

Changing Weather and Air Quality Patterns in Central European and Mediterranean Region

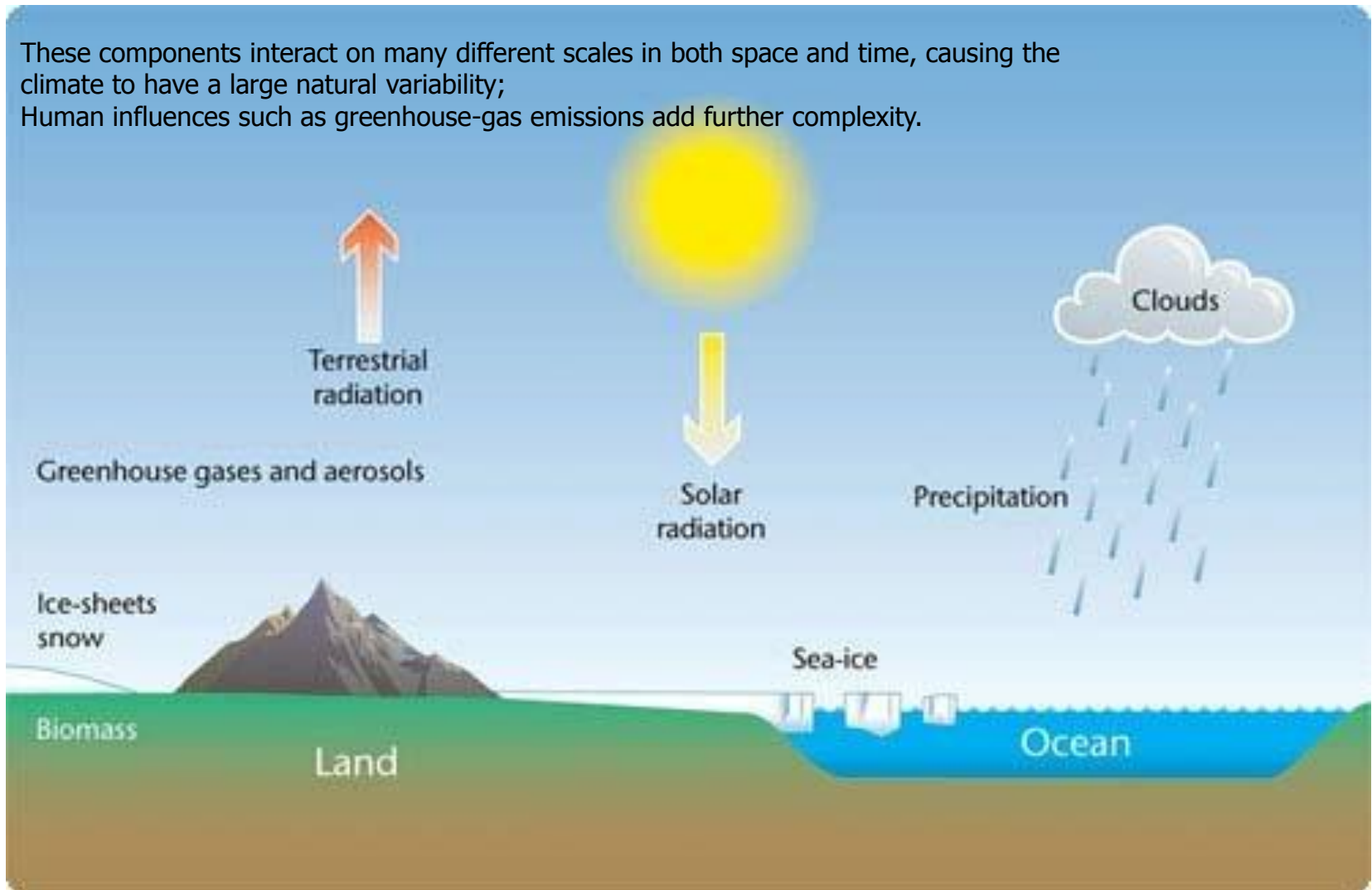
Prof. László Bozó

Hungarian Meteorological Service

*Mitigation of Disasters due to Severe Natural Events: From Policy to Practice
10-13 March, 2016, Srí lanka*

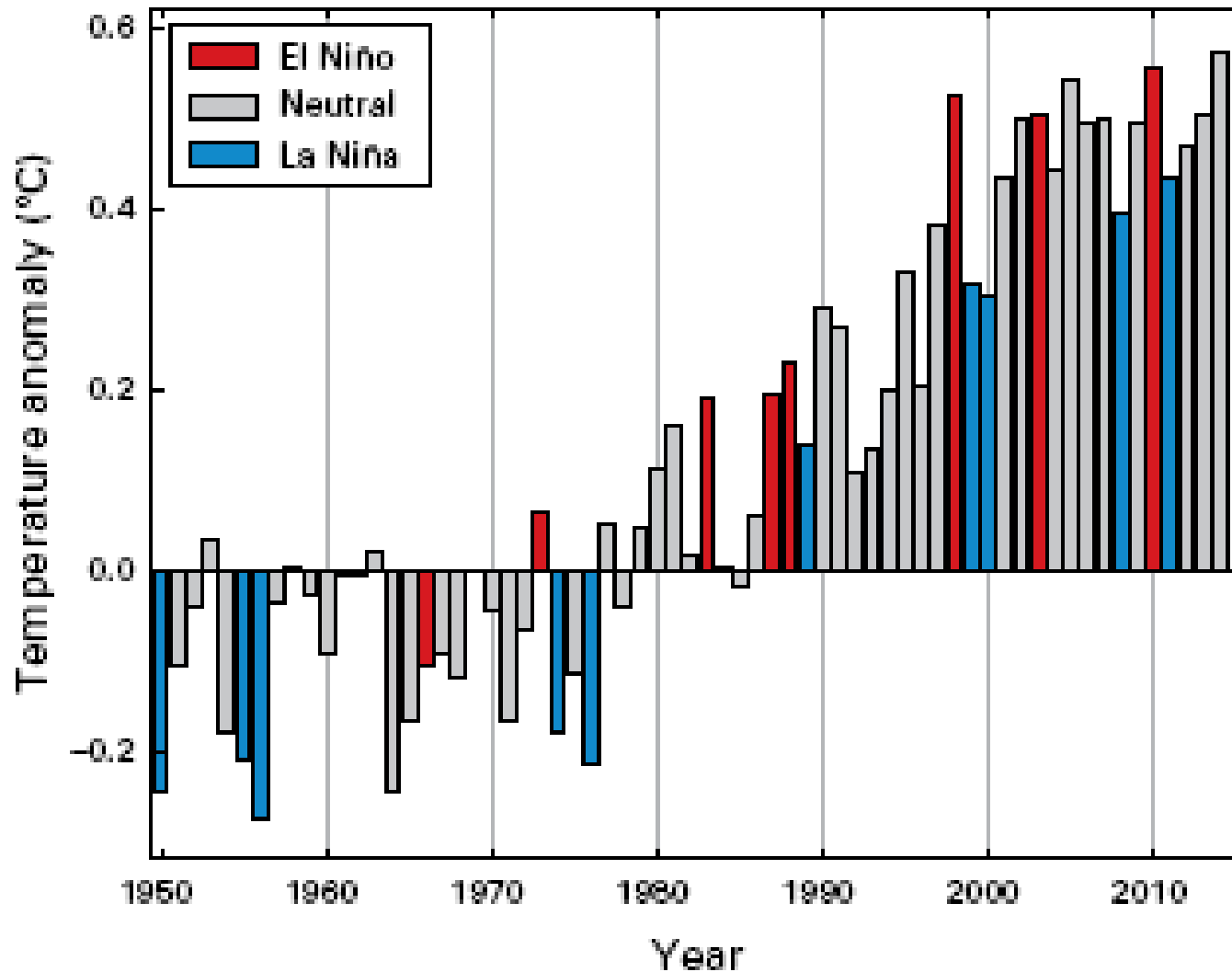
The Earth System

These components interact on many different scales in both space and time, causing the climate to have a large natural variability;
Human influences such as greenhouse-gas emissions add further complexity.



Anomalies of Annual Mean Temperatures

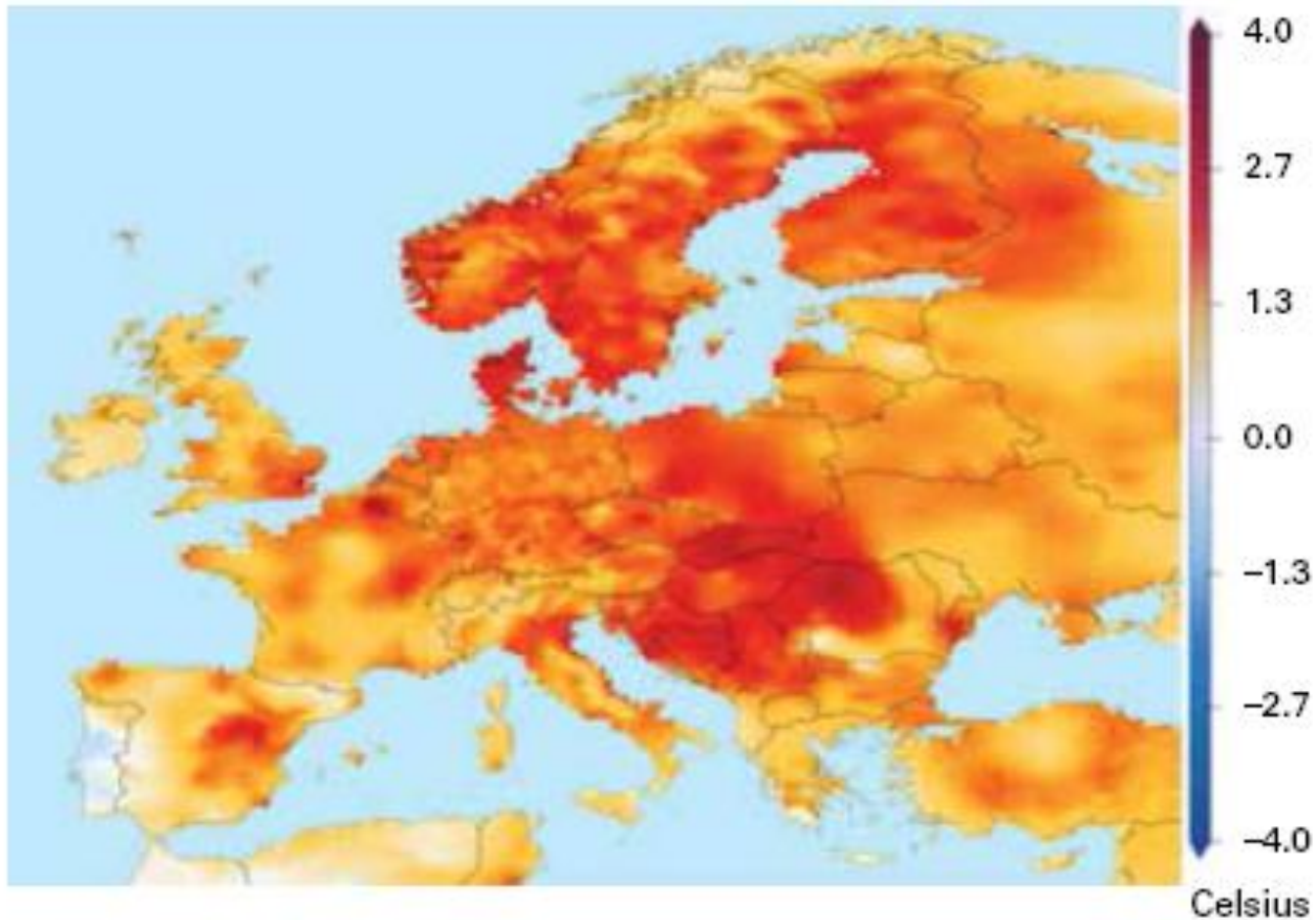
Reference: 1961-1990



Source: WMO, 2015

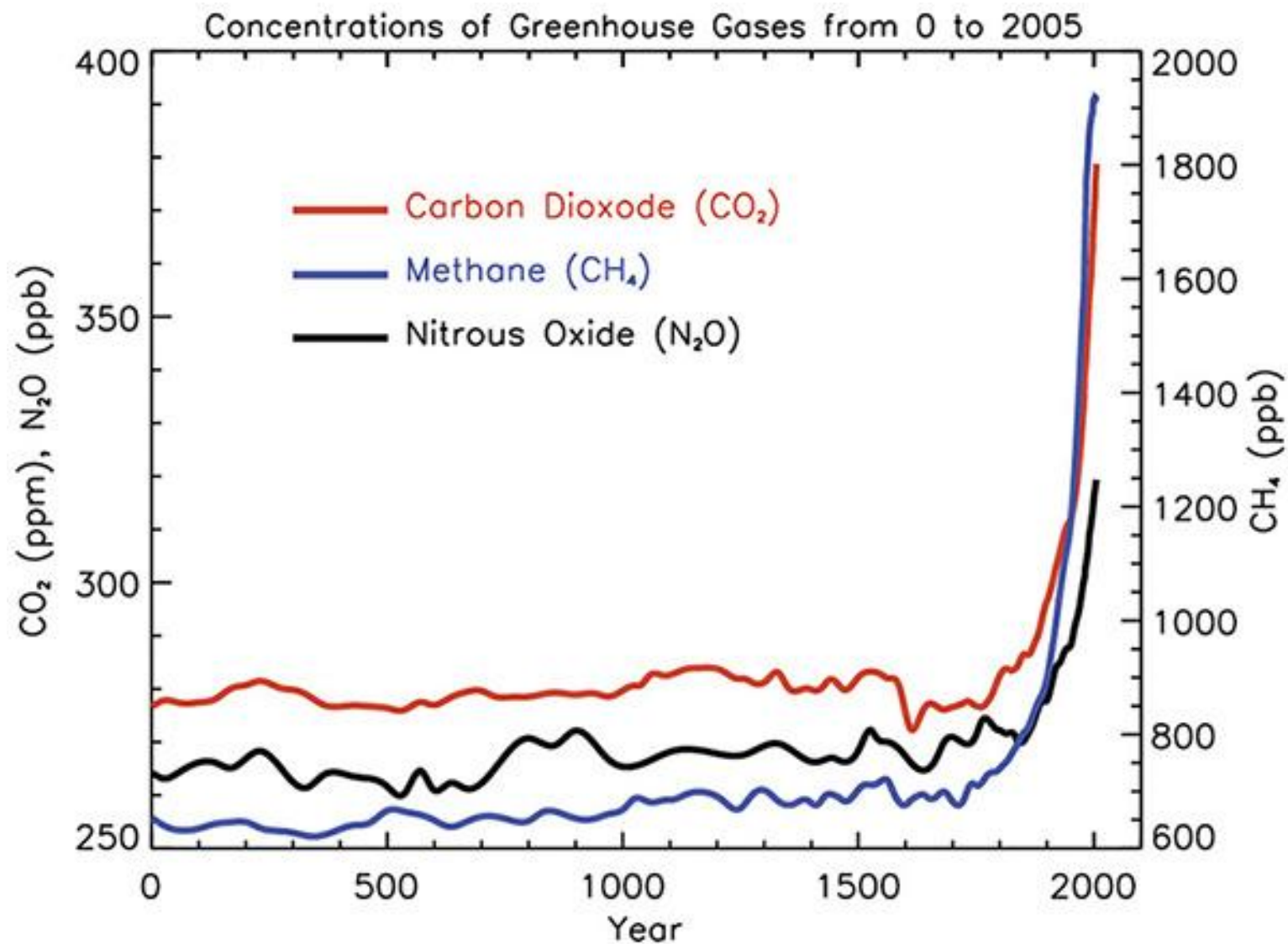
Anomalies of Annual Mean Temperatures in Europe

Reference: 1981-2010

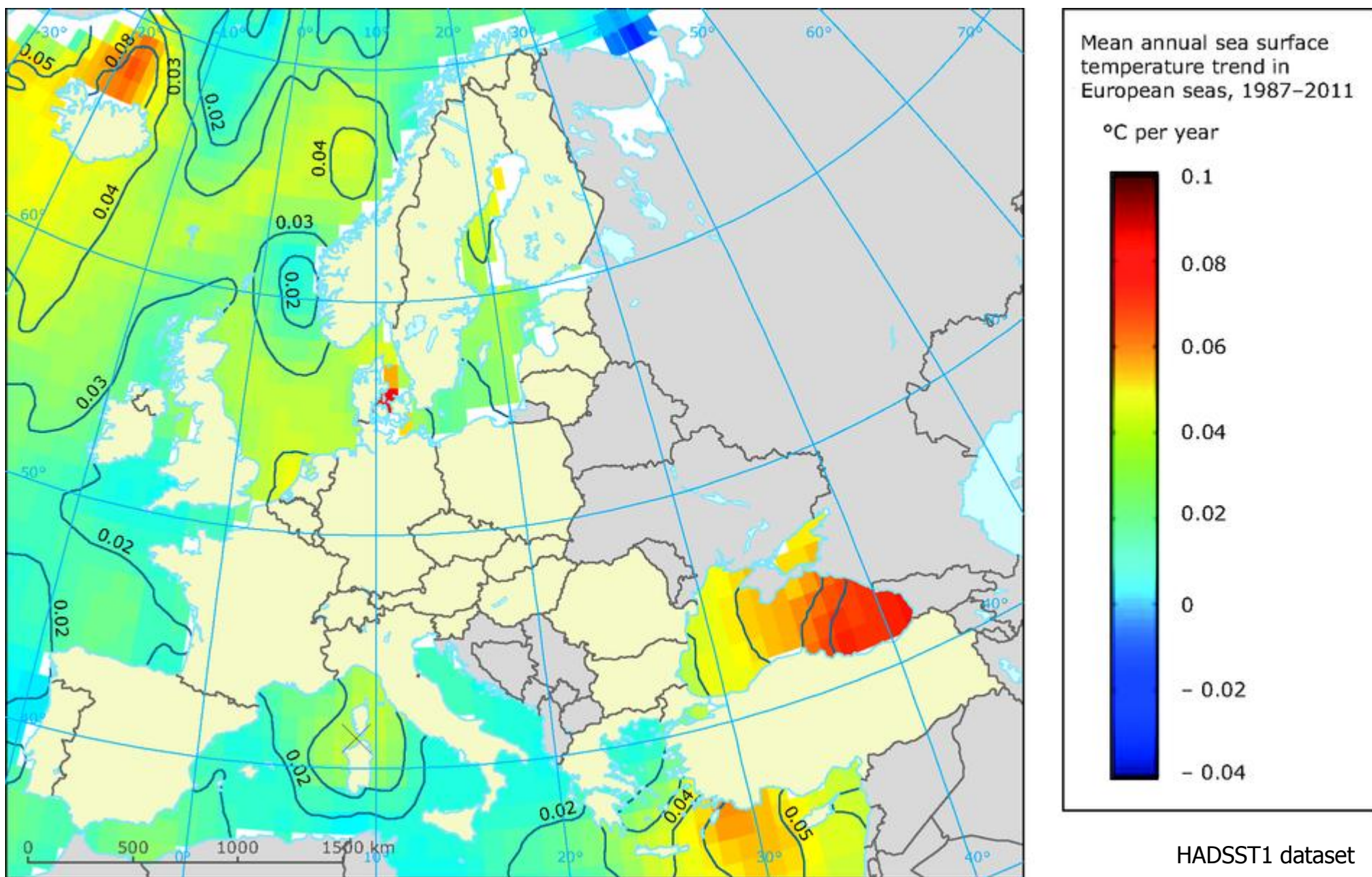


Source: WMO, 2015

GHG concentration trends

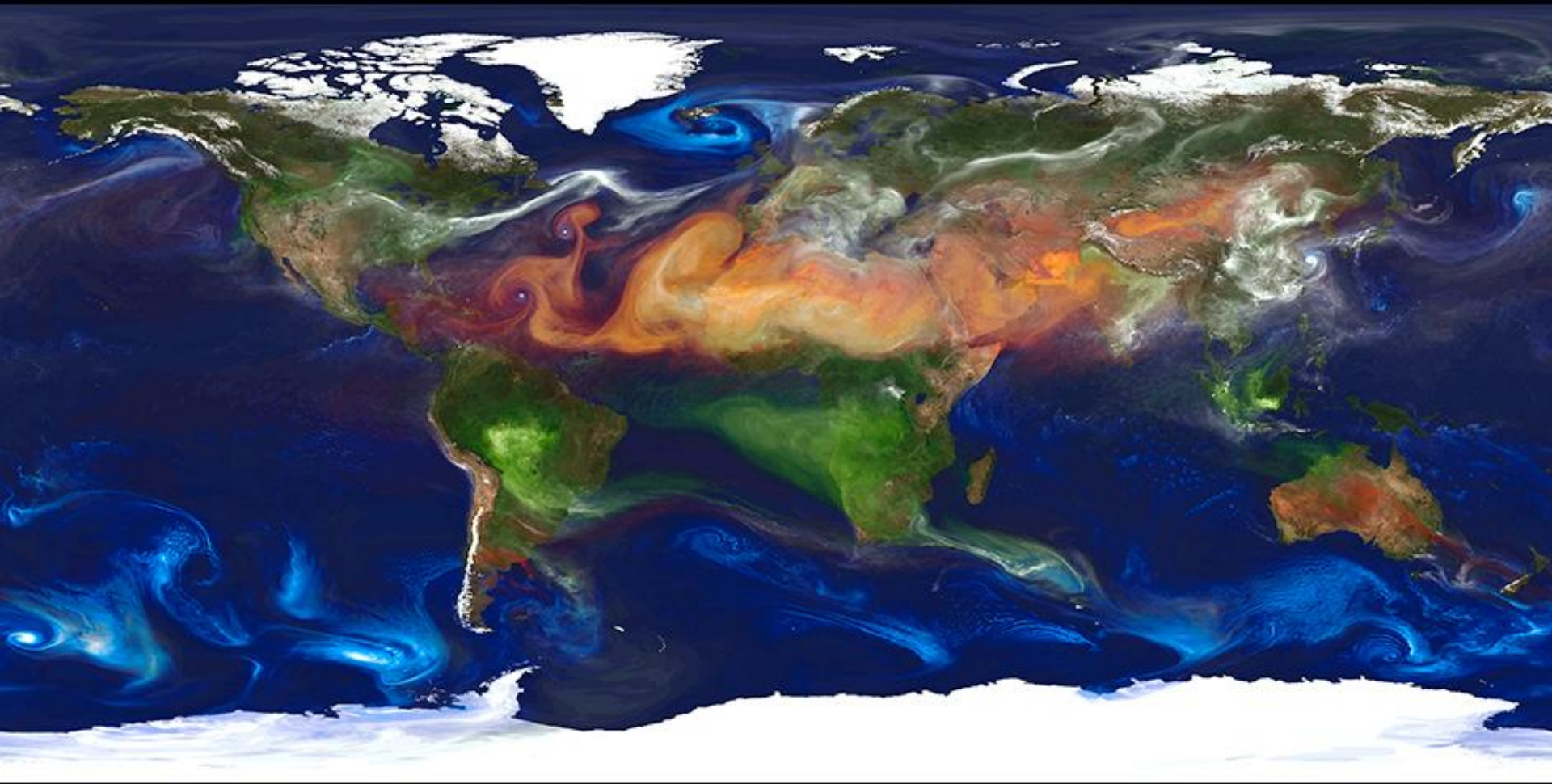


Mean annual sea surface temperature trend

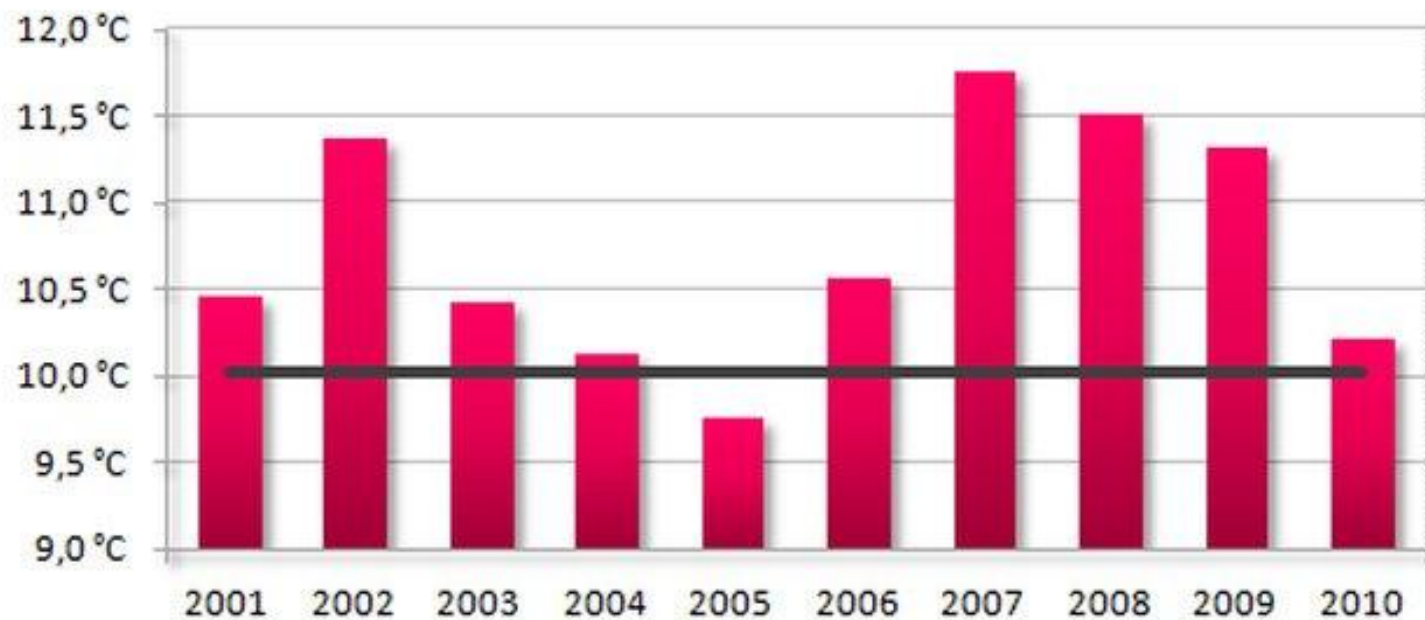


Global Transport of Atmospheric Aerosol Particles

NASA Goddard Earth Observing System Model GEOS-5, (*Putman W*, 2012)



Annual mean temperatures of Hungary 2001–2010



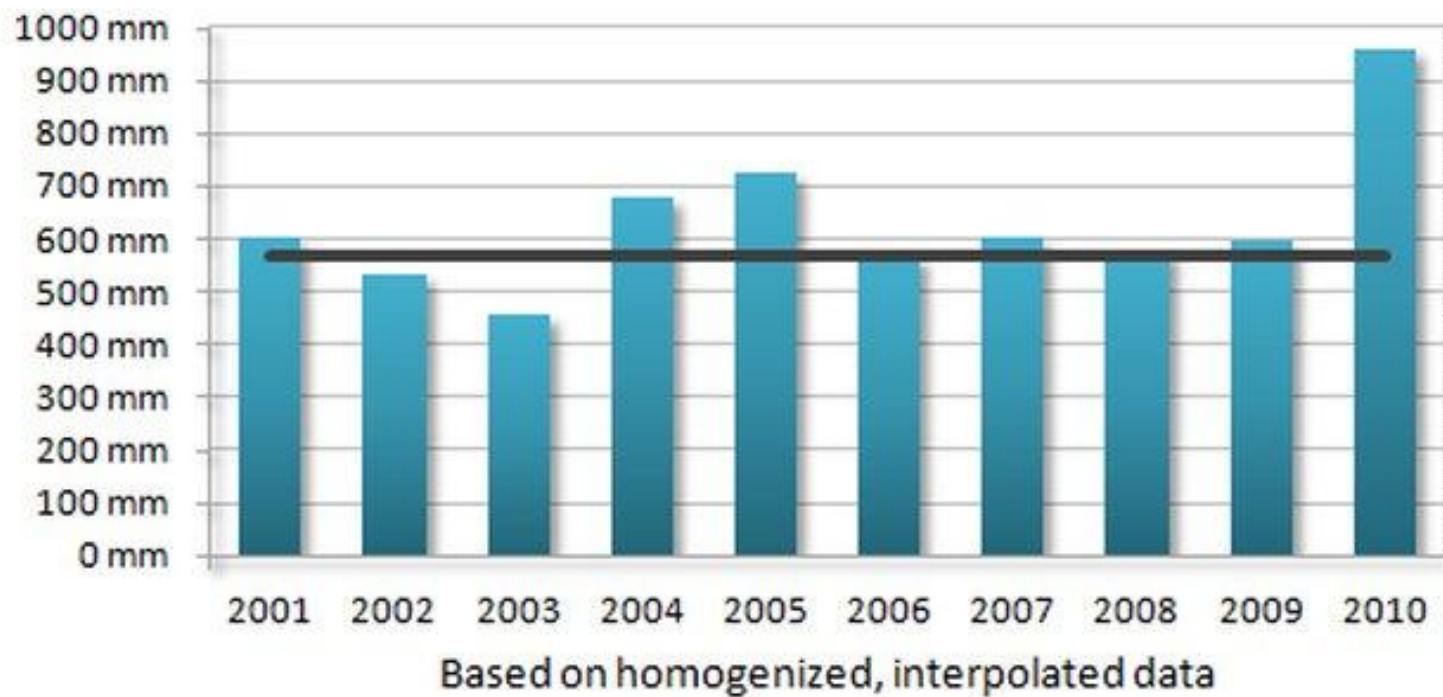
Based on homogenized, interpolated data



■ Annual mean temperatures

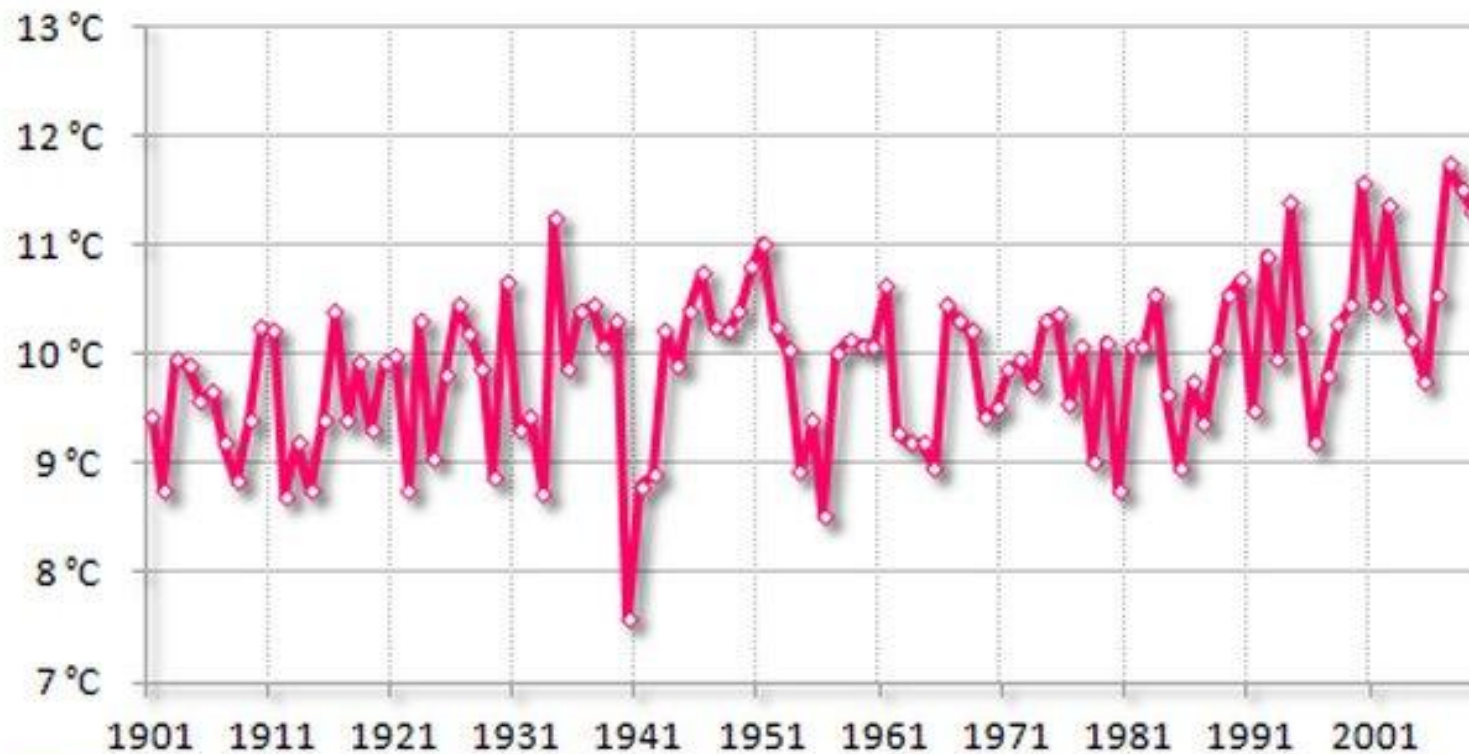
— Average of 1971-2000

Annual precipitation of Hungary 2001–2010

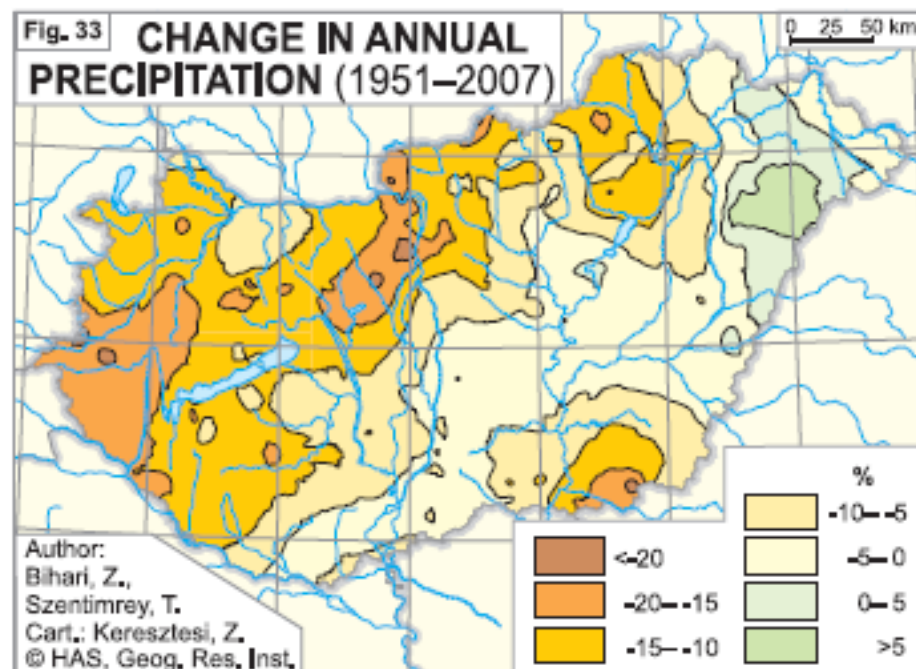
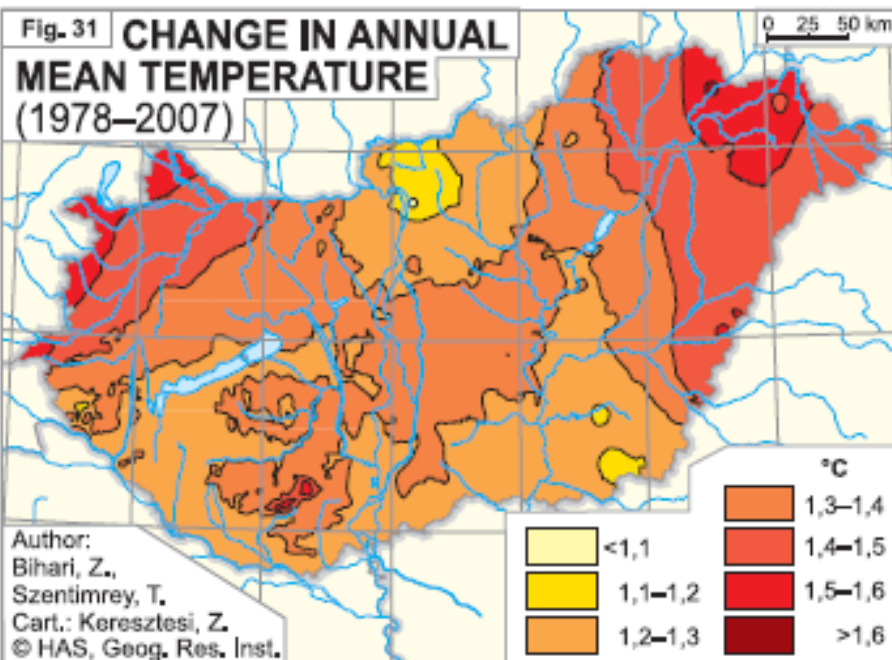


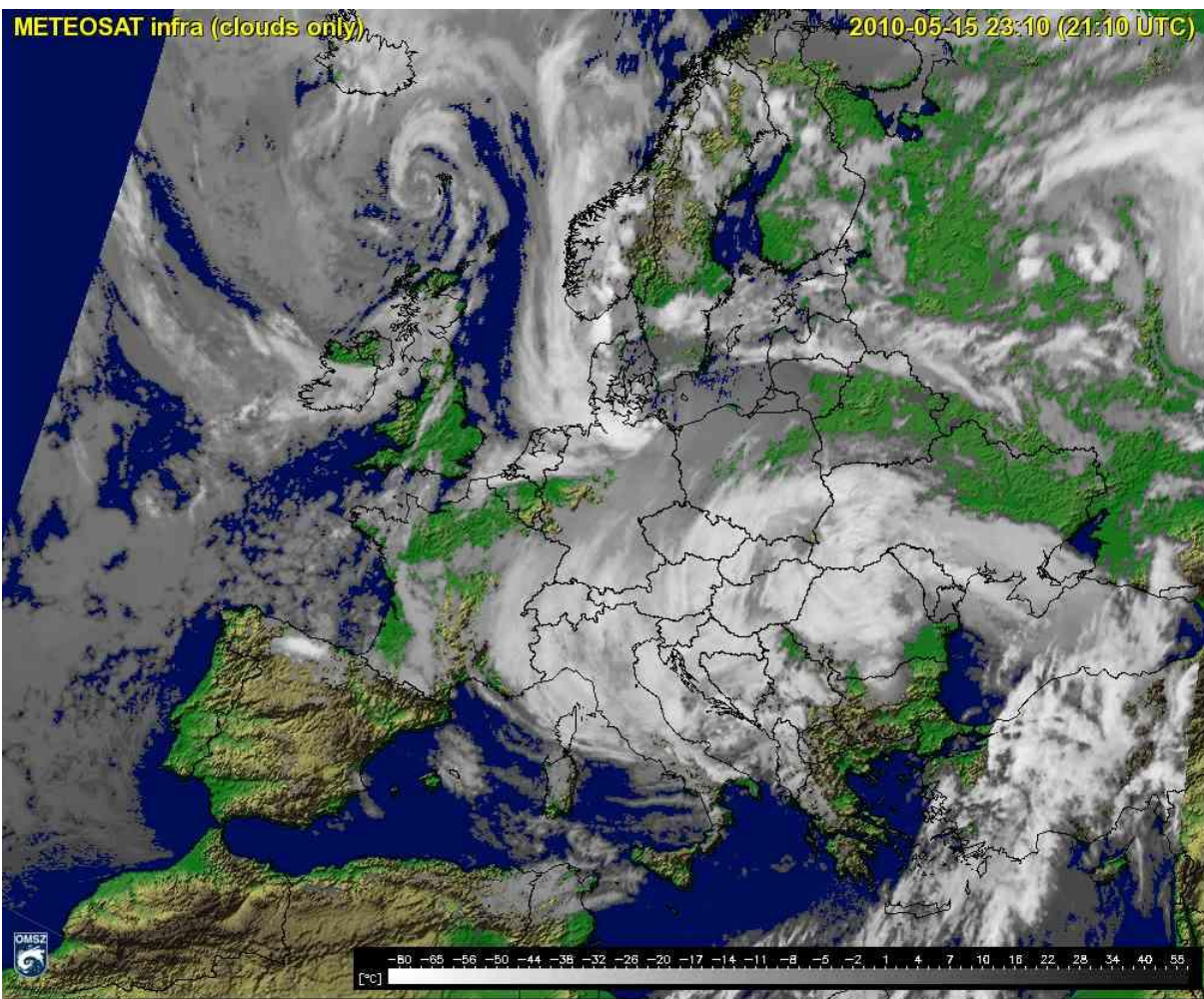
■ Annual precipitation — Average of 1971–2000

Annual mean temperature of Hungary 1901-2009



Based on homogenized, interpolated data

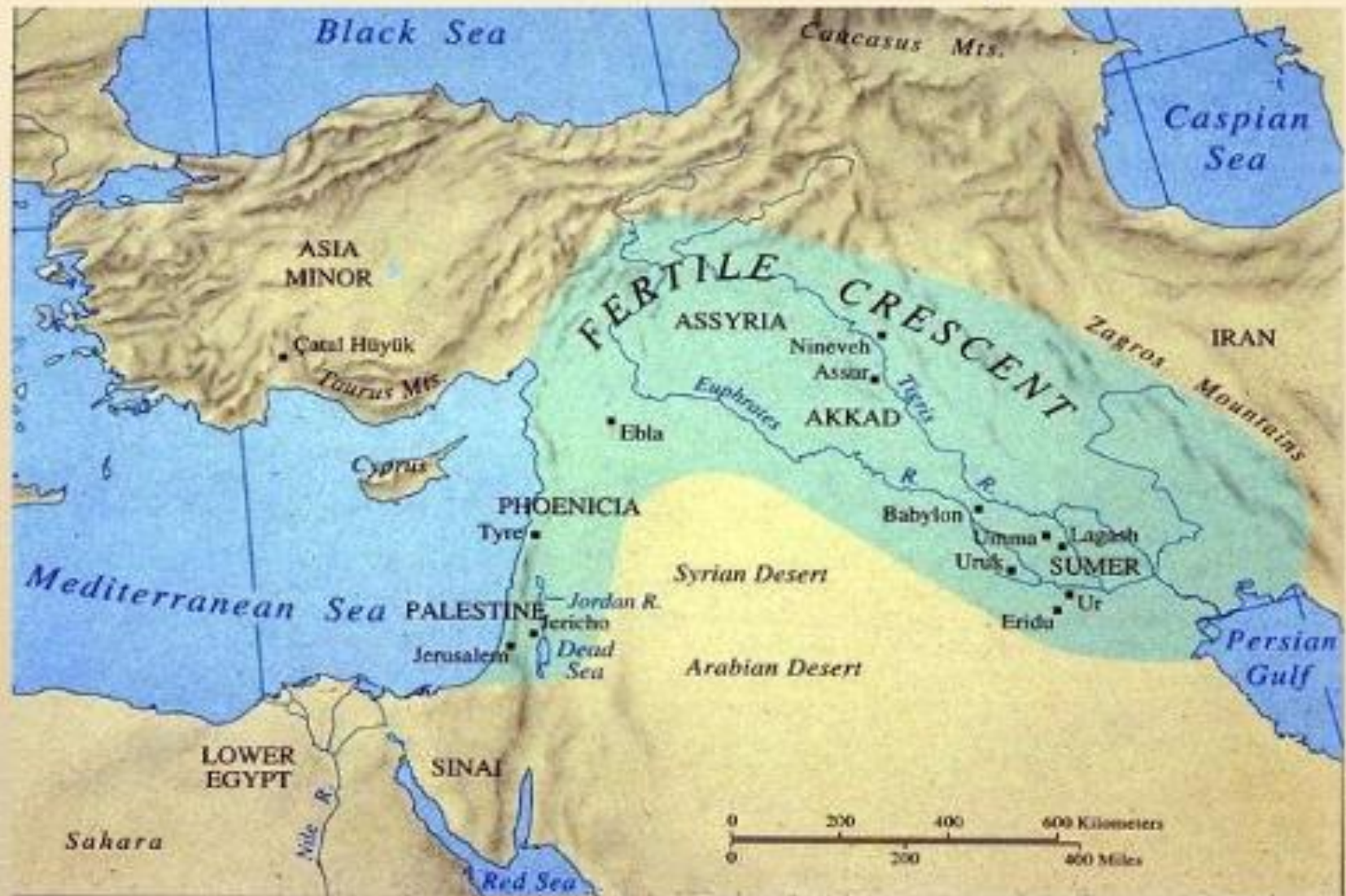




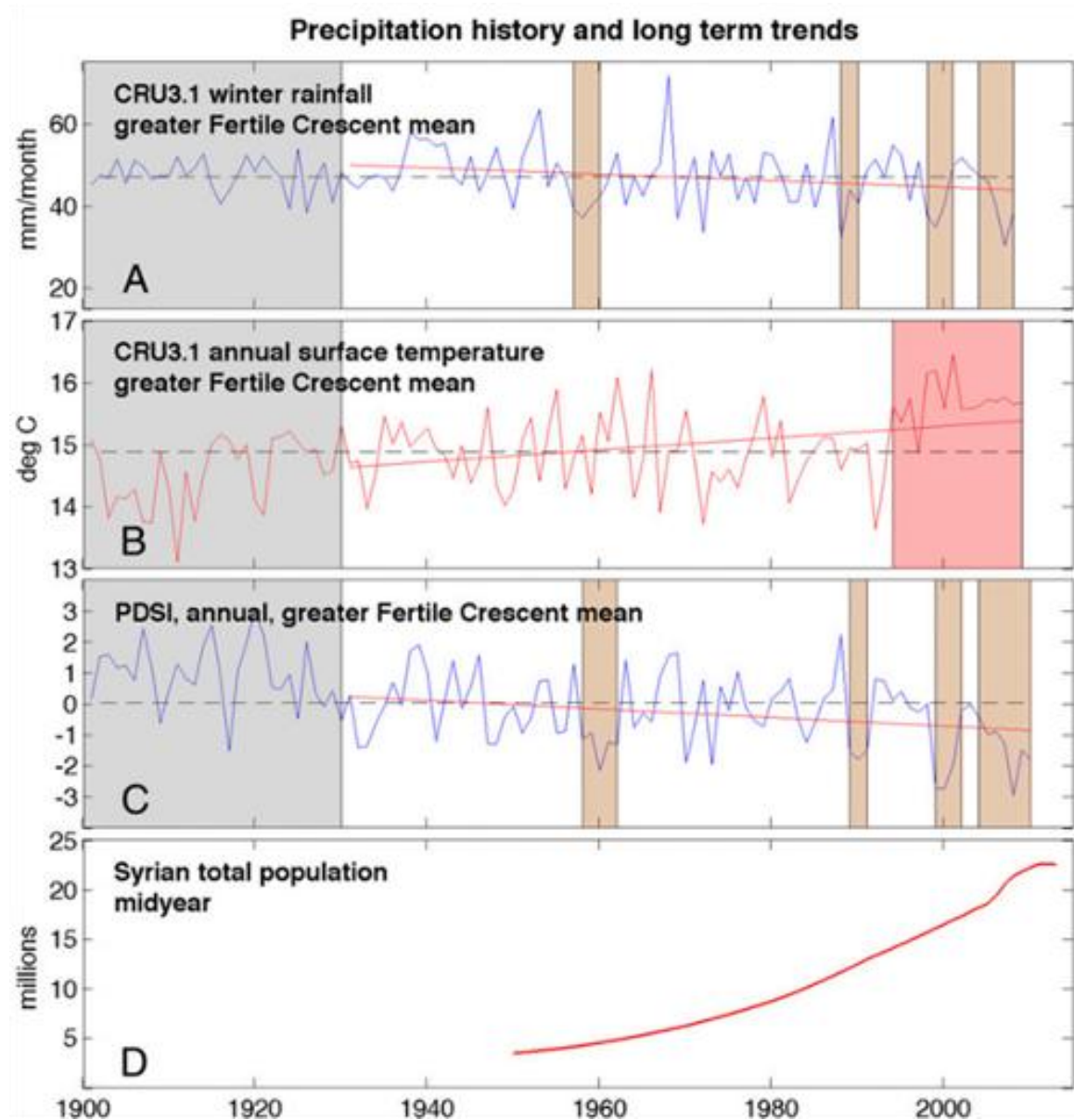
Flash Flood in Hungary, 2004

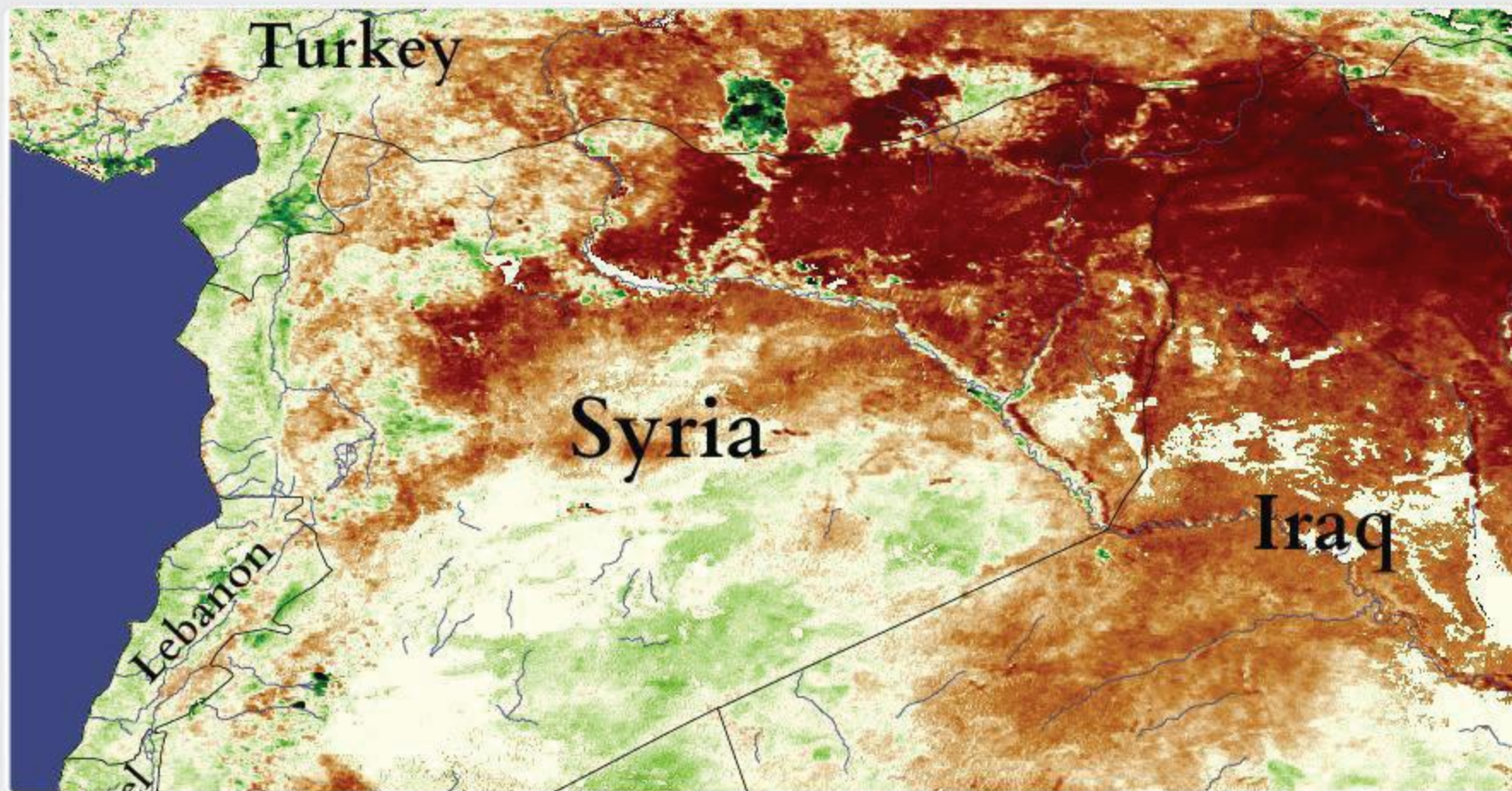


The Fertile Crescent/Mesopotamia



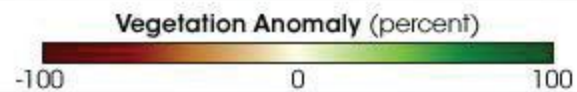
Syria: climate and population changes





2007-2008 Drought in the Fertile Crescent

April 2008



Impacts of Climate Change

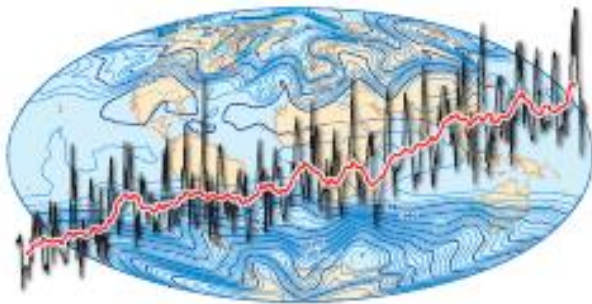
Most of the impacts are connected with the water cycle.

- Long-term trend in precipitation amount, intensity and frequency;
- Increase in risks of droughts and floods affecting agriculture, food production, energy production, water reservoirs, sustainability of ecological systems and infrastructure development;
- Rising sea levels endangers the sea-shore communities, cities, water reservoirs and food production.

Effects of Climate Change

Human Health

- Heat stress, cardiovascular diseases;
- Invazive allergenic species;
- Longer and more intense air pollution episodes;
- Flash floods endanger food and drinking water safety;
- Tropical and subtropical diseases emerging in northern areas
- Food safety, security and storage



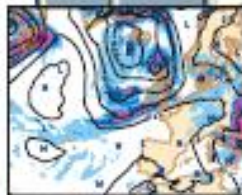
Developing the core forecasting systems



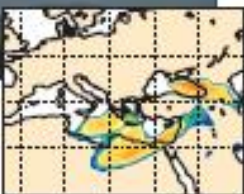
Reliable forecasts of severe weather



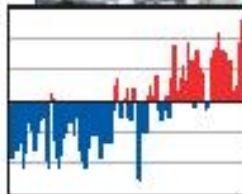
High-quality near-surface weather products



Atmospheric composition forecasting



Climate monitoring



ECMWF Strategic Plan, 2011-2020

Monitoring Atmospheric
Composition and Climate
(MACC-II)

Conclusions for Central Europe

Changing climate in Central Europe increases the risk of flooding, drought and inland excess waters.

The extent of damages caused is expected to increase and therefore the tasks of the water management in fighting floods, excess waters and droughts must be defined in their interaction and joint causes.

The main emphasis is supporting multiple effect measures, such as the creation of multipurpose reservoirs or the breaking through the semi-impermeable upper soil layer with various ploughing techniques so as to avoid inland excess water, which is generated mostly due to the lack of appropriate infiltration capacity of the soil.

Thanks for Your Attention !