

# Climate Change Impacts and Adaptation in the European Alps: Focus Water Resources



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*Project  
Members*



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research

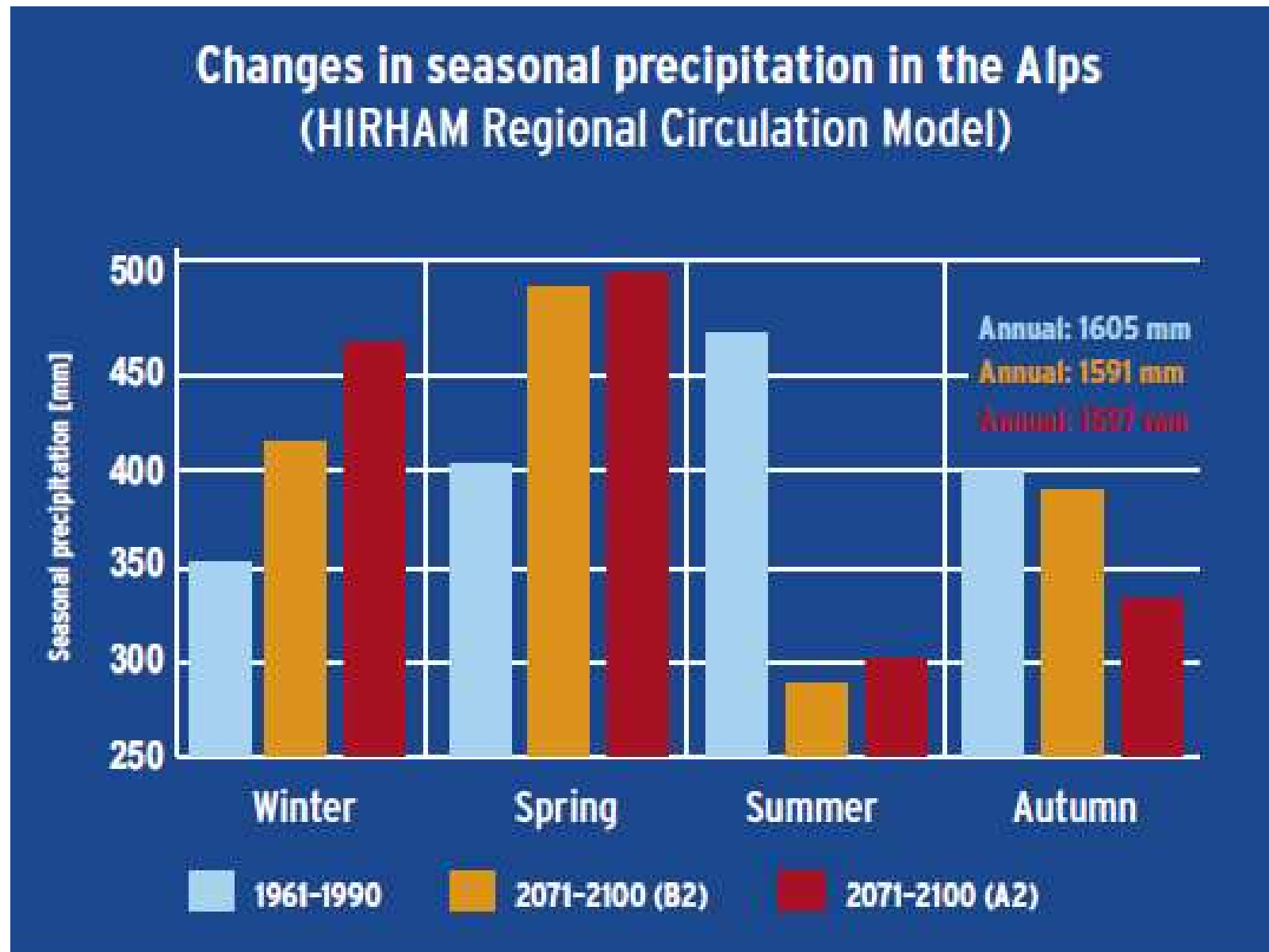


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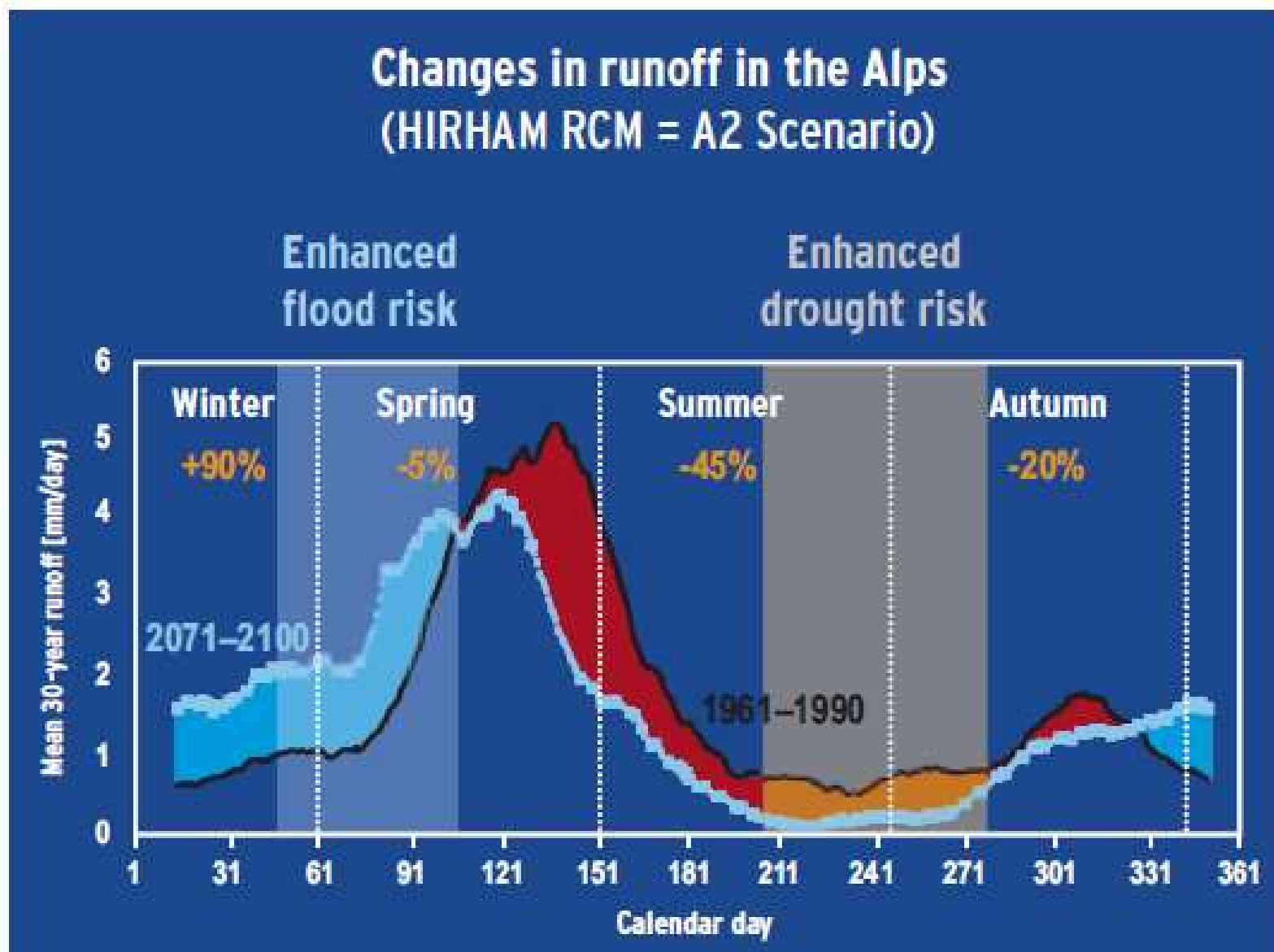


# Changes in seasonal precipitation in the Alps



Source: Beniston, M. (2006)

# Changes in runoff in the Alps (2071 – 2100)



Source: Beniston, M. (2006)



# Adverse Effects of Climate Change



**Dried-out Reservoirs**



**Lack of Snow in Winter**



**Loss of Biodiversity**



**Increasing Avalanches**



# Glacier Melting



# **Alpine Convention**

- Agreement for the protection and sustainable development of the Alpine Region (1991);
- 8 Member Countries and Permanent Secretariat;
- 8 Protocols on Transport, Energy, Conservation of nature and the countryside , Spatial planning and sustainable development , Tourism, Mountain farming, Mountain forests, Soil conservation;
- Declaration on Population and Culture (2006)
- Report on the state of the Alps II: water resources and water management (2009);
- Climate Change Action Plan (2009).

**<http://www.alpconv.org>**

## Studies

1. **OECD:** Climate Change in the European Alps: Adapting Winter Tourism and Natural Hazards Management (2006)

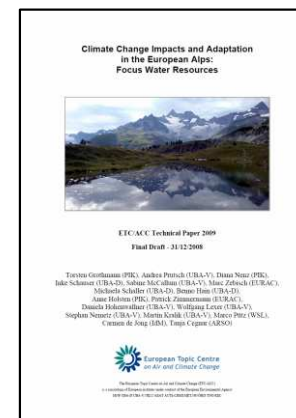
[www.oecd.org](http://www.oecd.org)

2. **German Environment Ministry:** Climate Change in the Alps: Facts - Impacts - Adaptation (2007)

[www.bmu.de](http://www.bmu.de)

3. **European Environment Agency:** Climate Change Impacts and Adaptation in the European Alps: Focus Water Resources

Coming soon



# Aims

- To analyse the **vulnerability** of the Alpine Region and surrounding European regions with regard to the impacts of global change, focussing on water availability
- To assess possible needs, constraints and opportunities for **adaptation** to the adverse impacts in the water sector
- To support **regional and local administrations** in making informed decisions to better develop and implement adaptation strategies
- To expand the **knowledge base** and **complement** other studies



# Structure

- **Setting The Scene** (Highly vulnerable region; EU Political background; Alpine Convention and Report on Water; Climate change in the Alps; Water tower of Europe; The sectoral perspective)
- **6 Alpine Case Studies** (4 climatic regions; drivers of adaptation measures; multi-level governance; example of good practices; knowledge barriers)
- **Lessons Learned** (Synthesis of key vulnerabilities and adaptation options across Europe/Alpine river catchments; Lessons learned and knowledge transfer to other mountain regions (e.g. Carpathian))

# Guiding Questions for the Alps Study

How will climate change affect the Alps?

Does the water supply from the Alps affect the whole of Europe?

How are sectors influenced by and adapting to changing water availability?

Do we need regional approaches to adaptation?

What lessons can be learnt from the regional case studies?

Is dealing with adaptation to water resource problems a European challenge?

Could other mountain regions profit from experiences in the Alps?

Data source: DEM: GTOPO30 (U.S. Geological Survey, 1996); Perimeter Alpine Convention; SABC (Vers. 1.1) & Ruffin processed by Zebisch, EURAC (2006) based on EuroBoundaryMap (2004) and modified by ifuplan (2007) and Umwelt Rivers & Lakes: CCM River and Catchment Database (European Commission - JRC, 2007); River Basin Districts: EEA National Borders: GISCO Database (Eurostat, 1997 - 2000), Cities: ESRI basemap data

## Lessons learned

1. Common understanding of “adaptation to CC”;
2. Communication networks between communities to deal with water problems;
3. Measures as response to climate change in line with existing traditions, rules and laws;
4. Future strategic planning based on risk awareness, clear responsibilities and management structures;
5. Actual knowledge about specific effects of climate change is valid enough for concrete planning;
6. Vulnerability estimates as basis for adaptation measures;

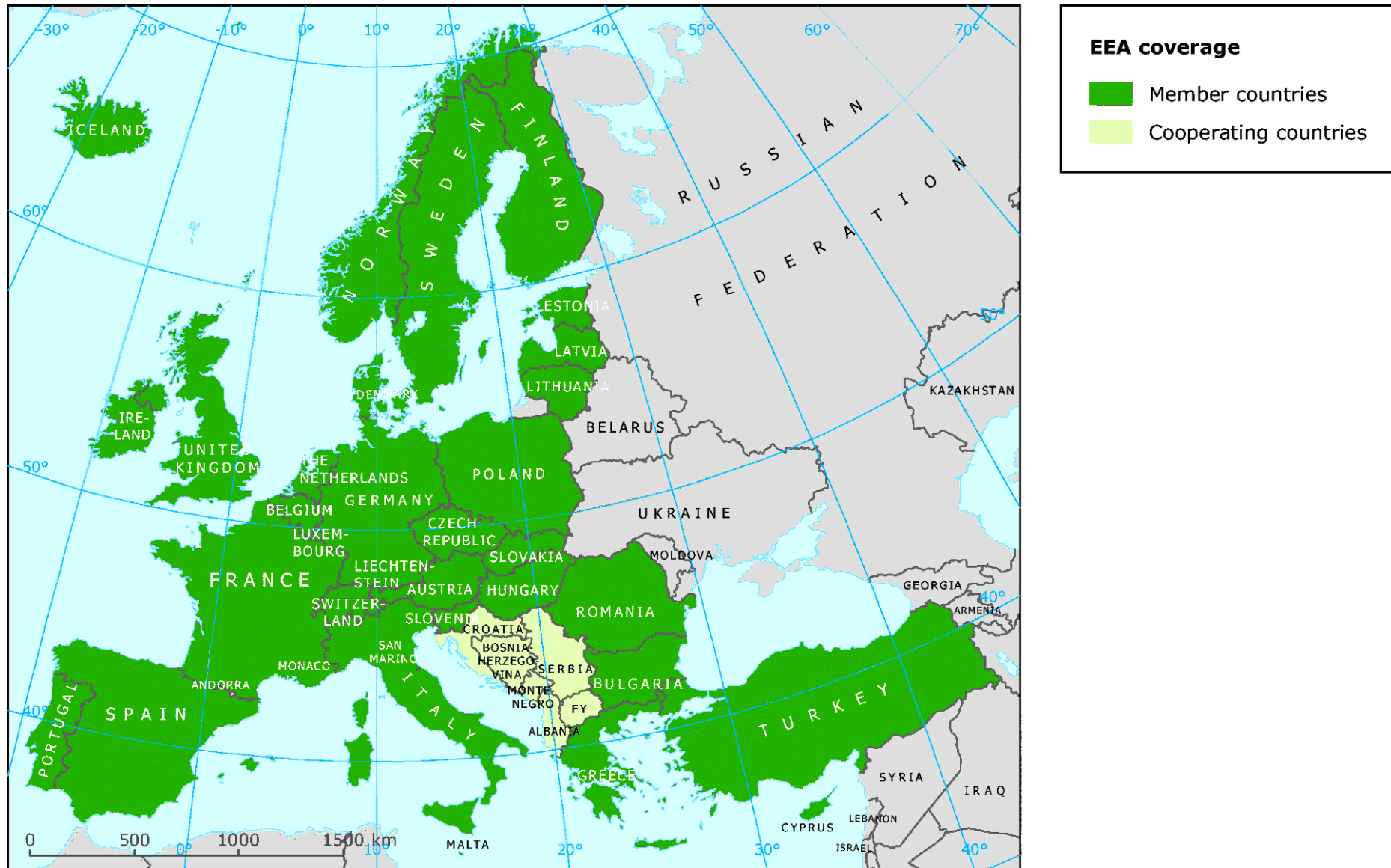


# The EEA Mission

***The European Environment Agency is the EU body dedicated to providing sound, independent information on the environment***

***We are a main information source for those involved in developing, adopting, implementing and evaluating environmental policy, and also the general public***

## EEA Member and Collaborating Countries



## EEA Key projects

- Impacts of Europe's changing climate – 2008 indicator-based assessment (EEA-JRC-WHO report)
- Vulnerability & adaptation to water scarcity in the Alps
- 2010 State of the Environment and Outlook report
- EURECA – European Ecosystems Assessment (2012)
- Mapping vulnerability and disaster risks
- Developing adaptation indicators
- Support to the development of a European Clearinghouse on climate change impacts, vulnerability and adaptation in Europe (EU Adaptation White Paper)



# European Clearing House on Climate Change, Impact, Vulnerability and Adaptation

- Climate change observations, impacts, vulnerabilities, actions, costs;
- Provides networking to existing and future thematic and regional networks and organisations (droughts, marine, forest fires, coastal zones, disasters);
- Implementation of EU White Paper on Adaptation;
- Supports the coordination of future EU contributions to the UNFCCC Nairobi Work Programme;
- Includes the results of relevant research projects;
- Relevant information for countries outside the EU.

# Maladaptation in the Alps : Snow cannons





**Thank You!**

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