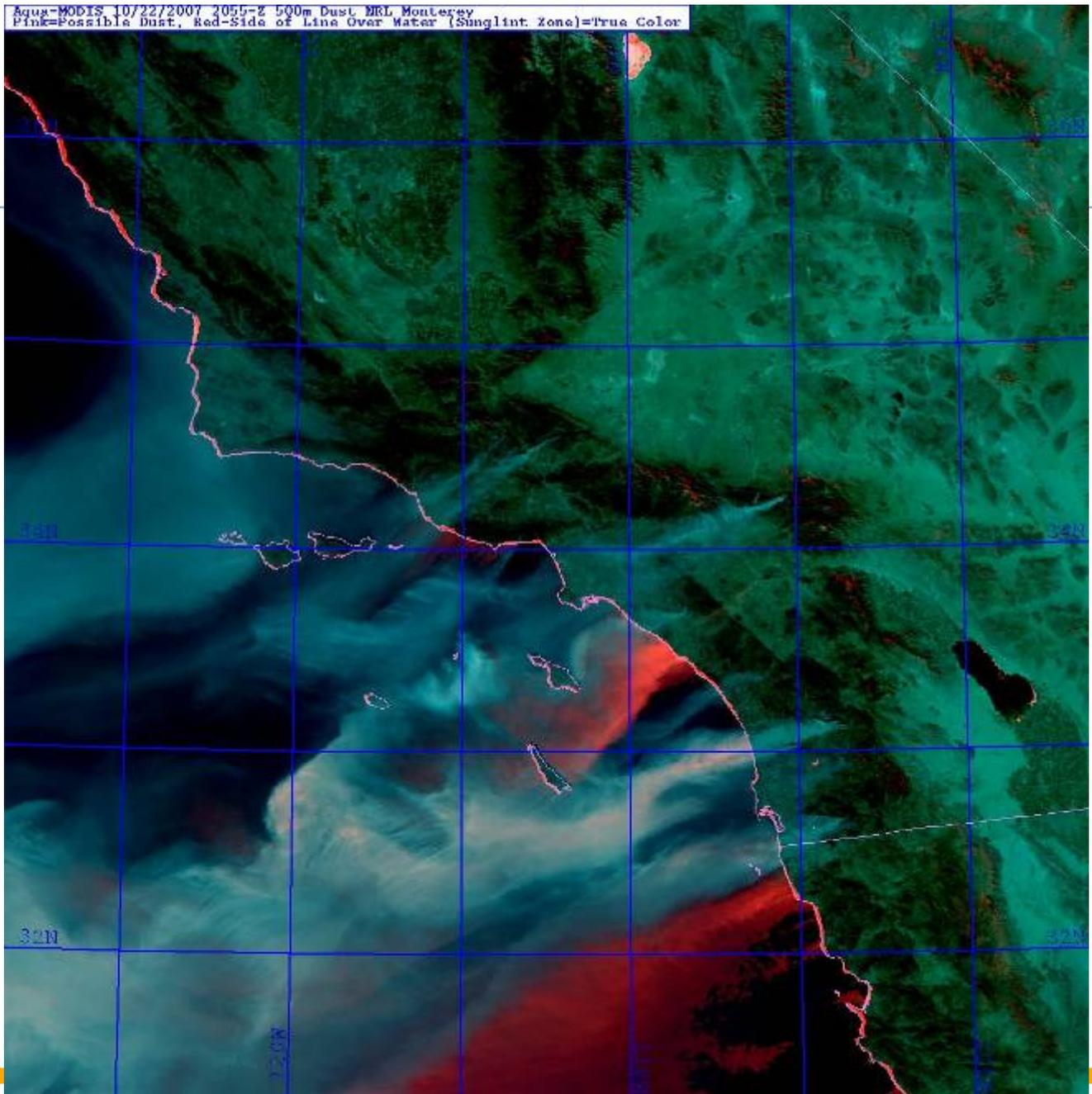


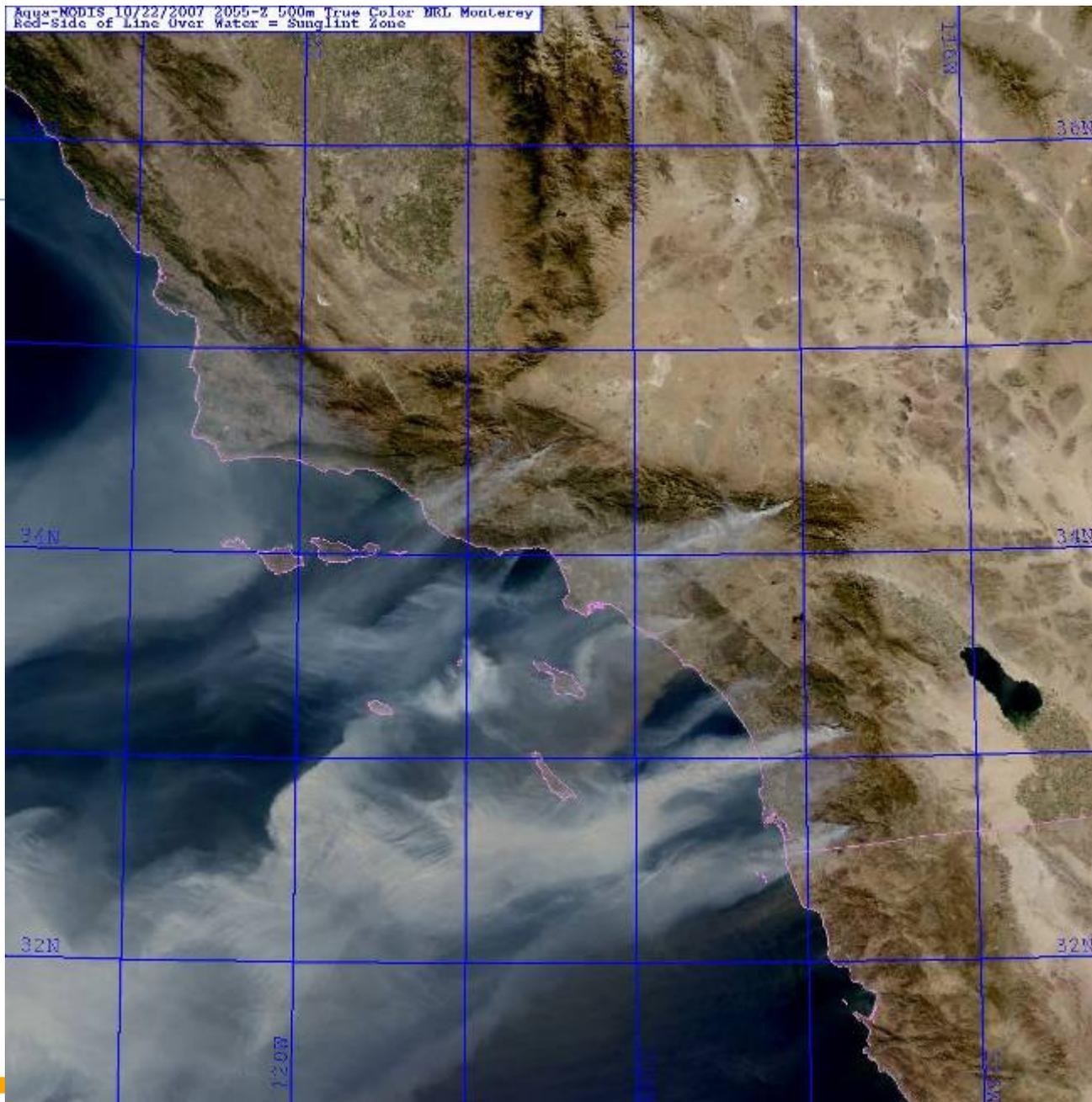
Meteosat-9 GOES-11 - SWDF ash
2011-06-05 12:00UTC

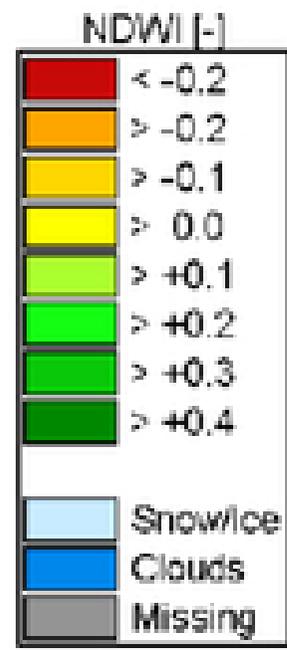
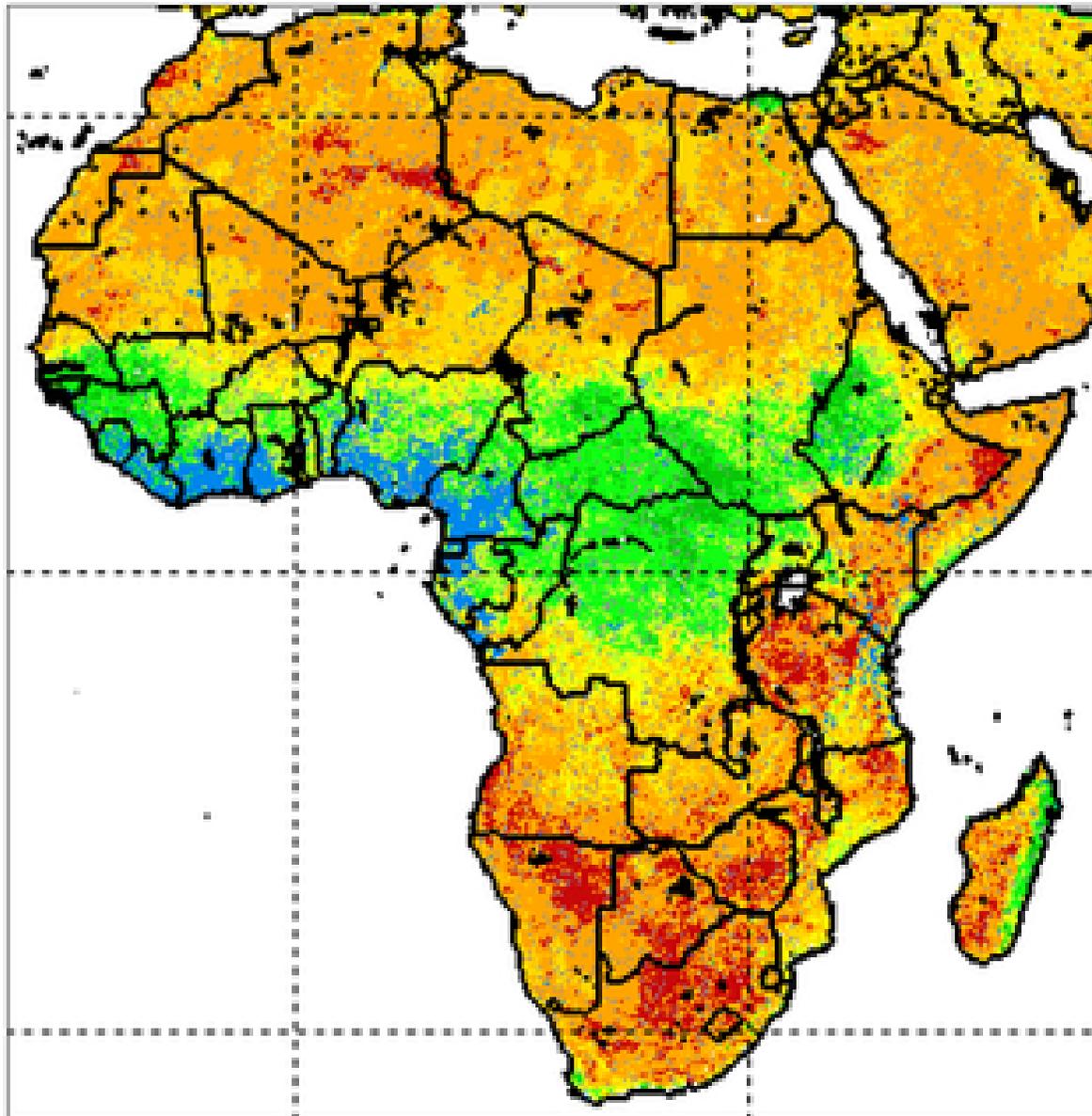




Aqua-MODIS 10/22/2007 2055-2 500m Dust BRL Monterey
Pink=Possible Dust, Red-Side of Line Over Water (Sunlint Zone)=True Color

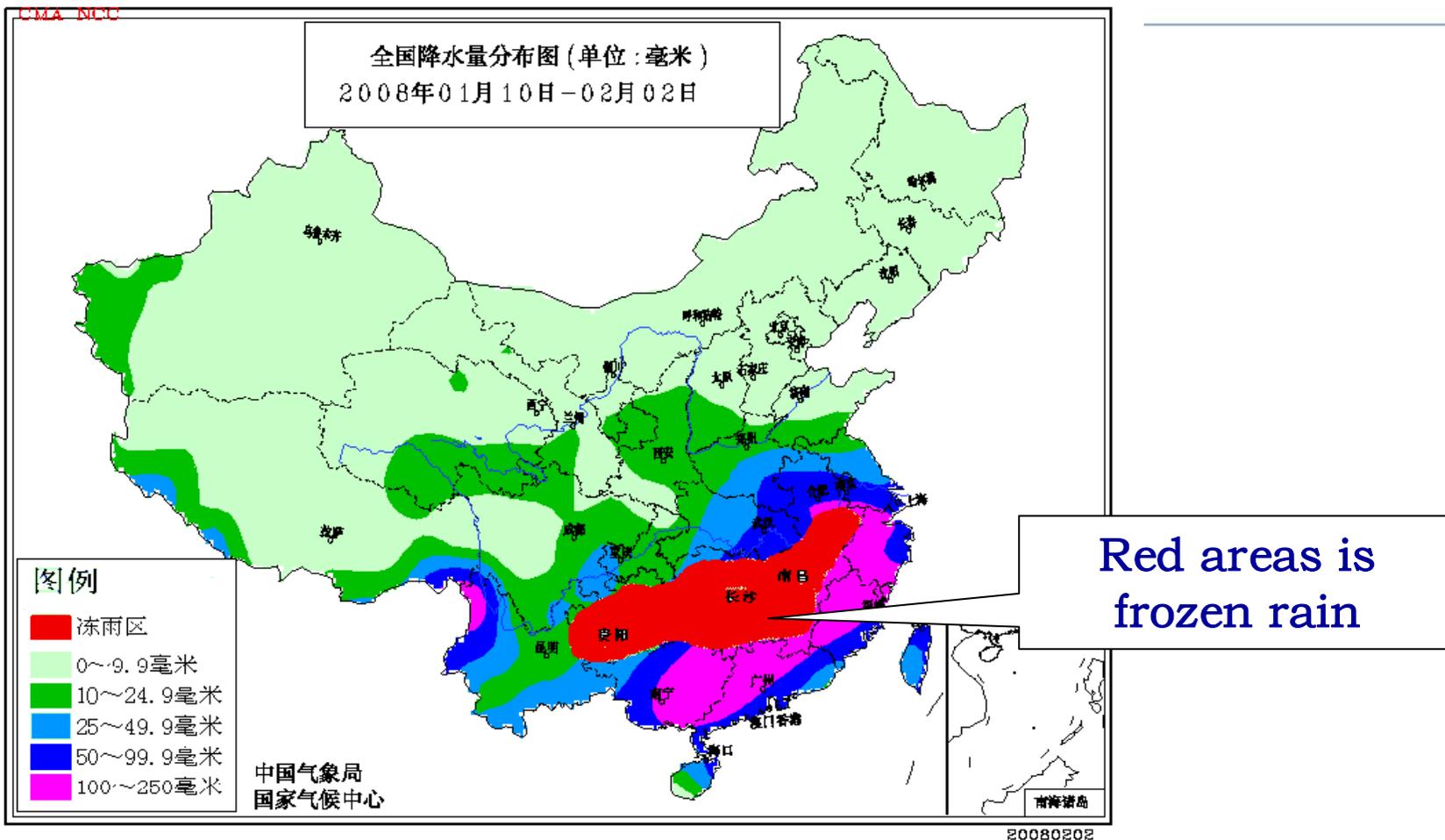








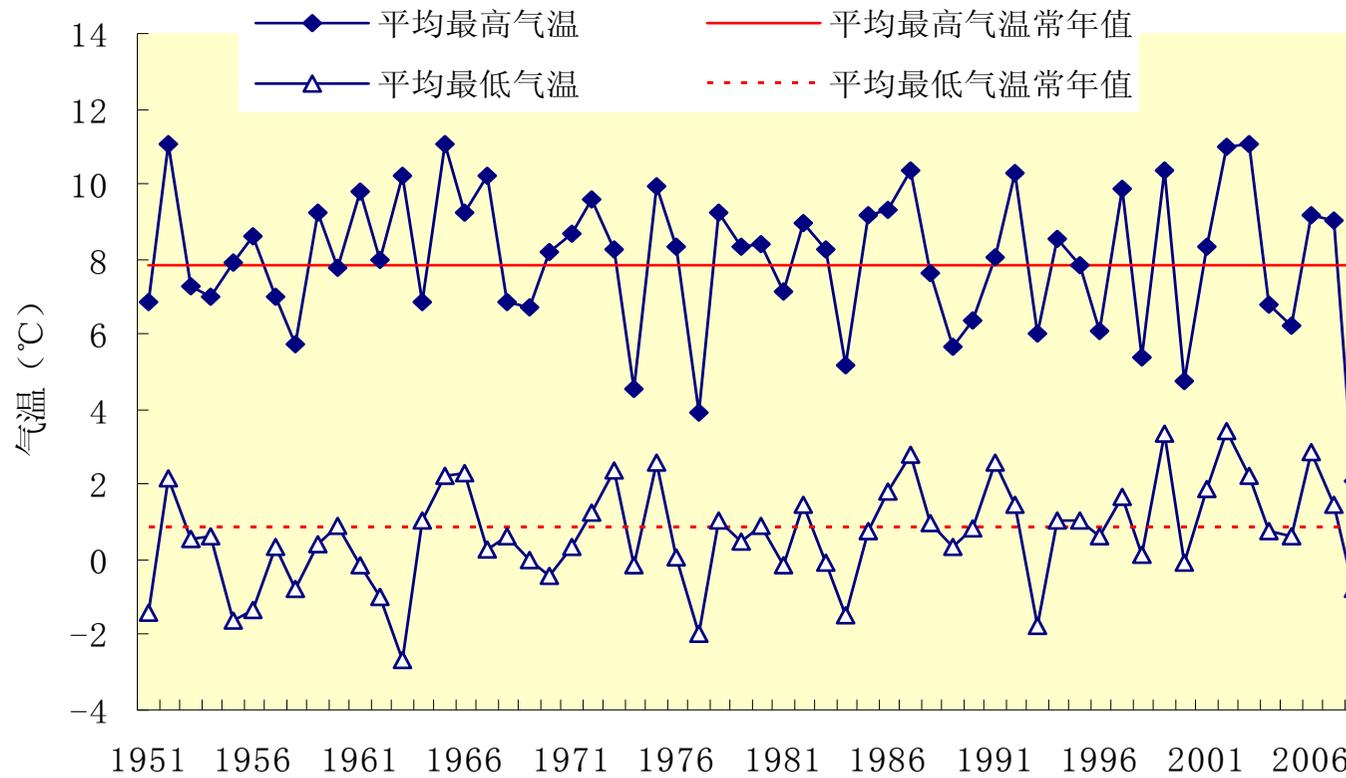
Jan. 10 - Feb 2, 2008, cold climate and above average rainfall



气象灾害呈现多发、并发



50 years lowest temperature in historical records



Lowest in 50 years

Jan 10 - Feb 1 average temperatures

above: average max

below: average min



冰雪贵州005









众志成城



众志成城



众志成城







冰雪贵州021





冰雪贵州012



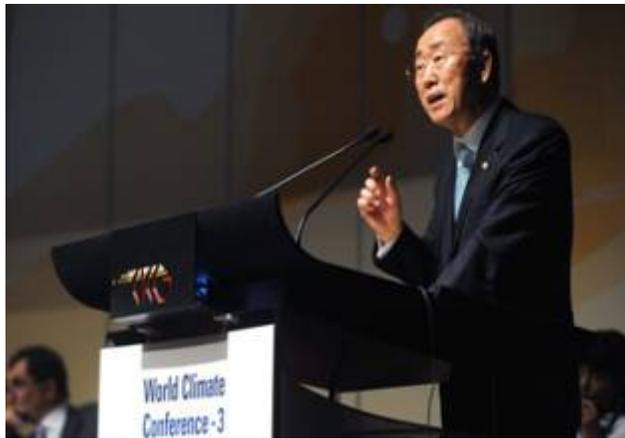




Climate Service Priority

- Due to unable predicting the climate trend (long-lasting cold weather), Direct economic loss exceed 100 Billion RMB, more than 100 people died;
- Similar cases happen every year around the world
- 10 – 30 days forecasts and seasonal to inter-annual climate prediction are WMO

Members **priorities!**



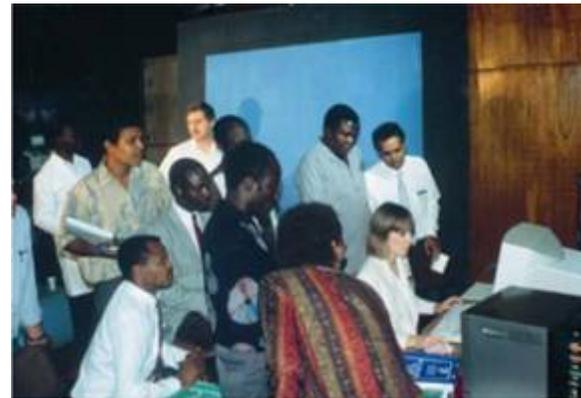
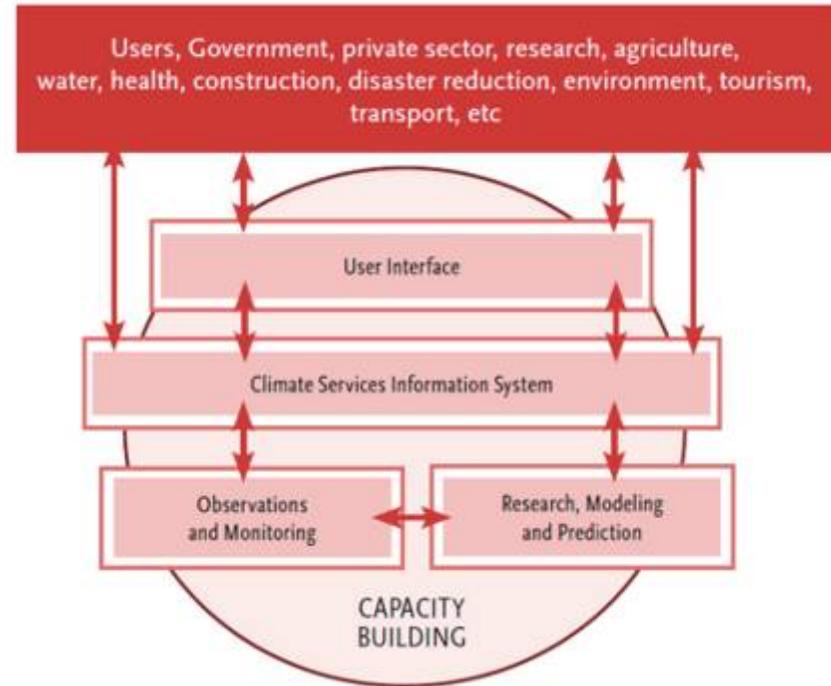
A historic event





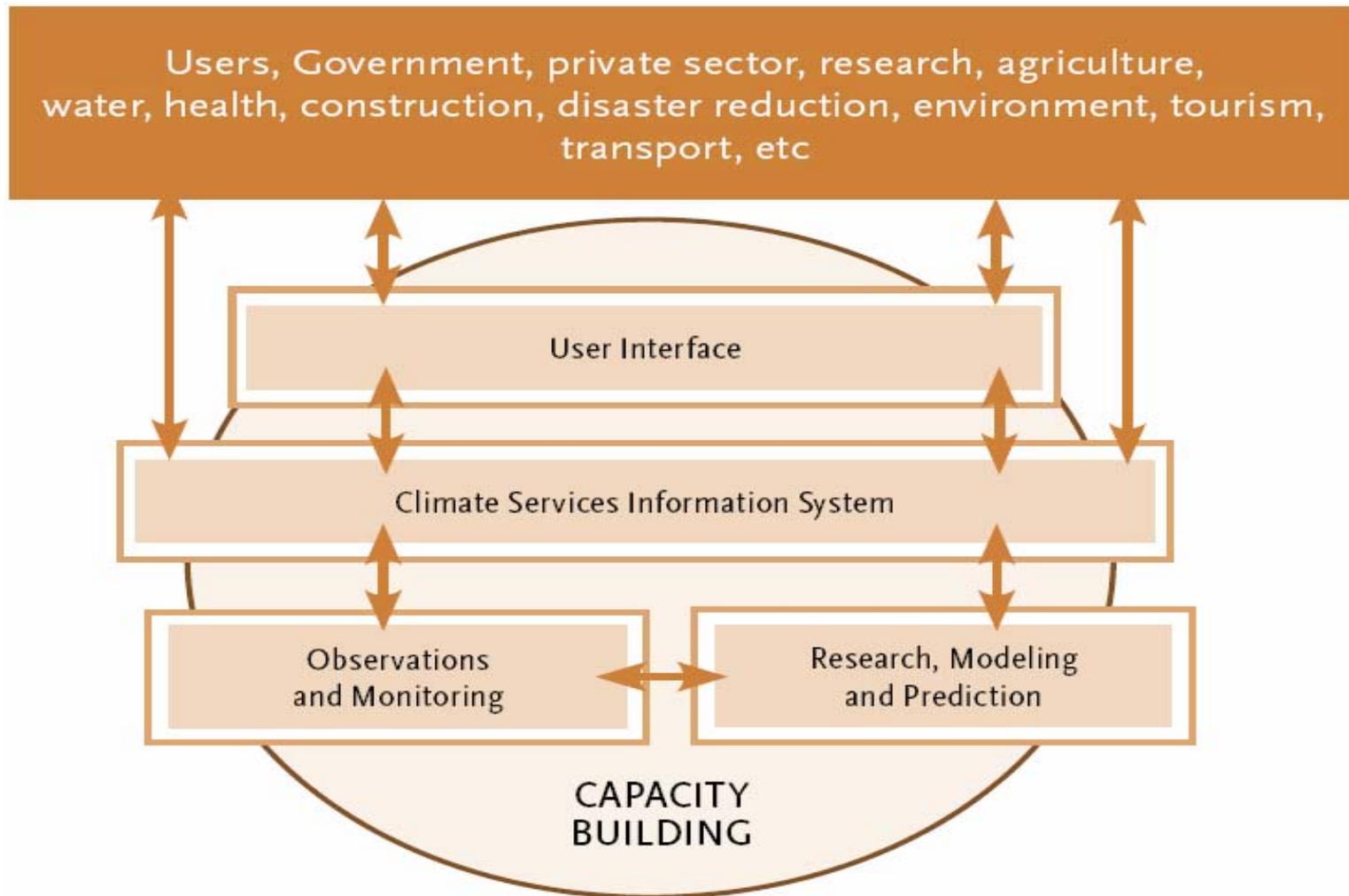
WMO Cg Decision on key priorities for 2012-2015

- ✓ **Global Framework for Climate Services (GFCS)**
- ✓ **Capacity building**
- ✓ **WIGOS/WIS**
- ✓ **Disaster Risk Reduction**
- ✓ **Aeronautical meteorology**





The vision of the GFCS





GFCS Priorities

All sectors to be tackled but in the first four years the GFCS is proposing giving priority to:

- Agriculture
- Disaster risk reduction
- Water
- Health





WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

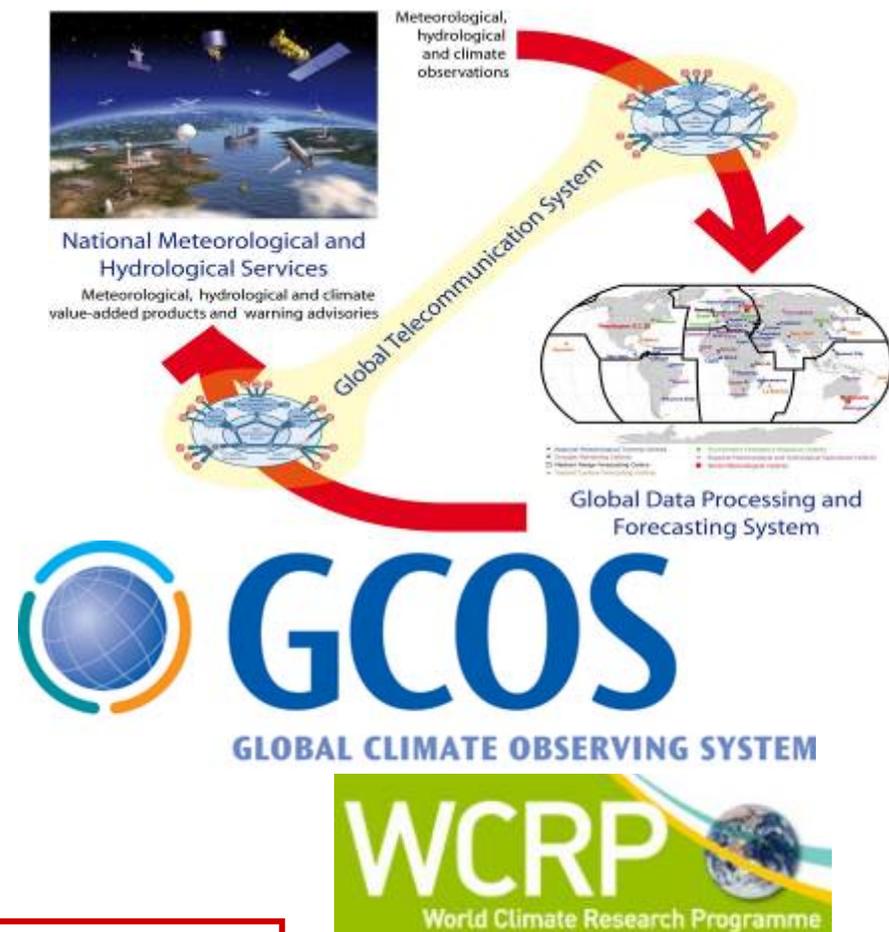
The whole is more than the sum of the parts--Aristotle





The contribution of WMO to the Development of GFCS

- GFCS is a global collective effort being built in collaboration with UN family, partners and stakeholders
- WMO with its Members, bodies and co-sponsored programmes will provide only a component needed to build the framework



Partnerships are key for success of GFCS



data

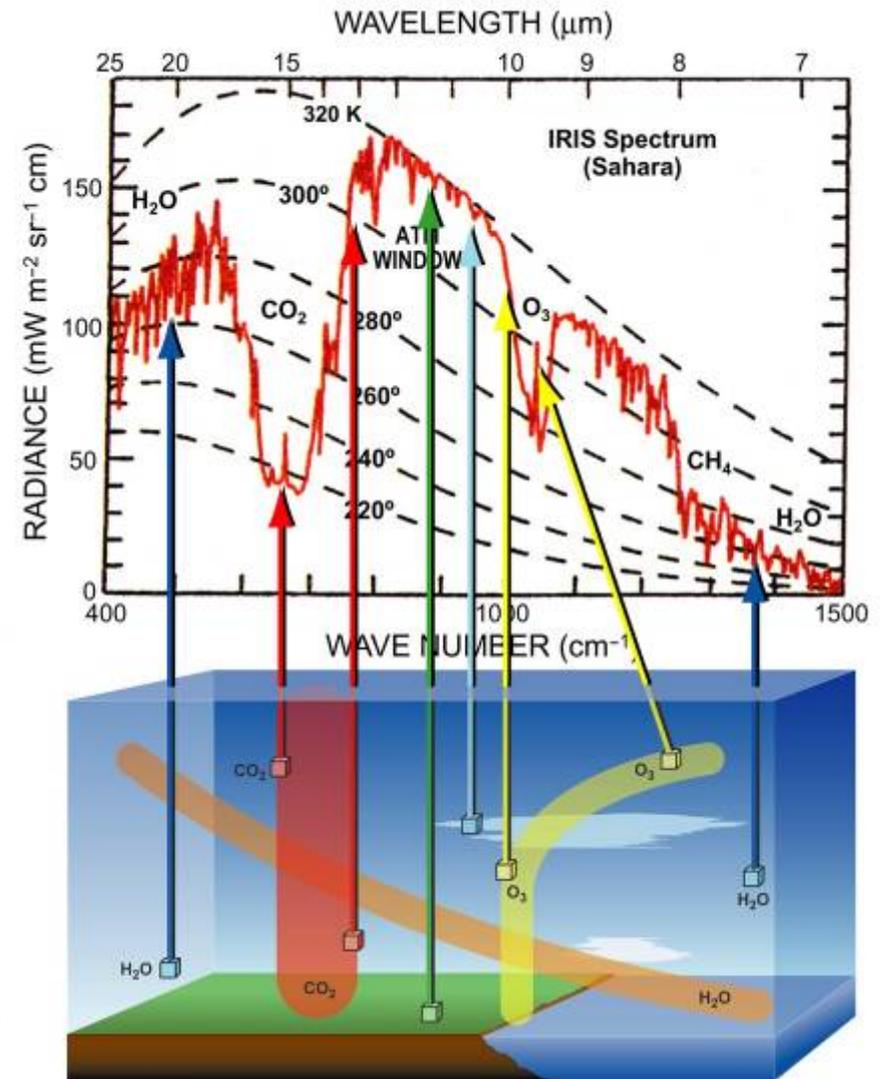
products

information

knowledge

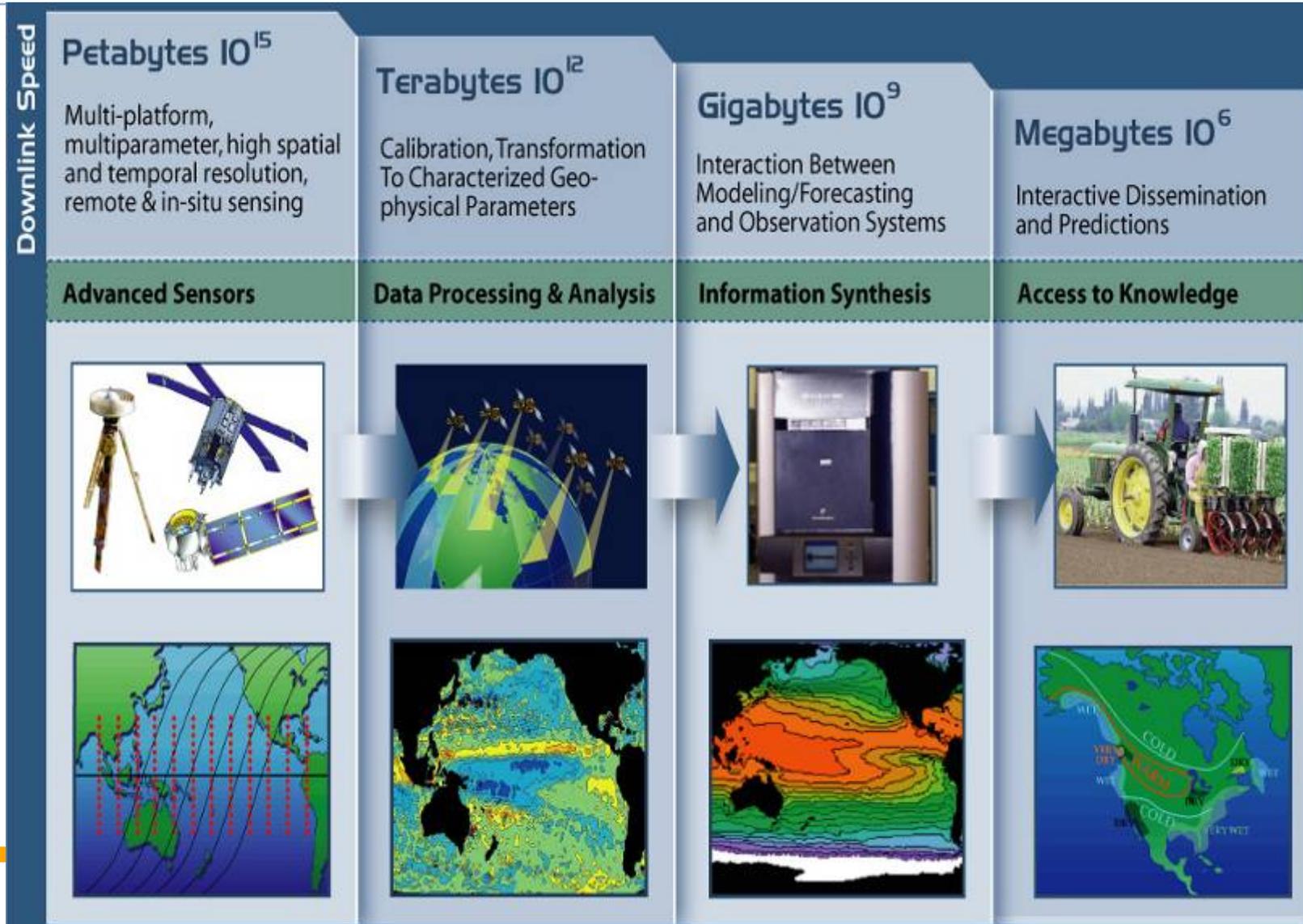
- **Great challenges:**

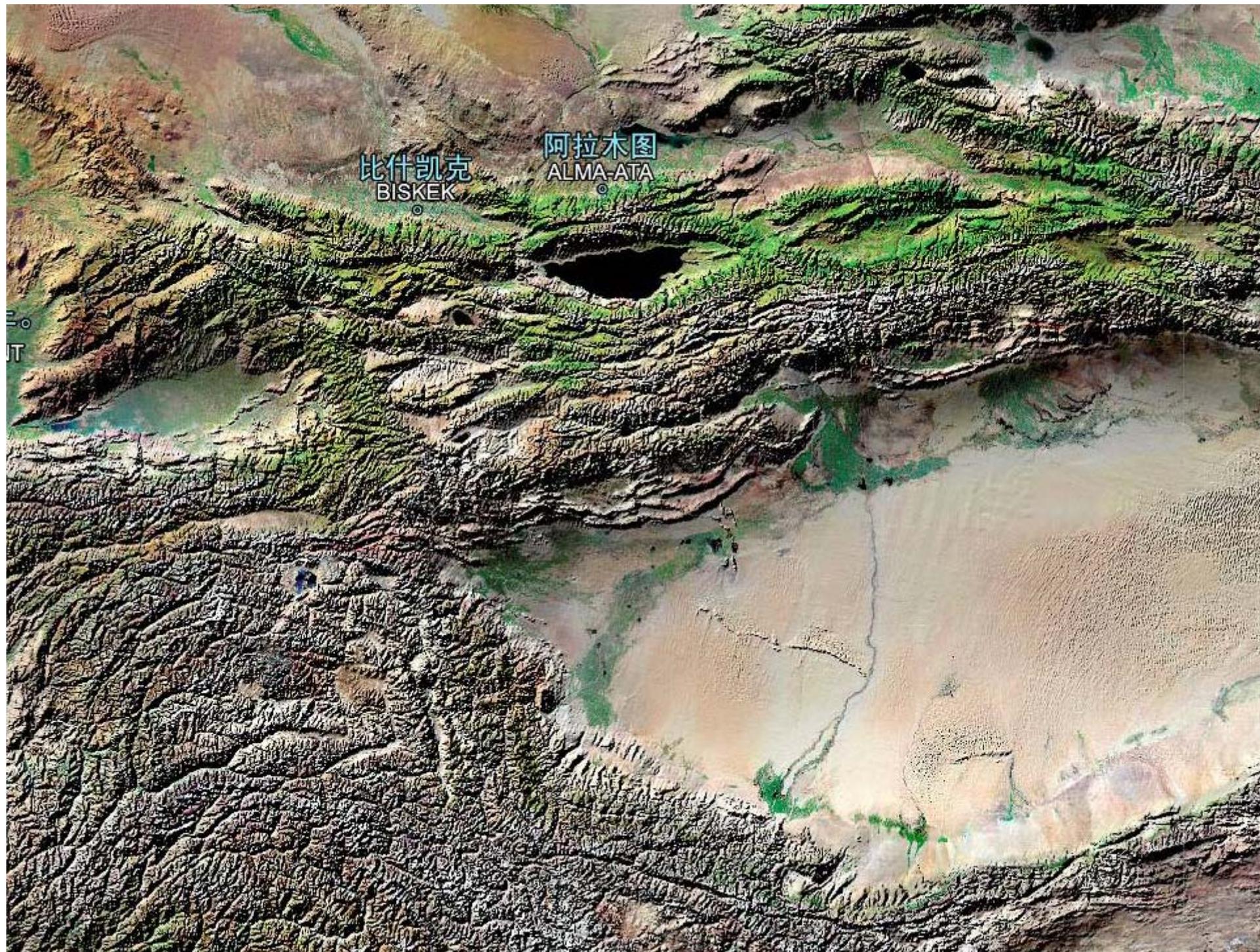
- Sciences
- Technologies
- Coordination
- Collaboration
- Cooperation
- Resources
-





Need Great Global Consolidation Efforts





比什凯克
BISKEK

阿拉木图
ALMA-ATA



Cooperation with technical and EWS stakeholders in context of different hazard Types

Increasing level of operational coordination with primary coordinators of emergency preparedness and response



Type I	Type II	Type III
Hazard fully under the mandate of NMS	Hazard under joint mandate of NMS with another technical agency (e.g., NHS)	Hazard under mandate of other agencies but NMS contribute
e.g. strong winds, strong rainfall, snow/ice, hail, tropical cyclone	e.g. floods, landslides, heat/health etc.	e.g. locust, health epidemic, man-made hazards



Increasing Level of operational coordination and cooperation with other national technical and sectoral agencies for early detection, monitoring and development of warnings



Thank You

For more information please contact:

Dr Maryam Golnaraghi

Chief of Disaster Risk Reduction Division

World Meteorological Organization

7 bis, Avenue de la Paix

P.O. Box 2300

CH-1211 Geneva, 2, Switzerland

Tel: (+41 –22) 730-8006

Fax: (+41 –22) 730-8128

Email:disasters@wmo.int



<http://www.wmo.int/disasters>



Guidelines and Knowledge Products

Meteorological and Climate Services for Insurance and Financial Risk Transfer (FRT) Markets

- **Activities:**
 - Identification of needs and requirements of target segments
 - Identification and development of services
 - Training and capacity development programmes of NMHS
 - Operational cooperation among research, operational services and the sector
 - International Symposium on Meteorological and Climate Services for FRT - 2012
 - **Partner agencies:** World Bank, WFP, IFAD, UNEP-FI, UNFCCC, UN-ISDR, CCRIF, Private Sector associations and companies, Regional and global specialized meteorological centers centers, National Met and Hydro Services, experts from academia, etc.
 - **WMO Expert Advisory Group on Financial Risk Transfer is being established** with the meeting in December 2011.
-

Space-based Global Observing System

