



World Meteorological Organization

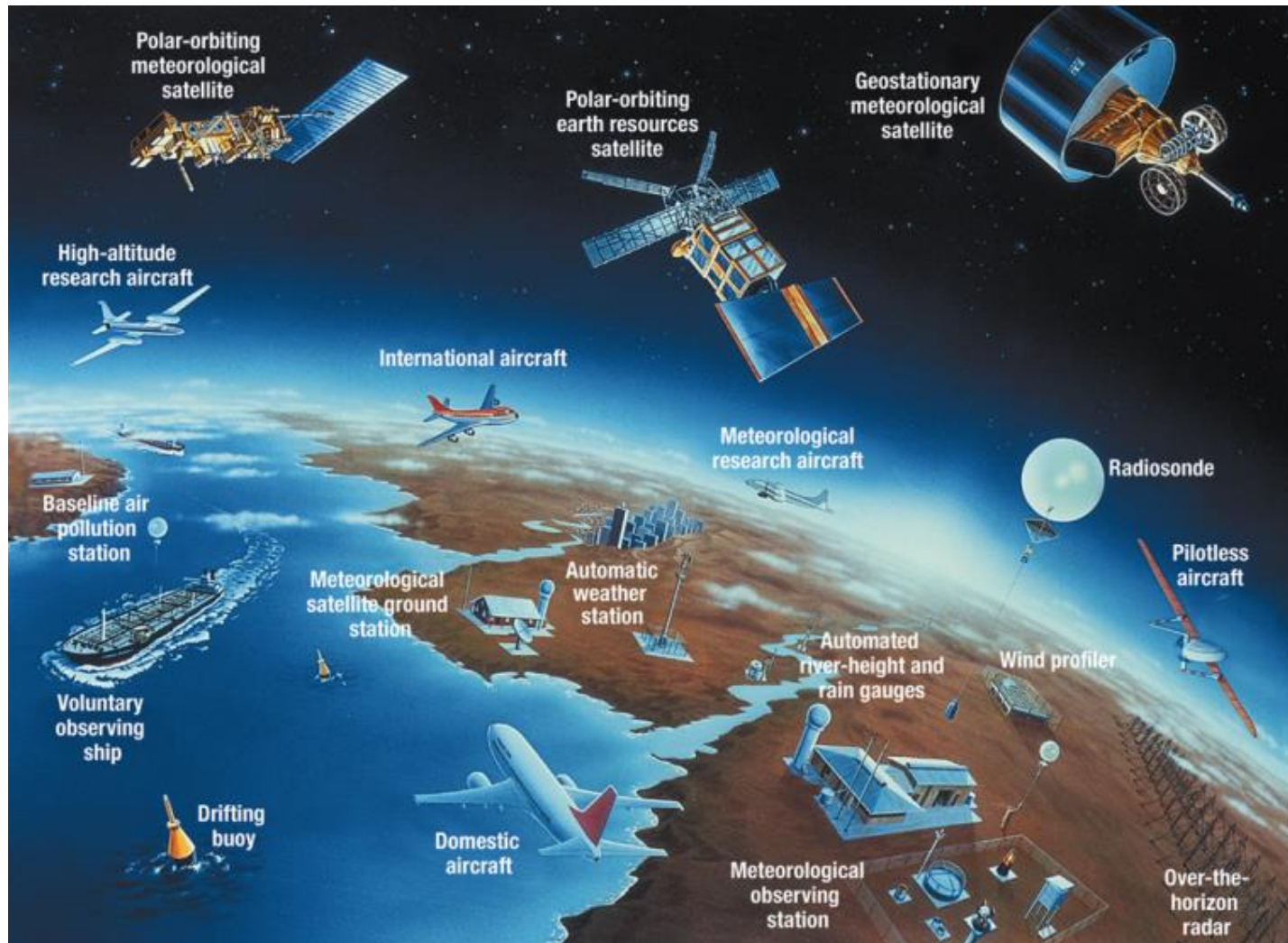
Weather • Climate • Water

# The World Meteorological Organization: addressing the challenges of weather extremes and climate change

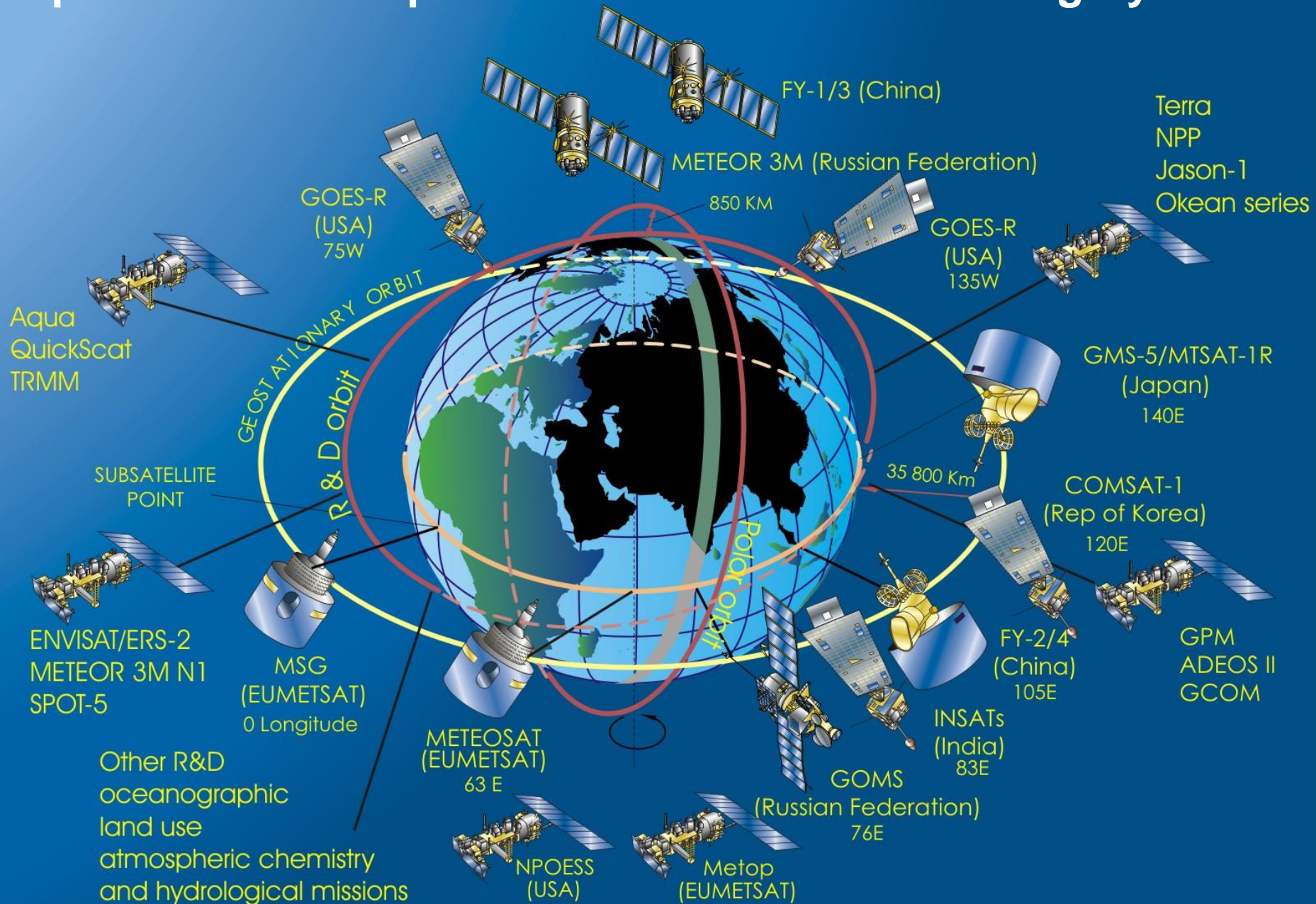
M. Jarraud  
Secretary-General

CERN – 7 May 2015

# WMO Global Integrated Observing System

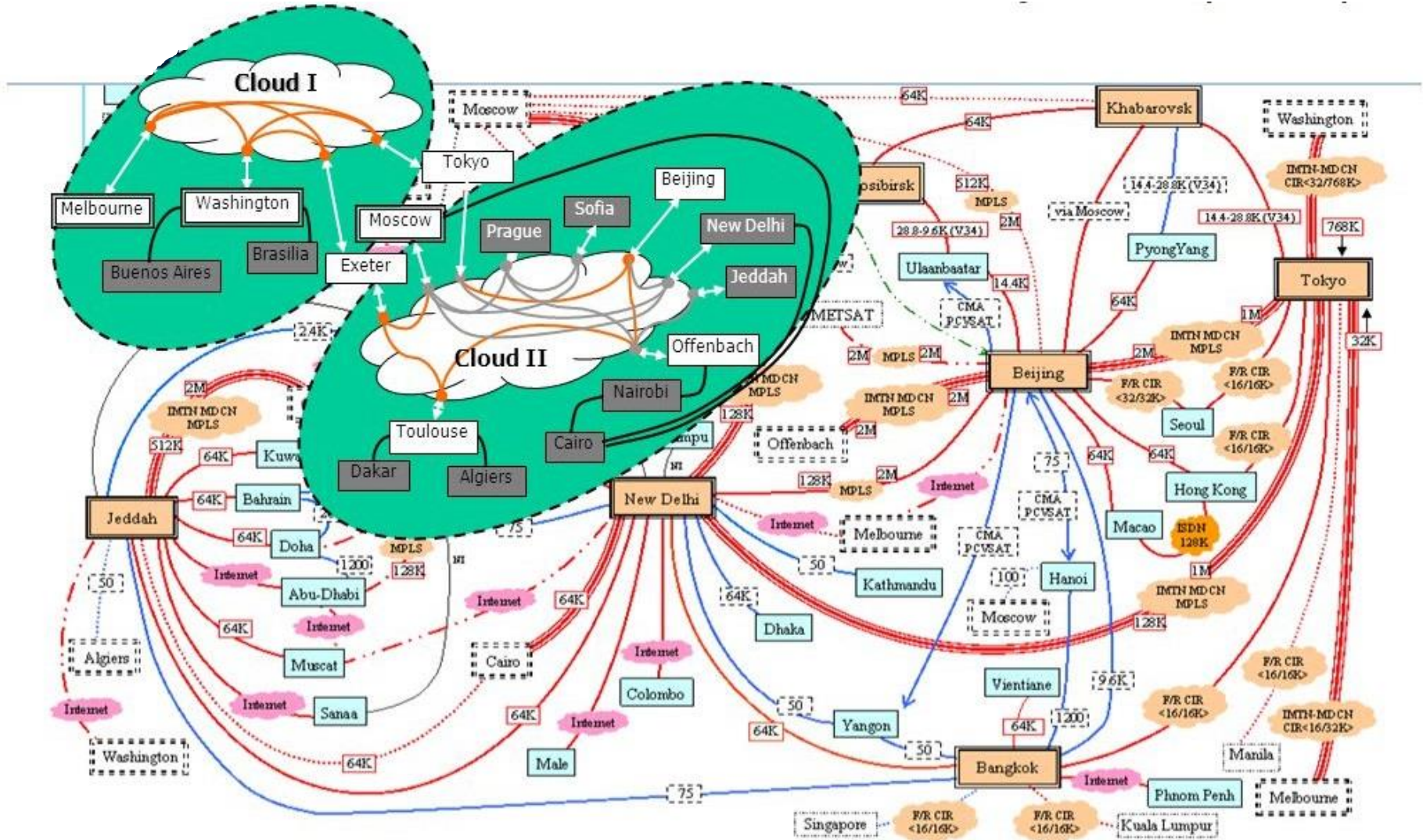


# Space-based component of the Global Observing System

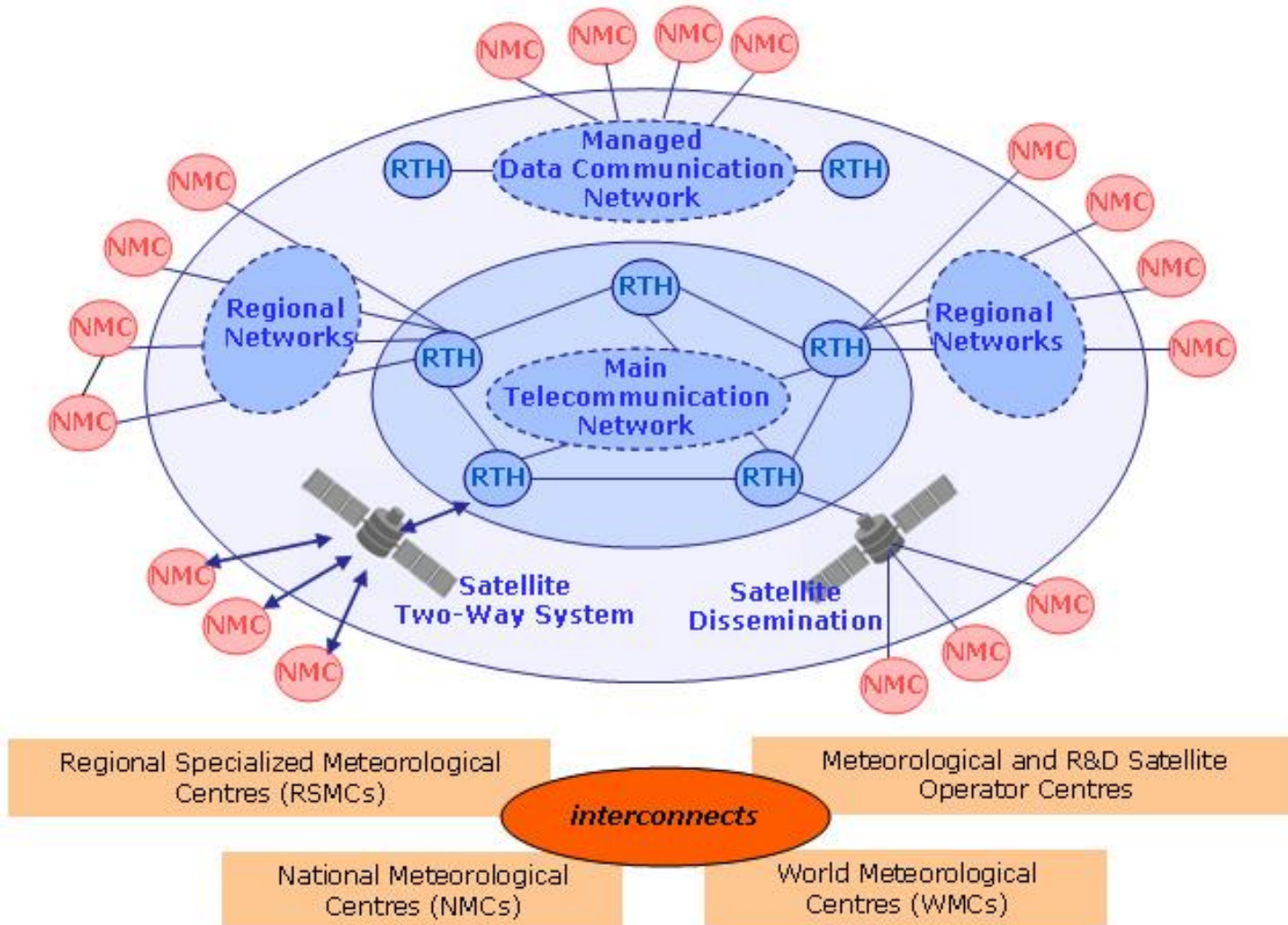




# WMO Global Telecommunication System



# WMO Information System





# WMO programmes

World Weather Watch

Global Atmosphere Watch

World Weather  
Research Programme

Hydrology and Water  
Resources Programme

World Climate  
Programme

World Climate  
Research Programme

Marine Meteorology  
and Oceanography

Information and Public Affairs

Regional Programme

WMO Space Programme

Public Weather  
Services Programme

Agricultural Meteorology  
Programme

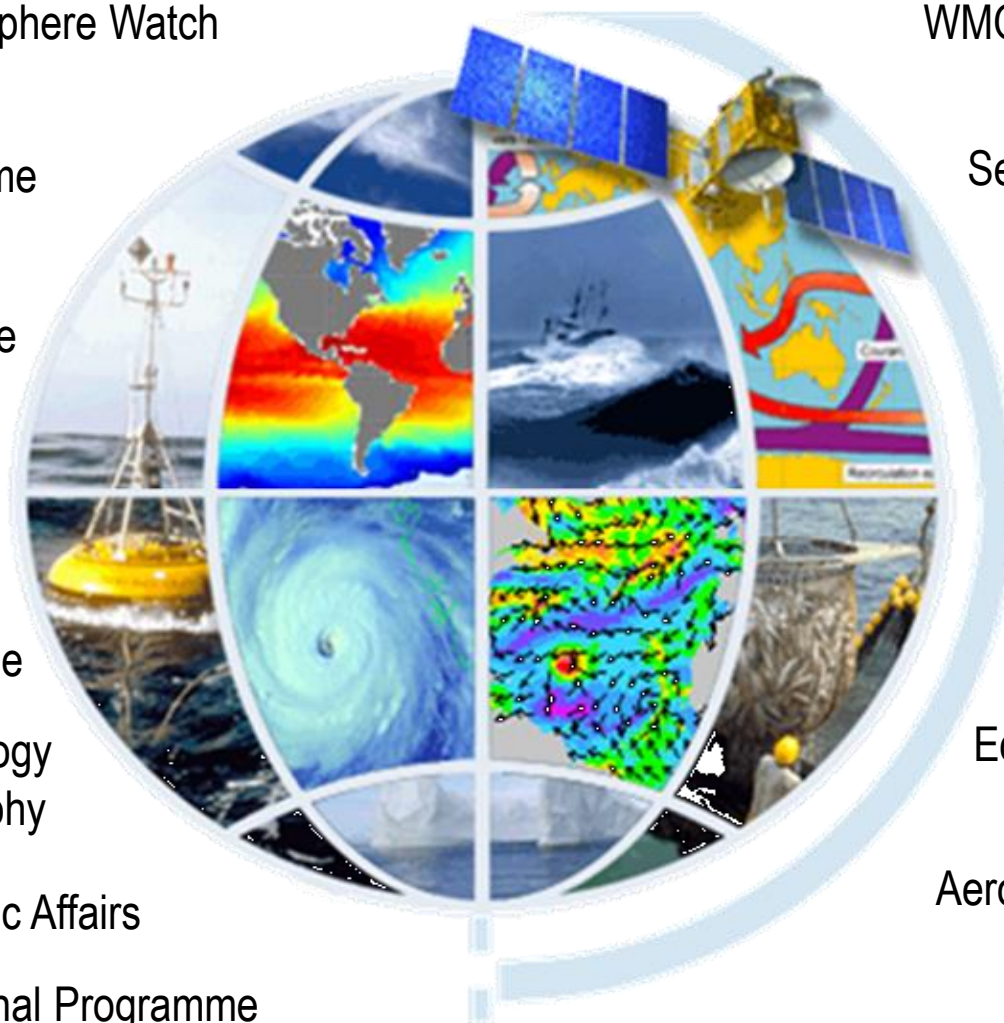
Tropical Cyclone  
Programme

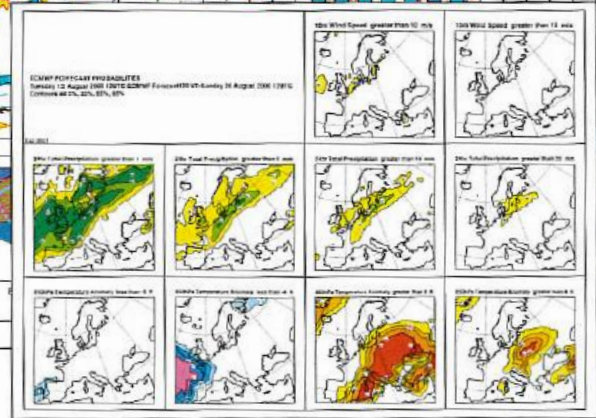
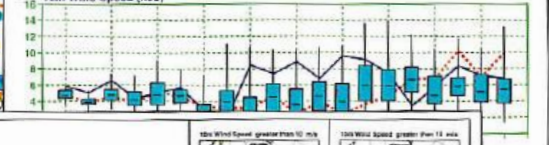
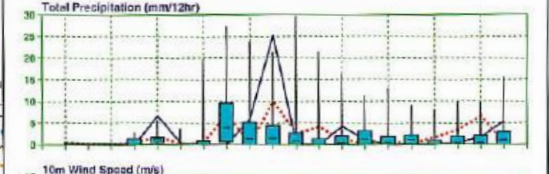
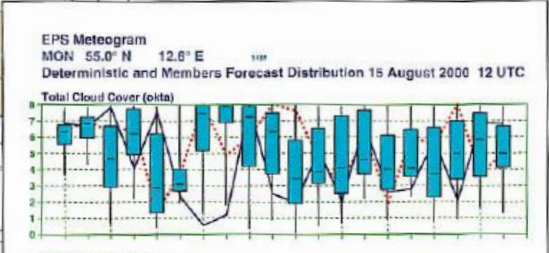
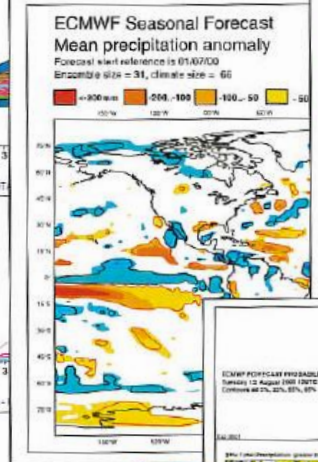
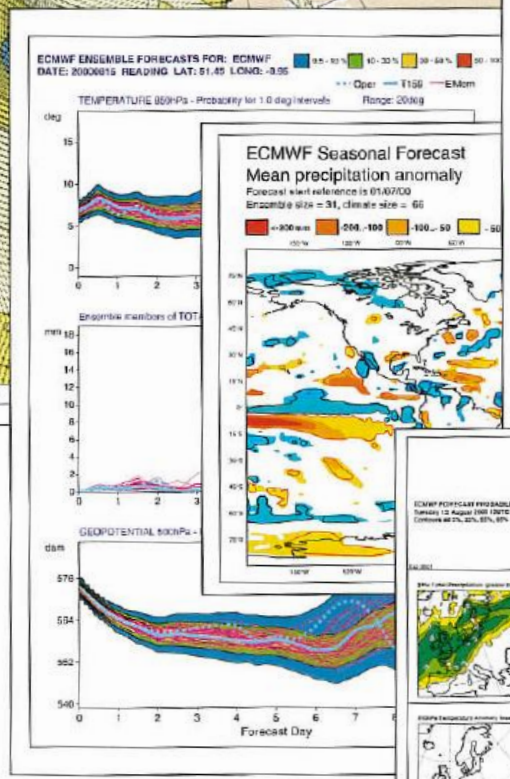
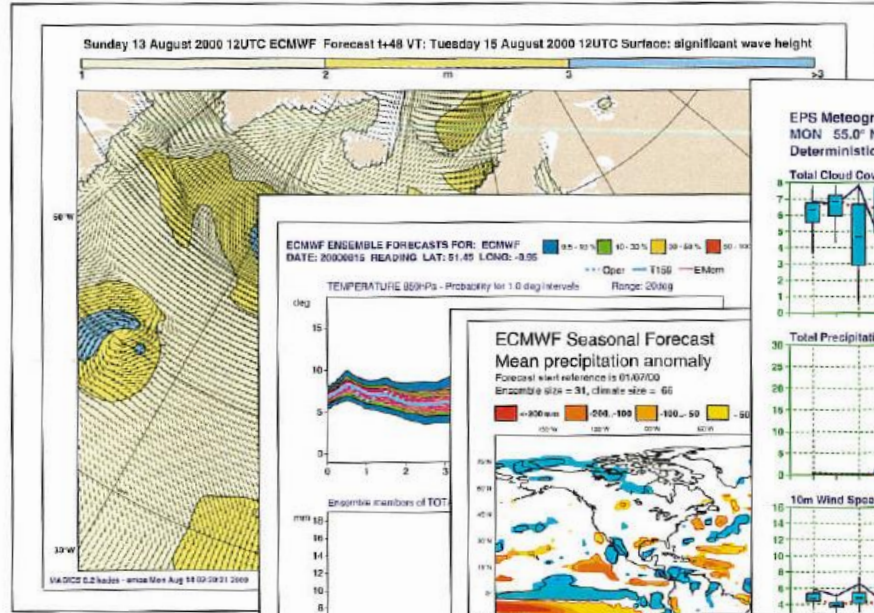
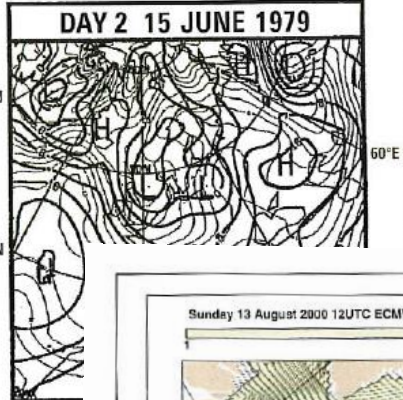
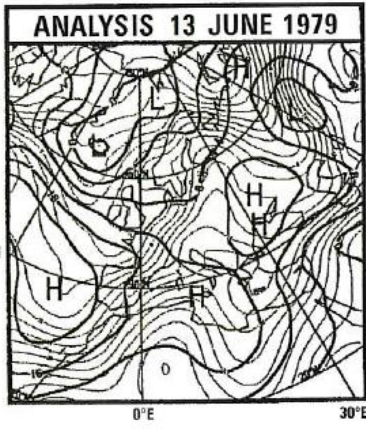
Voluntary Cooperation  
Programme

Education and Training  
Programme

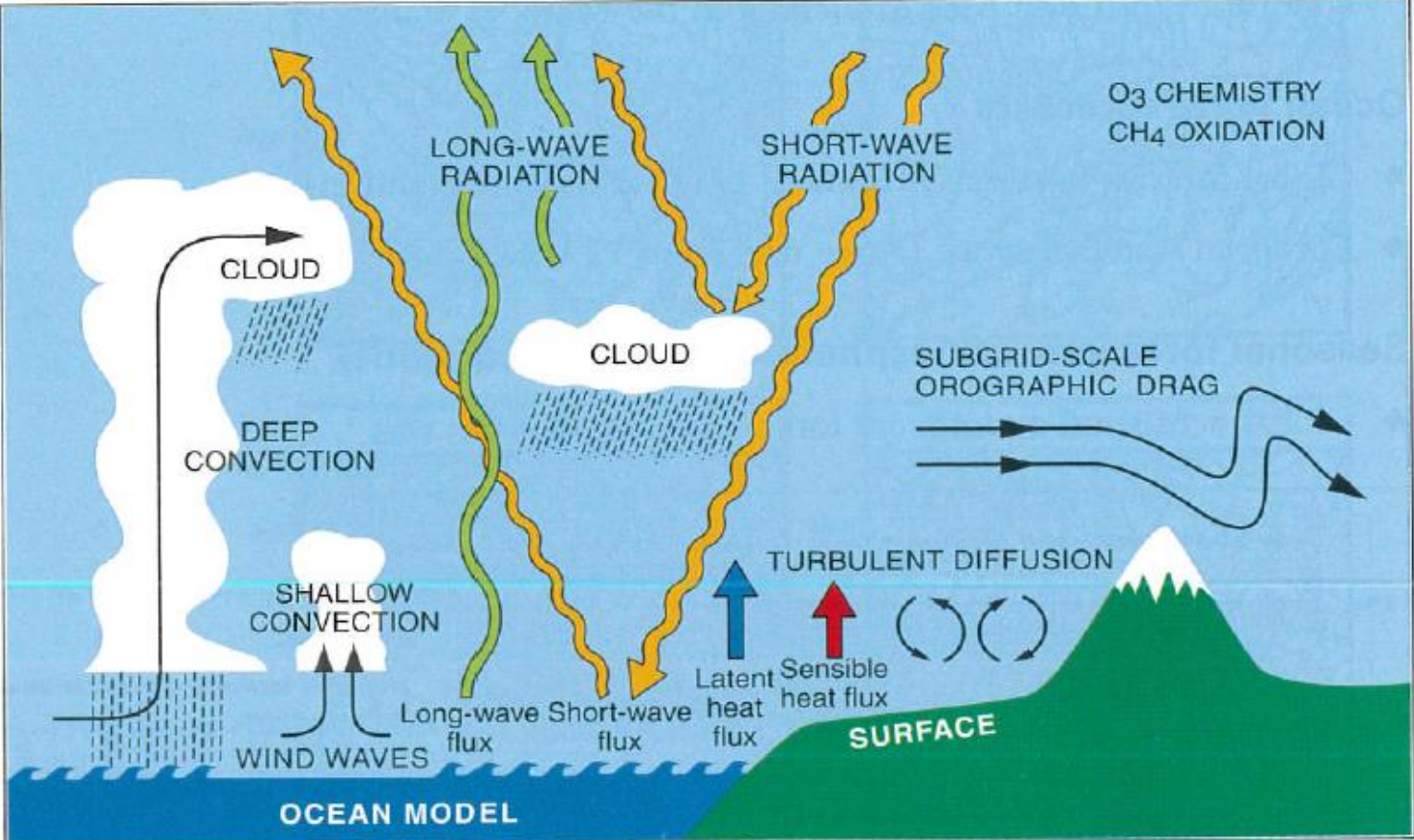
Aeronautical Meteorology  
Programme

Disaster Risk Reduction Programme







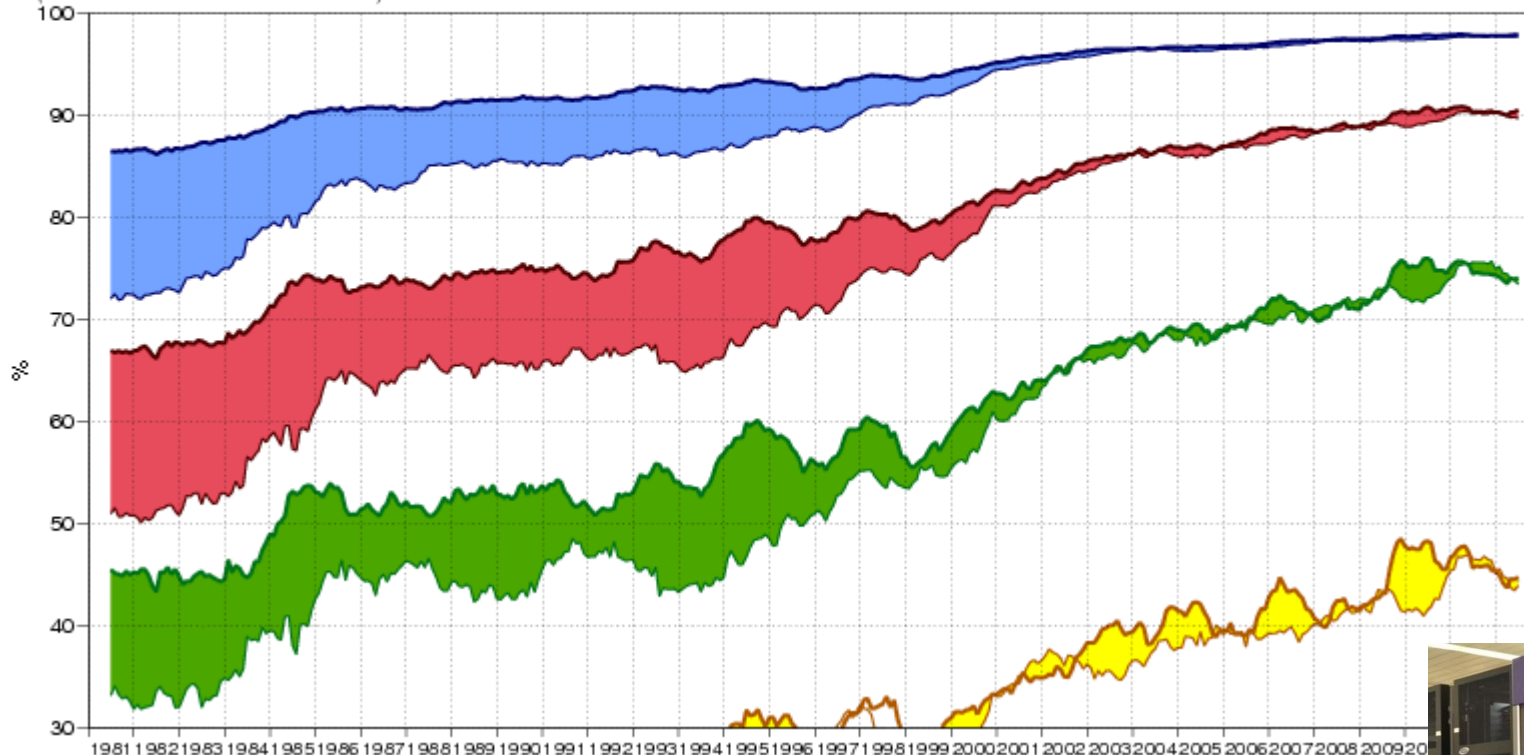




# Improved weather forecasts (1981-2011)

500hPa geopotential height  
Anomaly correlation  
12-month running mean  
(centered on the middle of the window)

Day 7 NHem      Day 3 NHem  
Day 7 SHem      Day 3 SHem  
Day 10 NHem     Day 5 NHem  
Day 10 SHem     Day 5 SHem



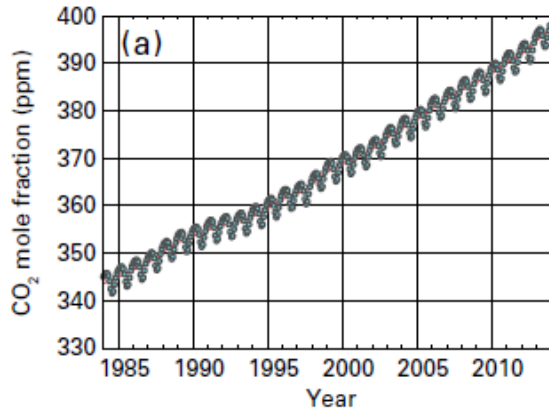
**Improvements in anomaly correlation of 500 hPa height forecasts of the European Centre for Medium-Range Weather Forecasts (ECMWF) for the northern and southern hemispheres linked to the increase in satellite observations and skill of numerical models**

## ECMWF Data Handling System

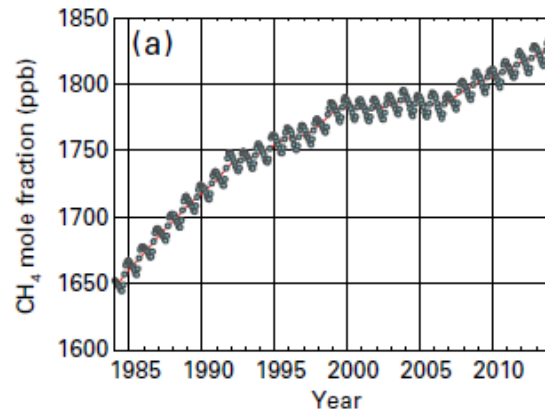
- Provides access to over 59PB of primary data (Spring 2014)
- The archive grows by about 65TB every day
- The system handles daily requests for between 9,000 and 15,000 tape mounts



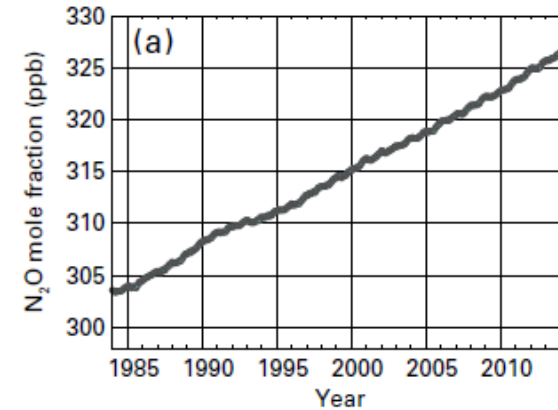
# Greenhouse gas concentrations 2013



**Carbon dioxide**  
**CO<sub>2</sub>**



**Methane**  
**CH<sub>4</sub>**



**Nitrous oxide**  
**N<sub>2</sub>O**

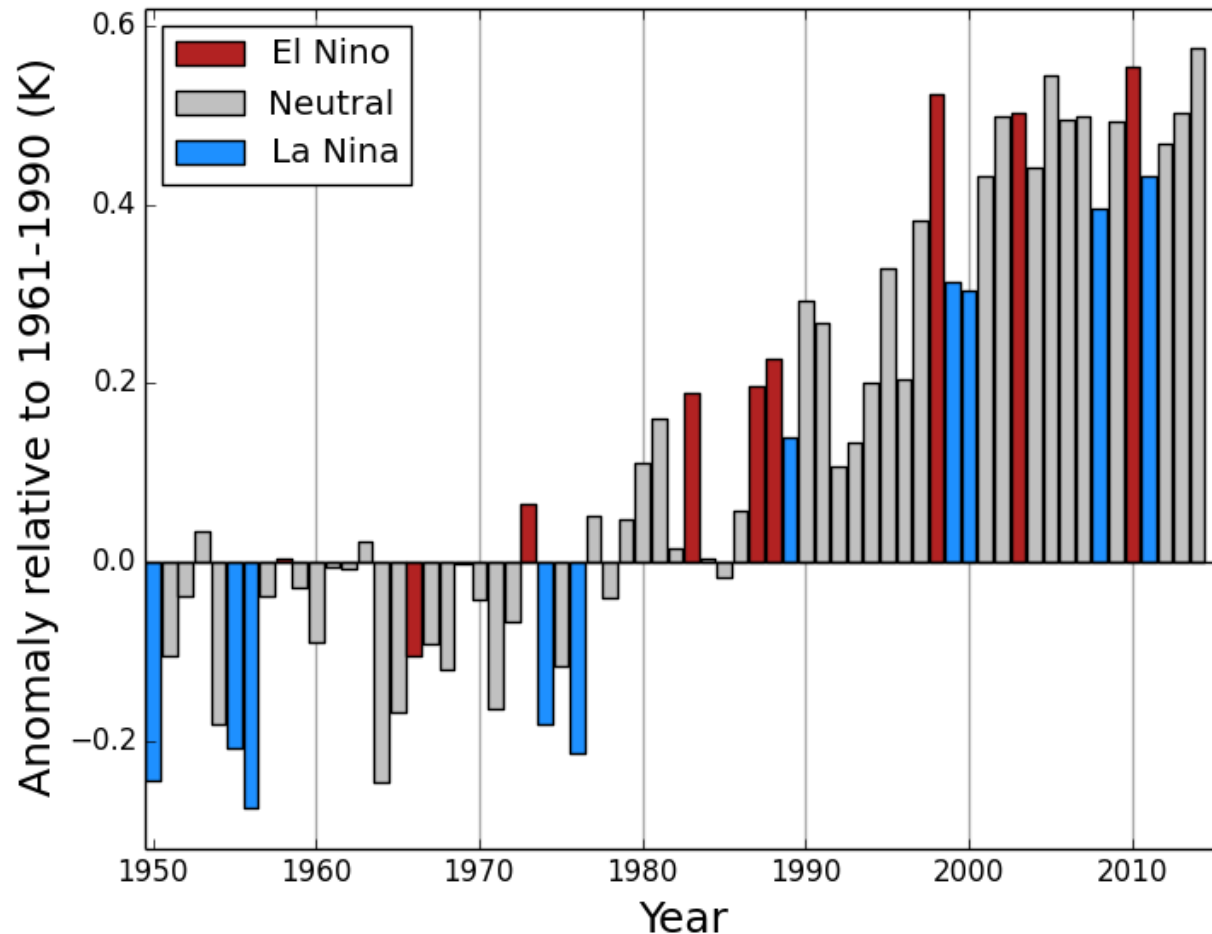
**In 2013 the amount of GHG in the atmosphere reached a new record high**

**WMO Greenhouse Gas Bulletin 2013**





# Temperature anomalies (1950-2014)

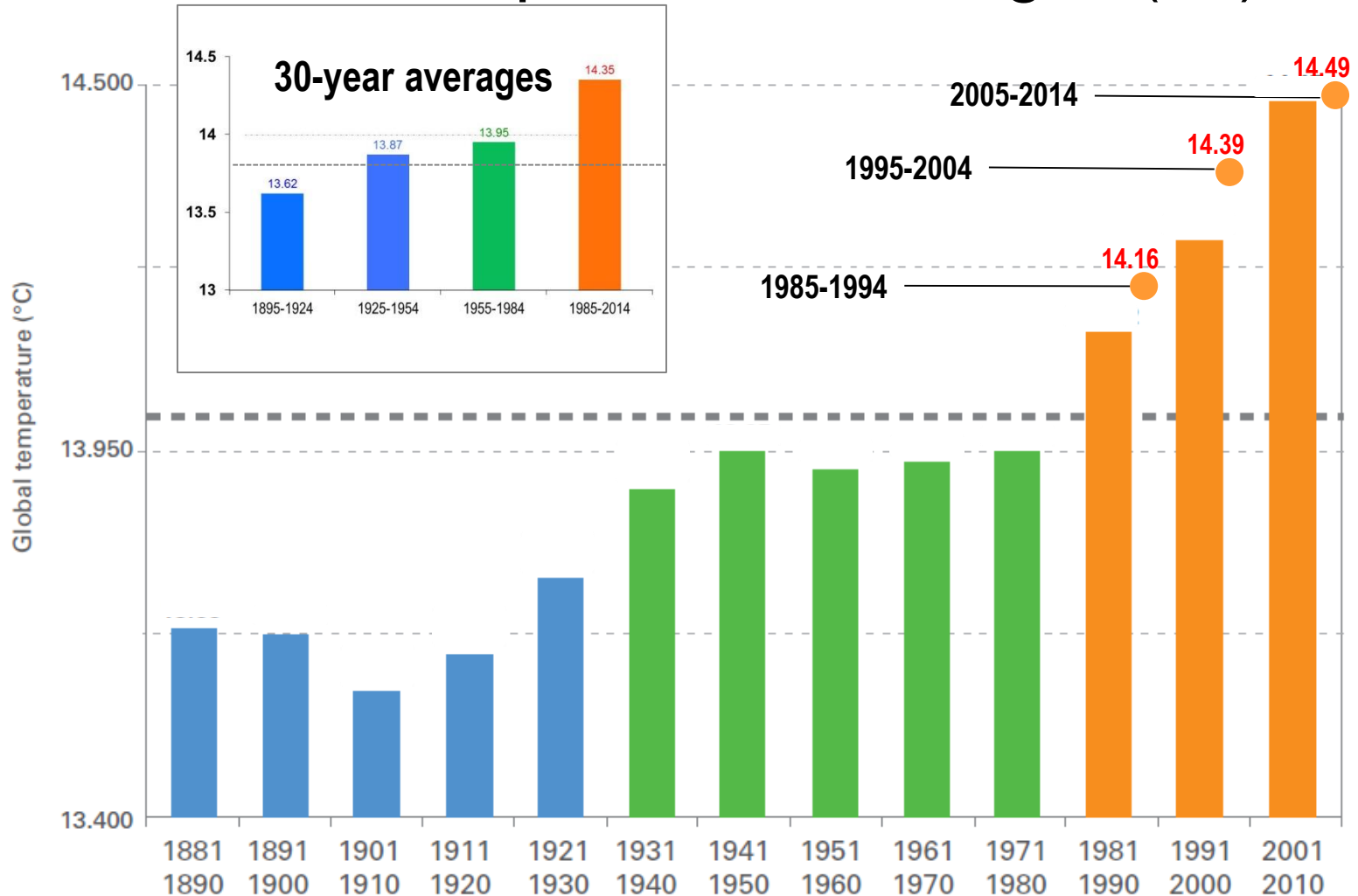


**The year 2014 has been the warmest ever recorded since modern records started**

**WMO Statement on the status of the global climate 2014**



# Decadal temperatures averages (°C)

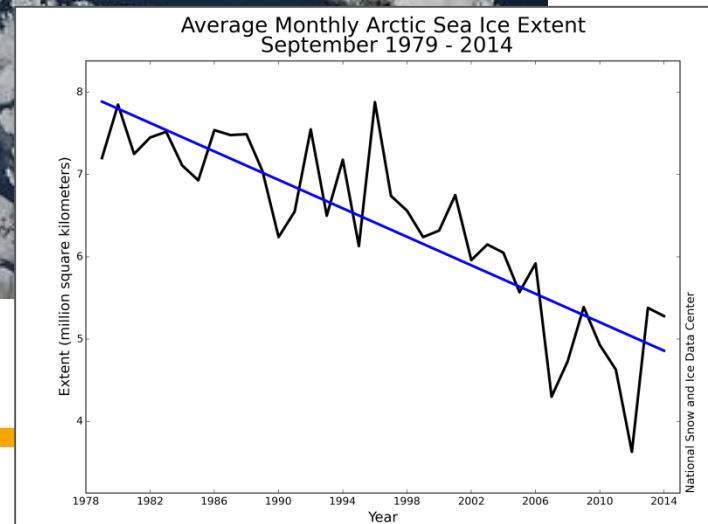
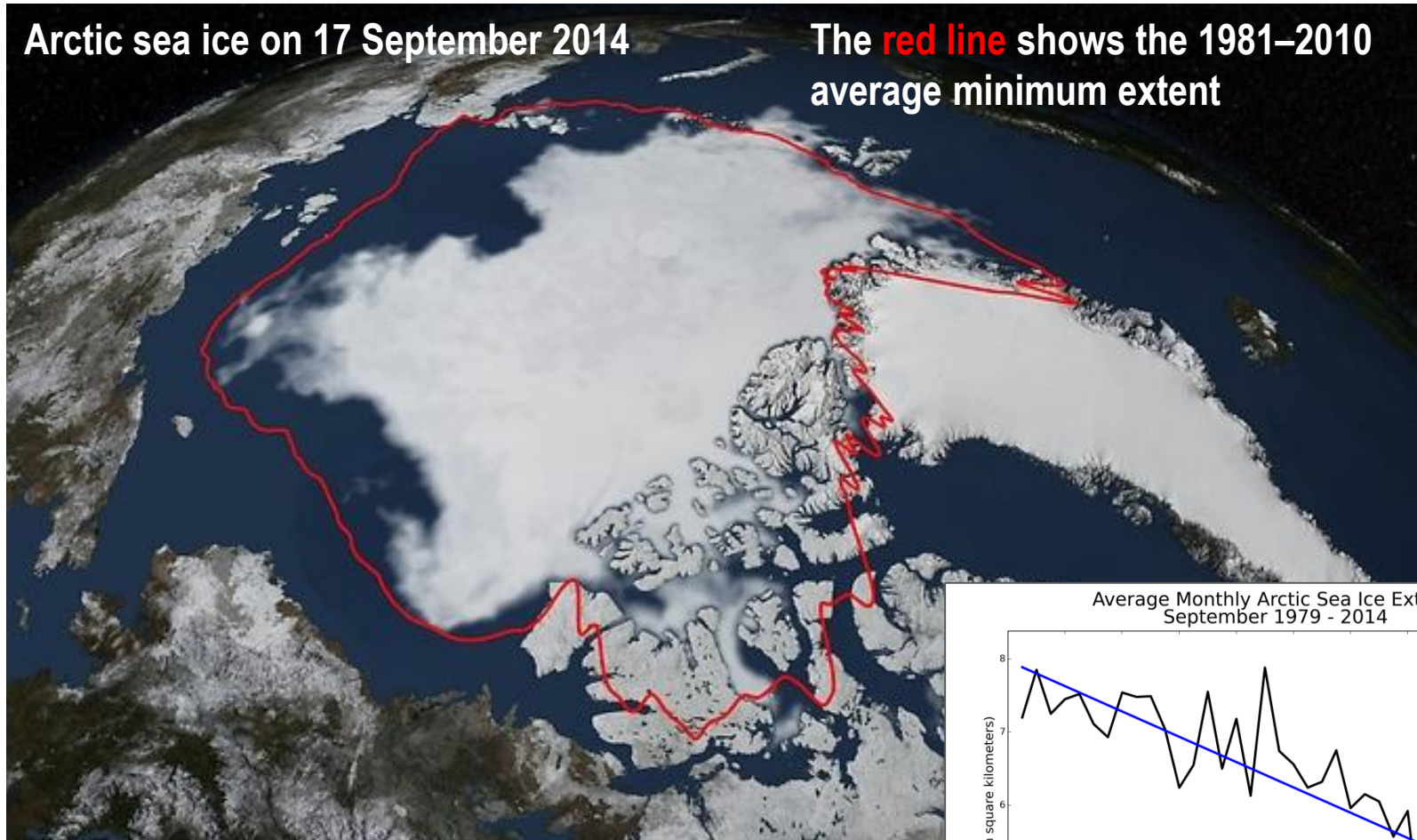


**Since modern records started, each period of 30 years has been warmer than the previous one**



# Arctic summer sea ice

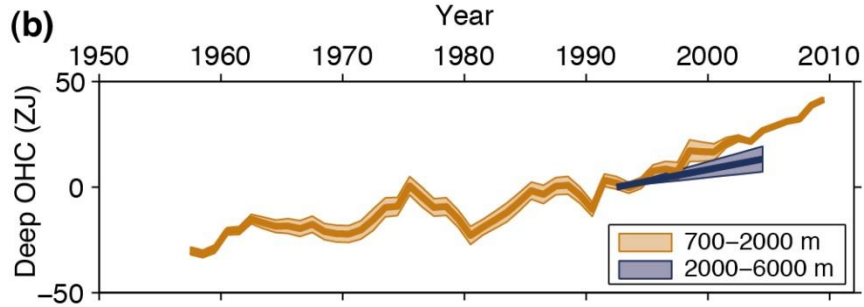
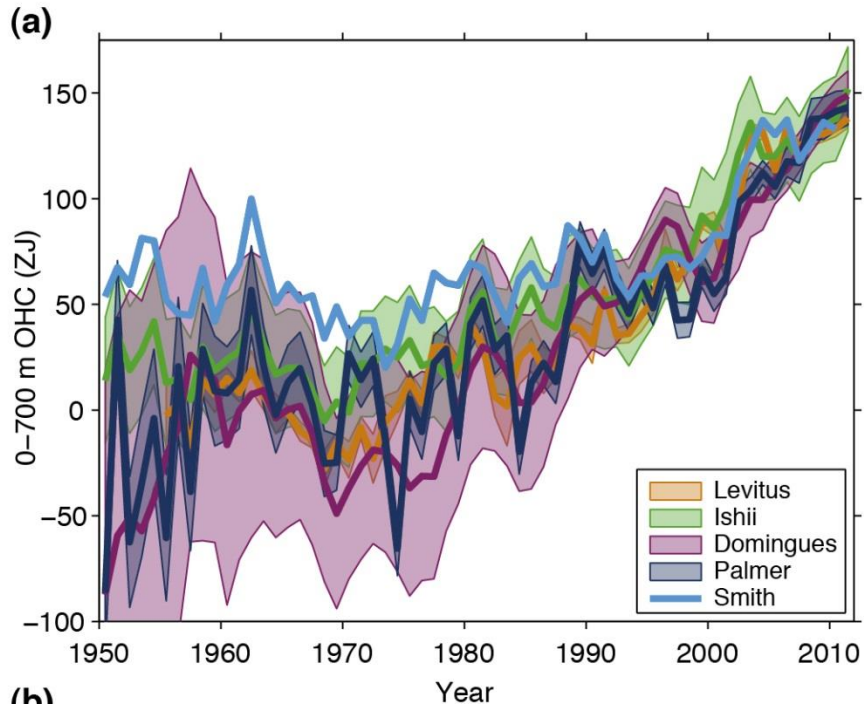
Steadily declining



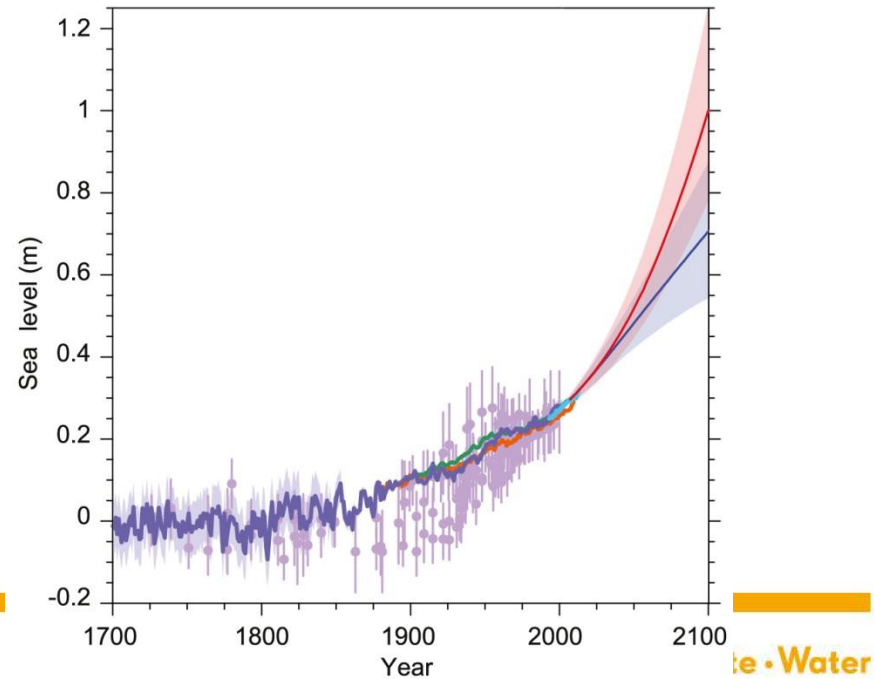
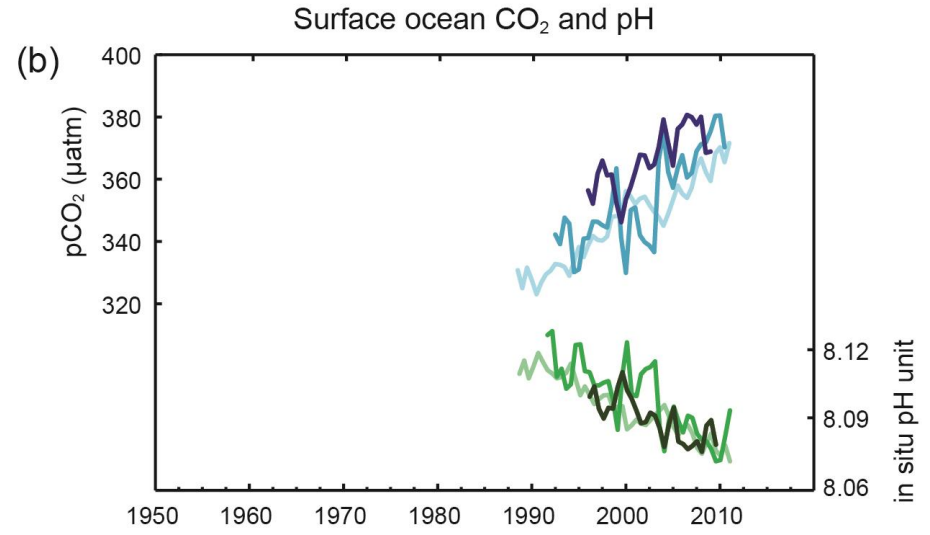
NASA/Goddard Scientific Visualization Studio



# Ocean warming and acidification, and sea level rise

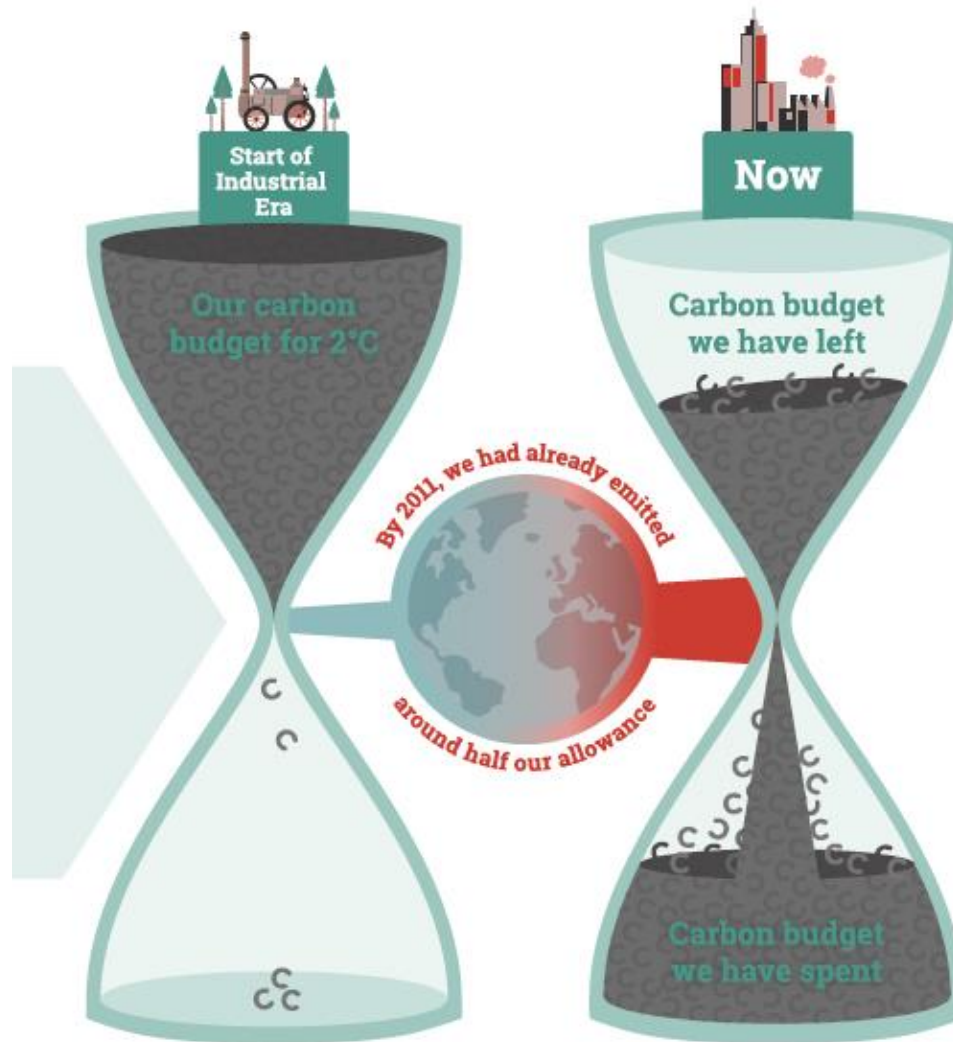


IPCC 2014





# The path to 2 °C



Unless we follow the '2.6' path we will reach our budget limit between 2050-2070

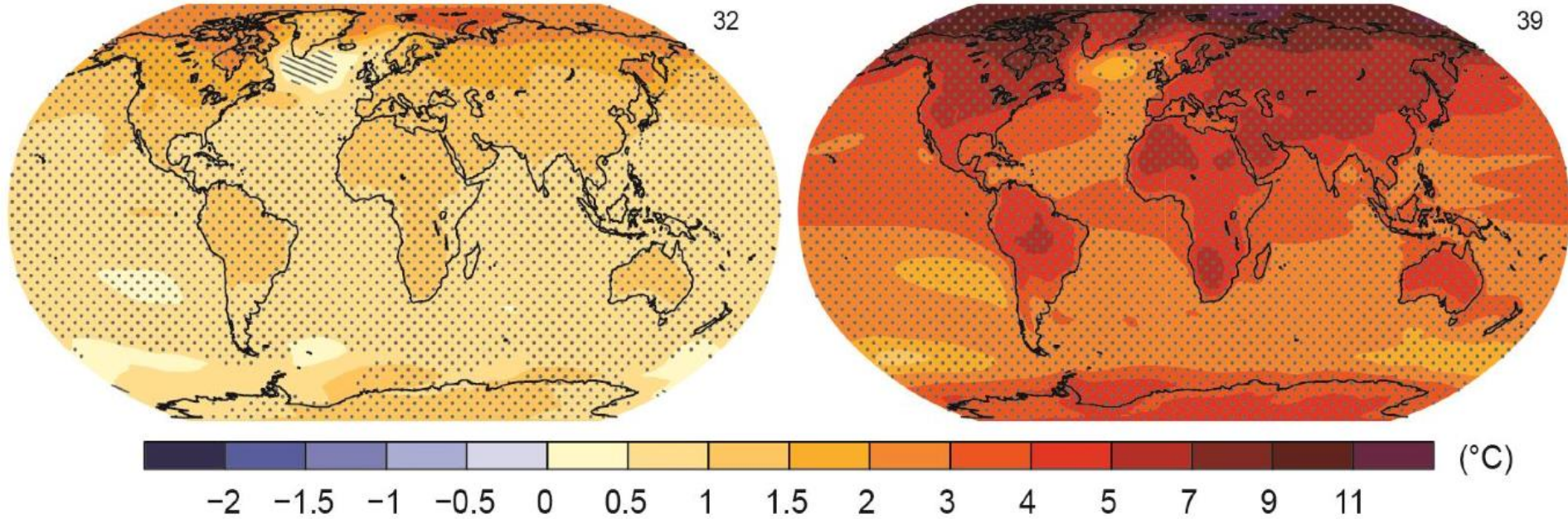


# RCP2.6

GIEC 2014

# RCP8.5

Change in average surface temperature (1986–2005 to 2081–2100)

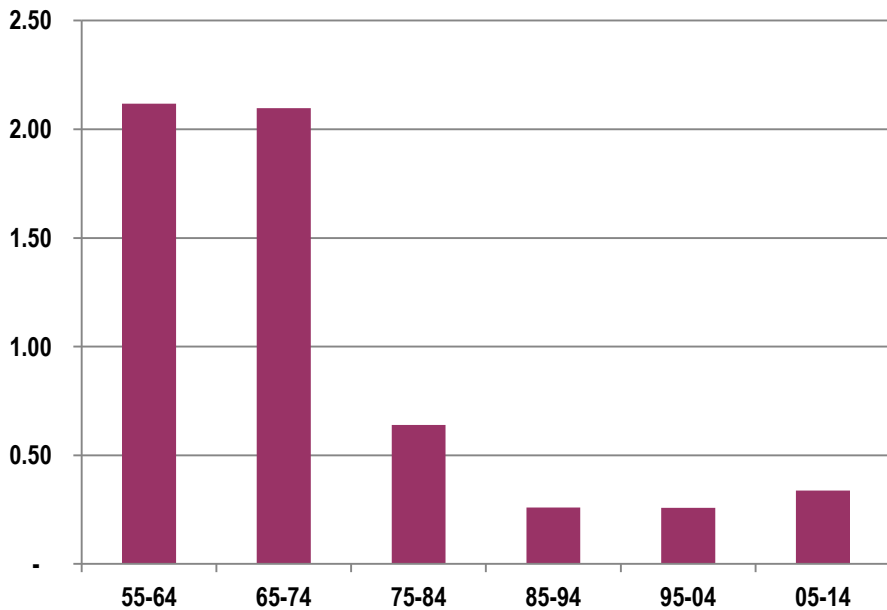


**We have a choice.**

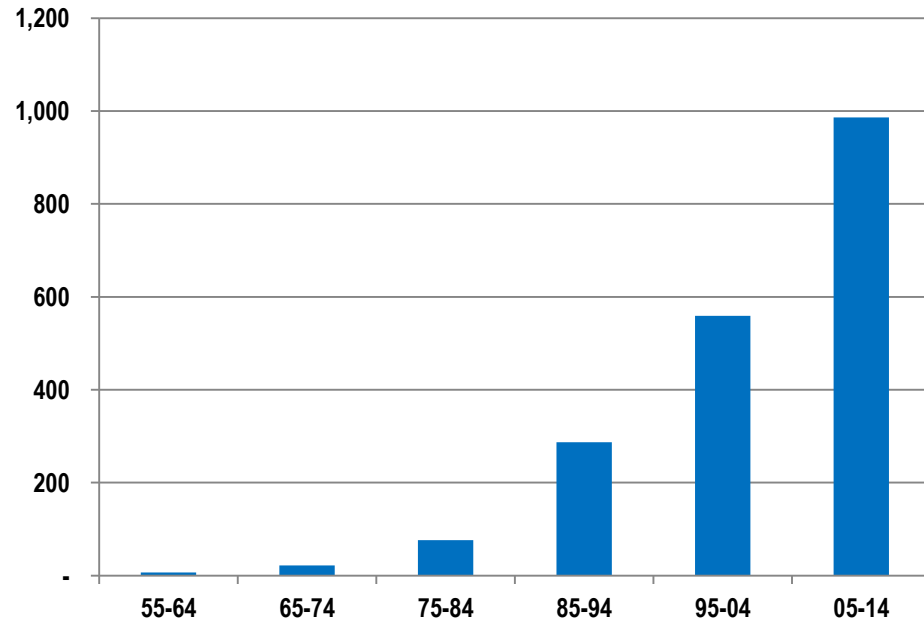


# Impacts of hydrometeorological and climatological hazards (1955–2014)

Human losses by decade  
(millions)



Economic losses by decade  
(billions of US\$ adjusted to 2013)



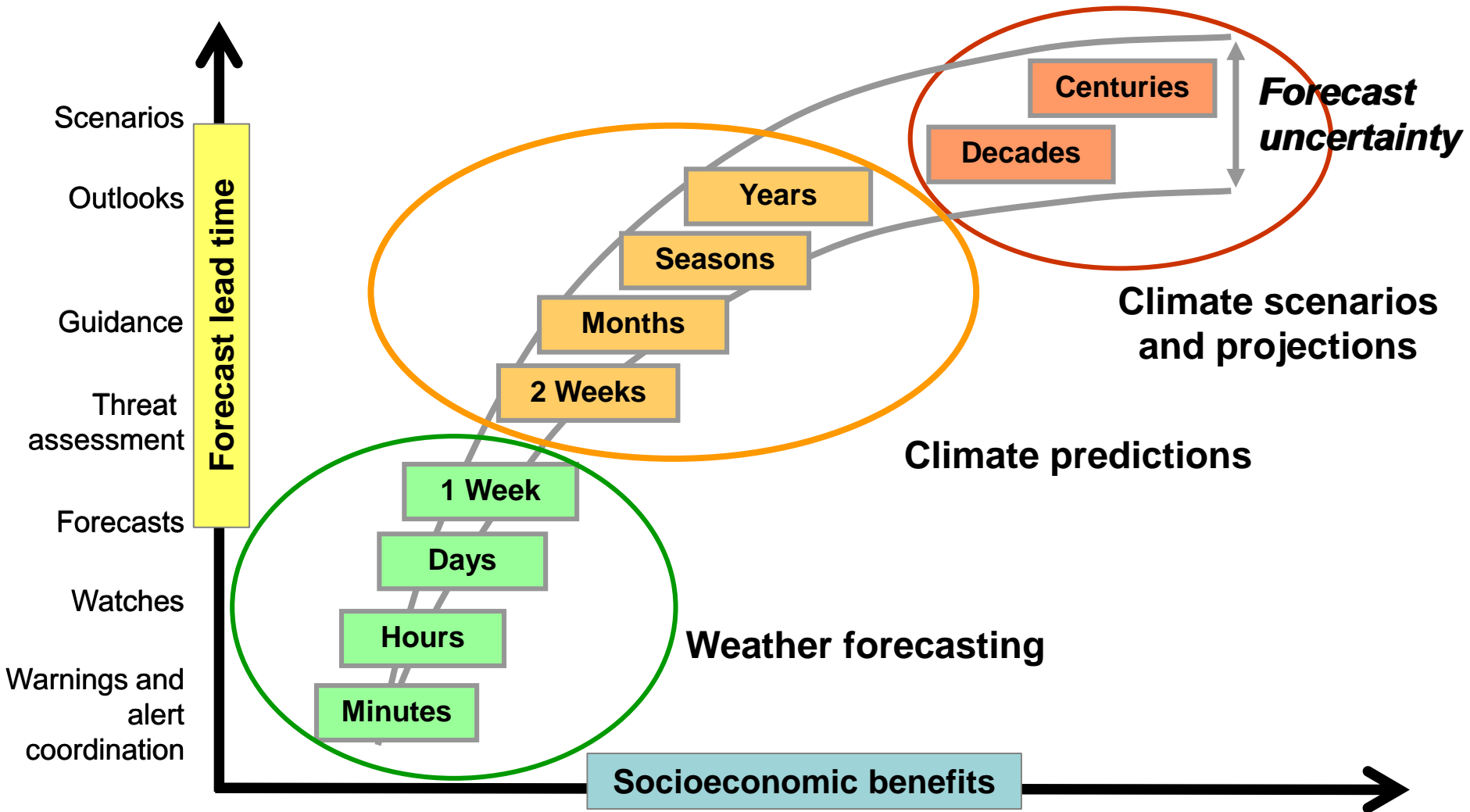
Epidemics and insect infestations are not included

**Reduction of the number of victims thanks to greater effectiveness of early warning systems and prevention measures**





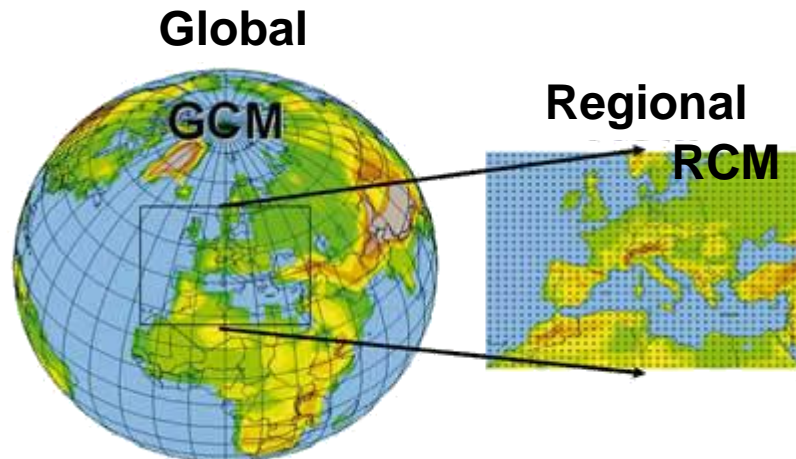
# Weather-to-climate: seamless framework



Adapted from NOAA 2011



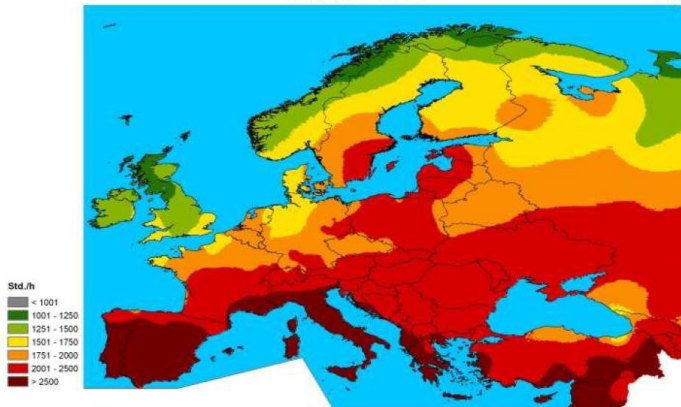
# Examples of climate services based on predictions



- Expected future temperature
- Precipitation scenarios
- Changing frequency of extreme weather events
- Sea-level changes
- Snow, glacier and sea ice coverage
- Growing seasons
- Potential impacts of climate change on the natural environment and major business and public sectors

Sonnenscheindauer 2011  
Sunshine duration 2011

Datenbasis/Data basis: CLIMAT  
Stand/last update: 28.01.2012





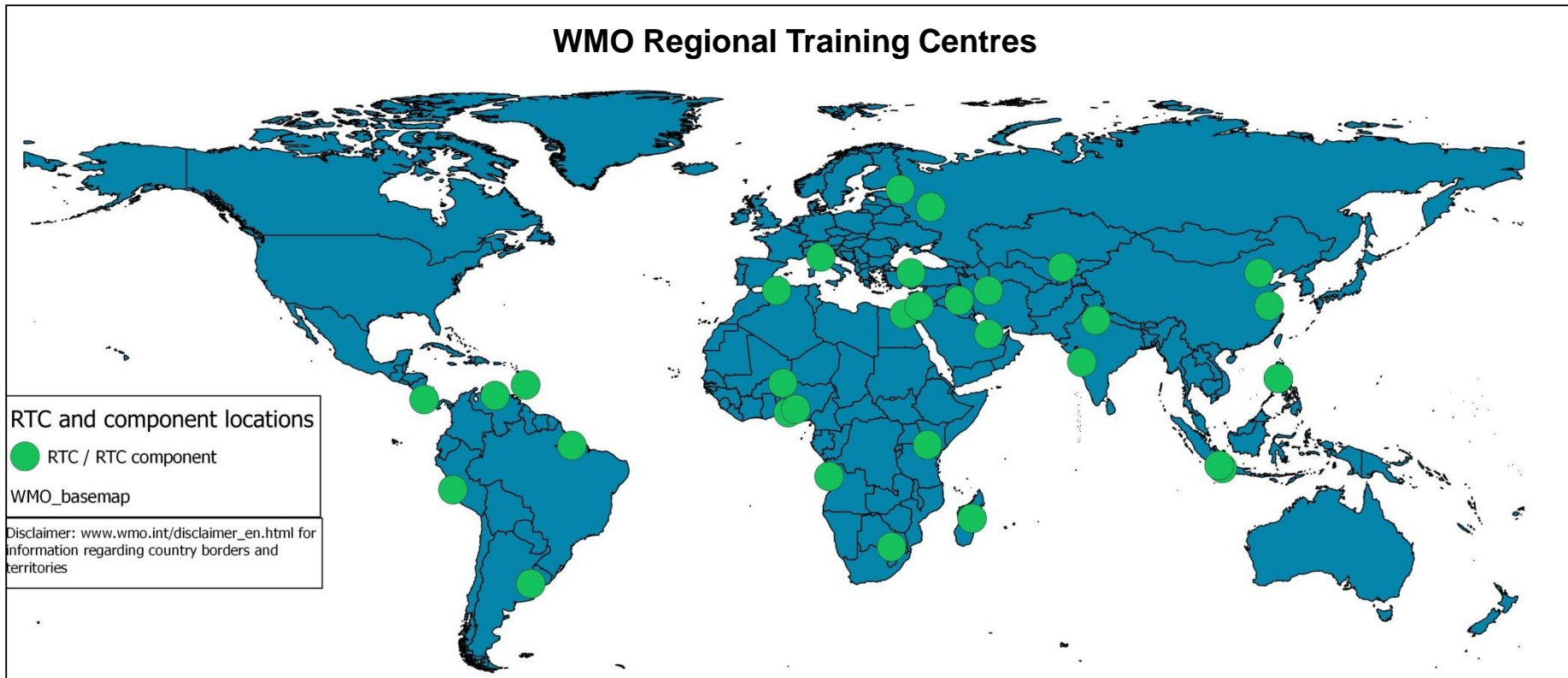
# The international Geneva

- Science and knowledge-based agencies and programmes
- Linkages with DRR, health, human rights, migration, international trade, inter-parliamentarian dialogue

**1** European Broadcasting Union (EBU) **2** European Free Trade Association (EFTA) **3** European Organization for Nuclear Research (CERN) **4** Geneva Academy of International Humanitarian Law and Human Rights **5** GAVI Alliance **6** Fonds mondial de lutte contre le sida, la tuberculose et le paludisme **7** Interparliamentarian Union **8** International Air Transport Association (IATA) **9** International Committee of the Red Cross (ICRC) **10** International Federation of Red Cross and Red Crescent Societies (IFRC) **11** International Labour Organization (ILO) **12** International Organization for Migration (IOM) **13** International Standard Organization (ISO) **14** International Telecommunication Union (ITU) **15** ONUSIDA **16** Médecins sans Frontières (MSF) **17** United Nations Children's Fund (UNICEF) **18** United Nations High Commissioner for Refugees (UNHCR) **19** United Nations' Office in Geneva **20** United Nations High Commissioner for Human Rights (UNHCHR) **21** World Council of Churches (WCC) **22** World Health Organization (WHO) **23** World Intellectual Property Organization (WIPO) **24** World Meteorological Organization (WMO) **25** World Trade Organization (WTO) **26** Maison de la Paix **27** Chateau de Penthes



# WMO education and training activities



More than CHF 4 million per year devoted to support education and training (about 40% is on posts, 35% on fellowships and the remainder on support for very short-term training). In addition, Members' carry out their own training activities

At any one time more than 120 fellows being supported with around 50 new fellows a year added. Fellowships range from four months to five years and cover on-the-job training in meteorological forecasting through to MSc's and occasionally PhDs.



# Science and post-2015 development agenda





**World  
Meteorological  
Organization**

Weather • Climate • Water

Thank you  
Merci