

# European Initiatives on Drought: Research Projects and Networks

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# Outline



- Drought in Europe: events and issues
- Previous research on hydrological drought
- Current Research Projects
- Research Networks
  - The European Drought Centre (EDC)
  - XEROCHORE



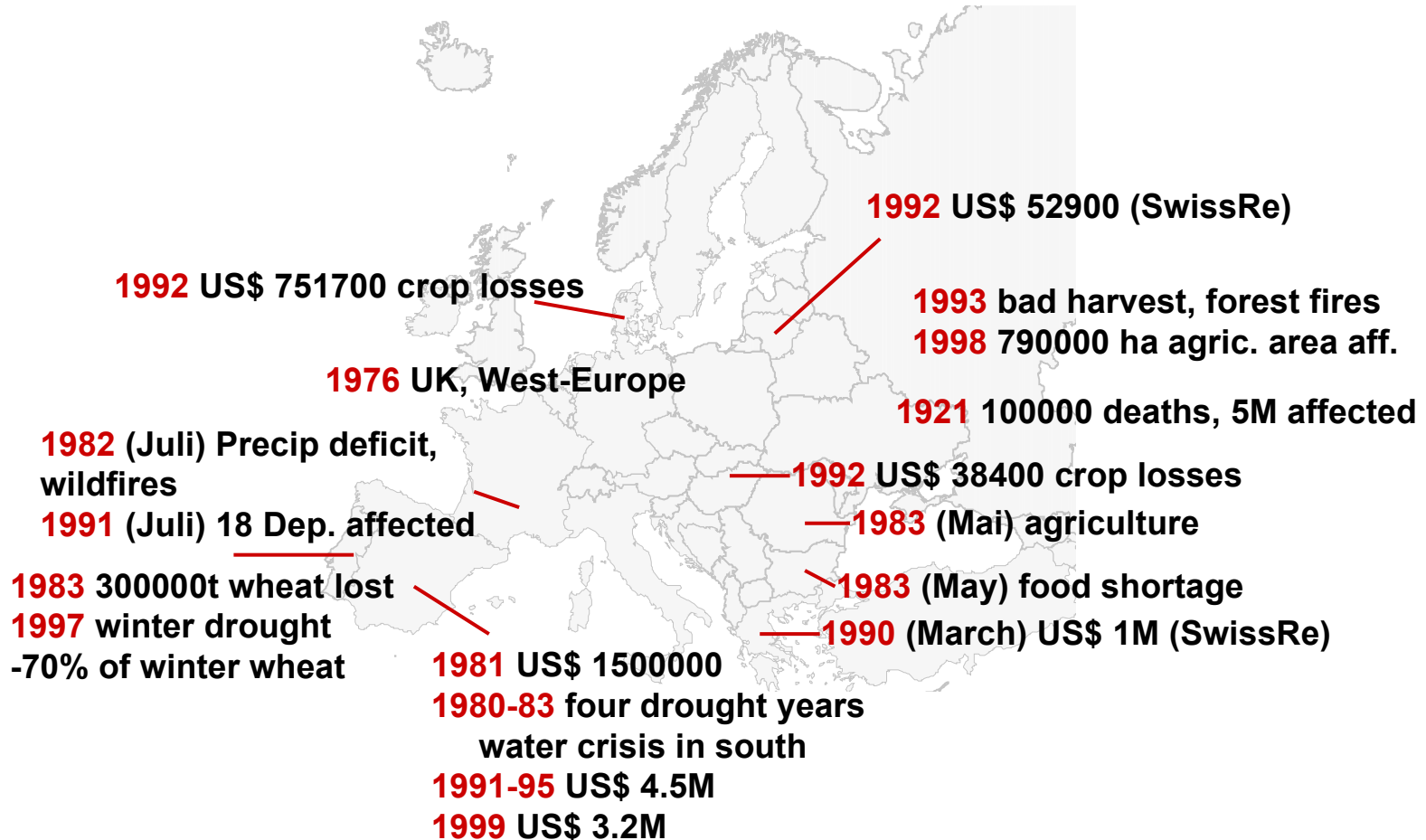
# Drought in Europe



Project



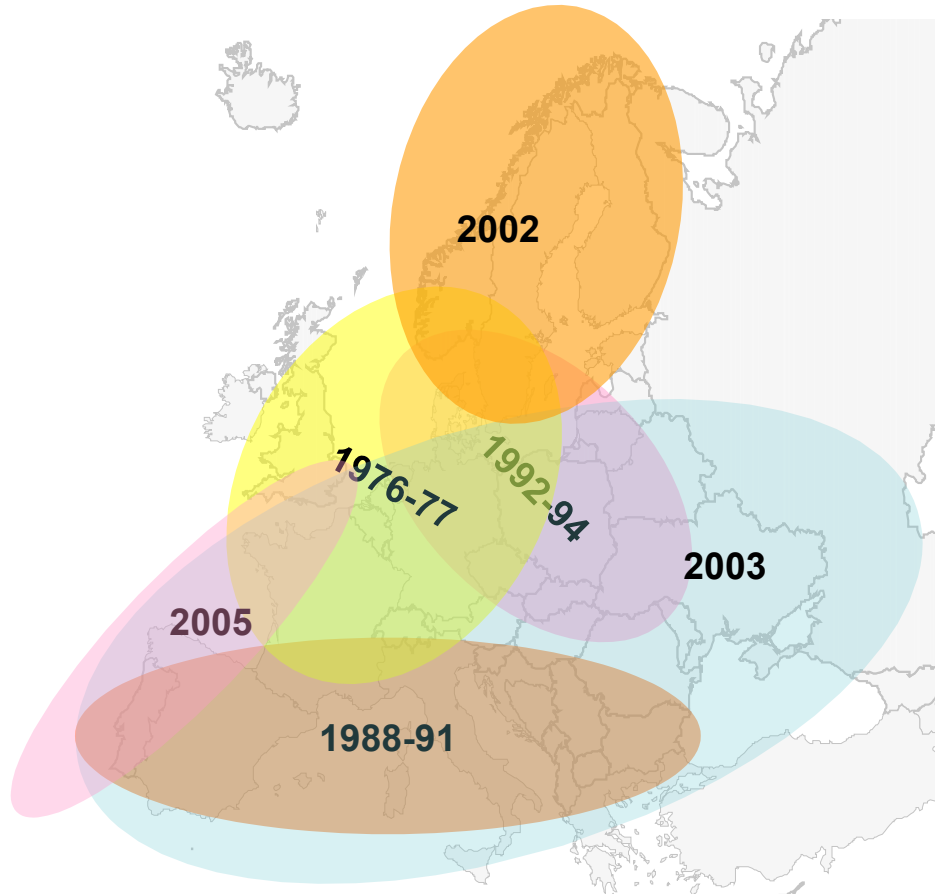
# Drought in Europe: Impacts



Source: Em-Dat OFDA/CRED International Disaster Database

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# Recent Droughts in Europe

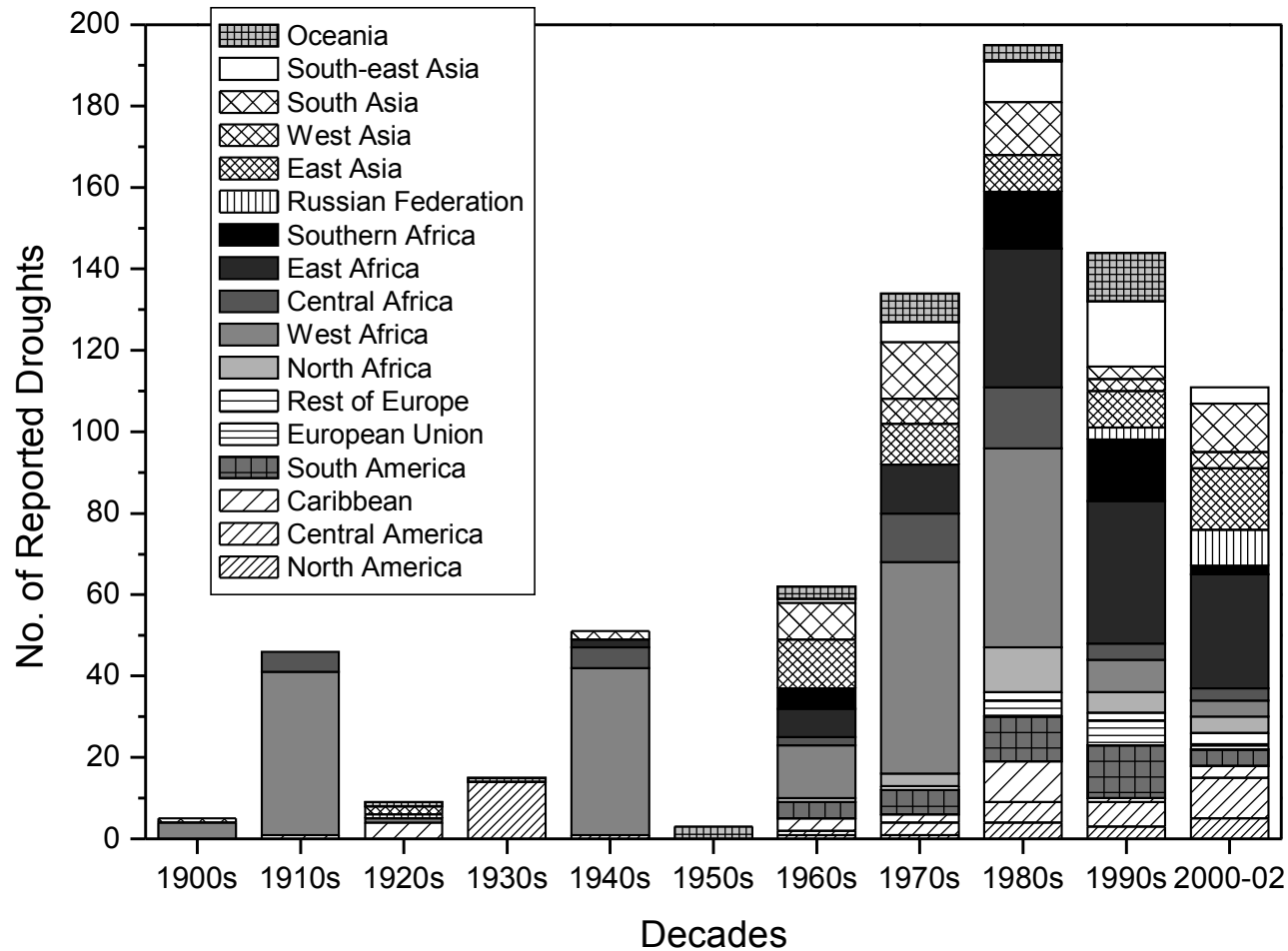


# Impacts of 2003 drought



- Navigation problems with in large rivers
- Danube: lowest water level in 160 years
- Rhine at Lobith: lowest observed water level ( $825 \text{ m}^3\text{s}^{-1}$ )
- Water temperatures of up to 30 C lethal to fish
- Power plant shut-downs (cooling water too warm)
- Rotting foundations of historical buildings and dikes (NL)
- Forest fires, reduced crop (10.6 Billion Euro)
- Deaths due to heat wave

# Droughts in Europe in the 20<sup>th</sup> Century



Source: Em-Dat OFDA/CRED International Disaster Database





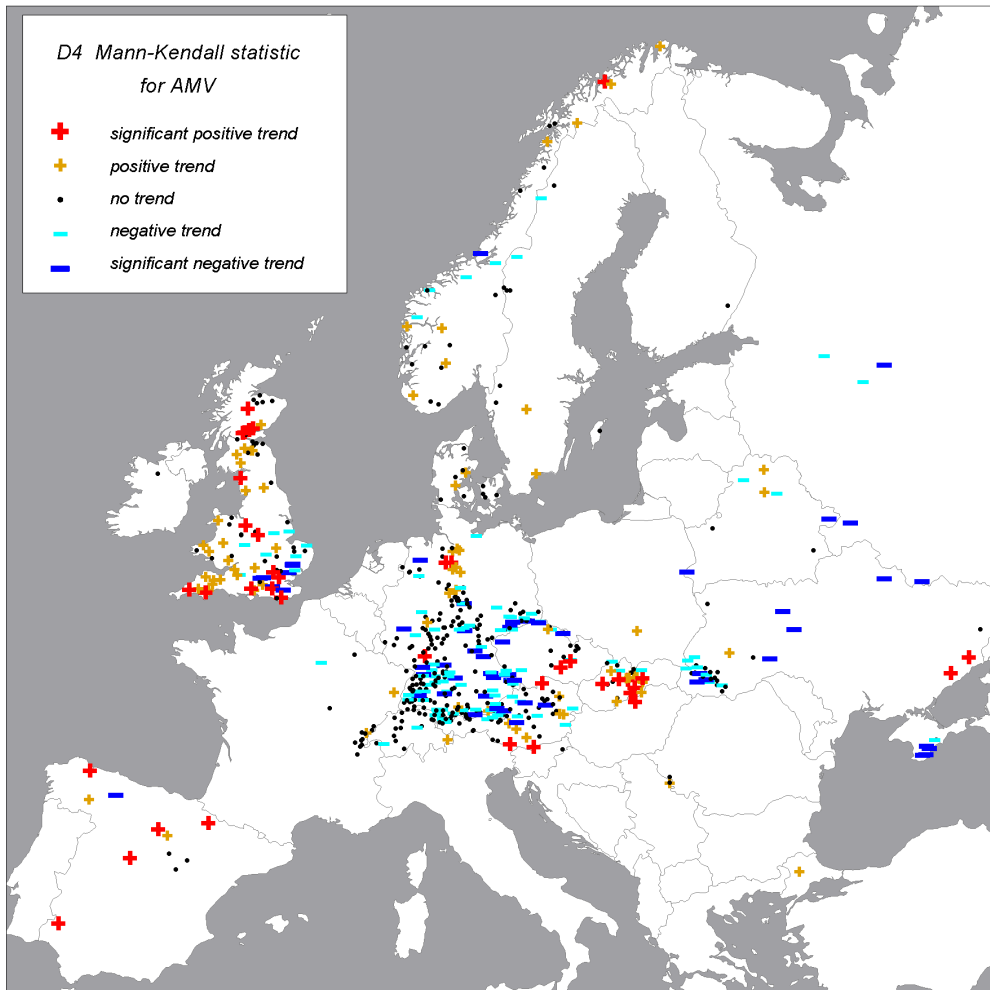
# Previous research on hydrological drought

# (Previous) Research Questions

## Hydrological Drought – Streamflow Deficit

- Have droughts become more frequent or severe?
- Are there recurring spatial patterns?
- Which weather patterns cause drought?
- Are droughts related to decadal climate modes?
- Can these links be used for prediction?

# Have droughts become more frequent or severe?

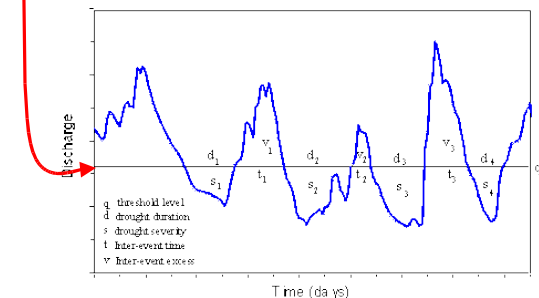
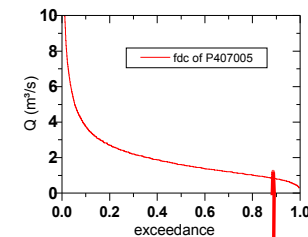


Hisdal et al., 2001, Int. J. Climatol.

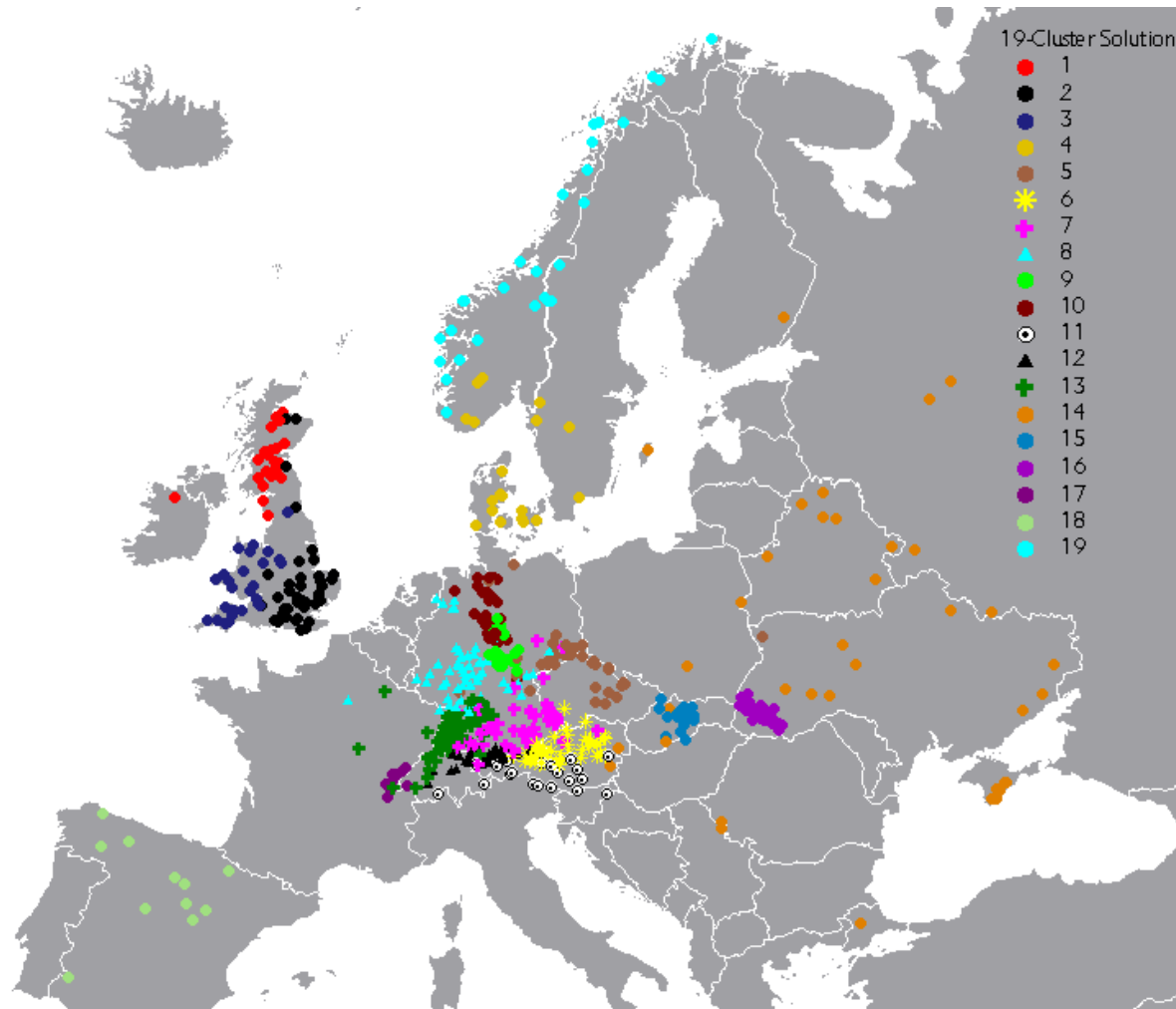
## Drought trends in Europe: 1962-90

red - significant positive (towards drier conditions)

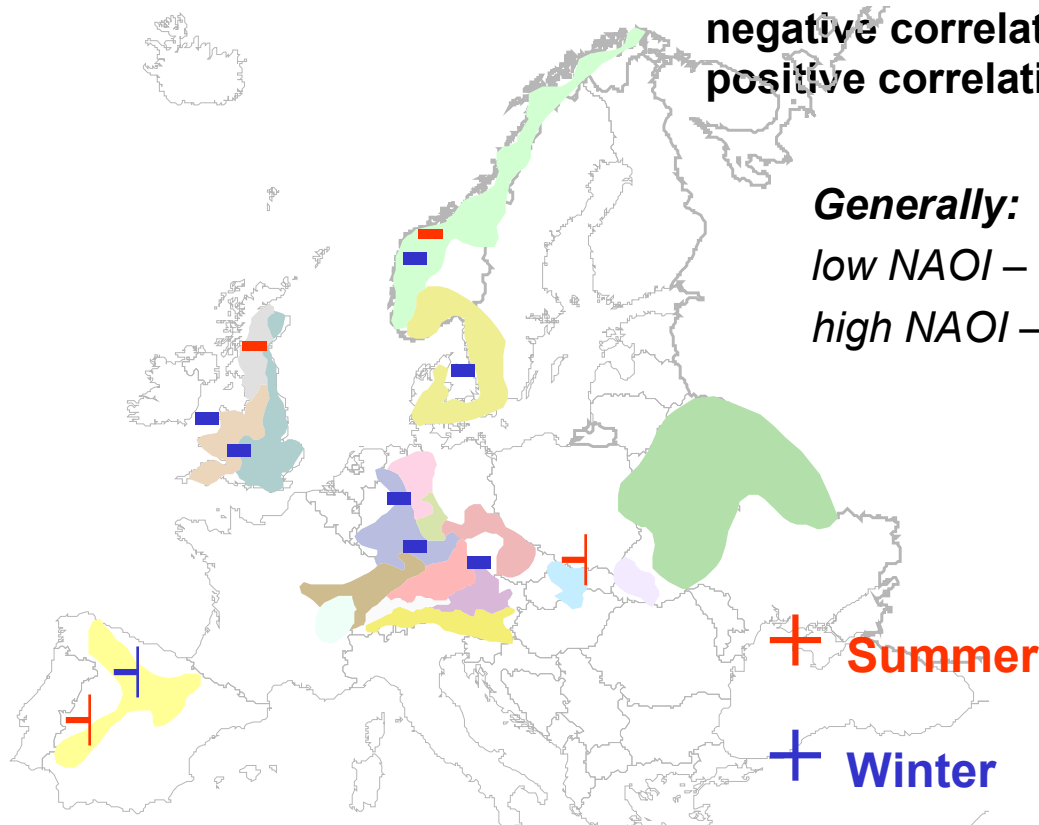
blue - significant negative (towards wetter conditions)



# Cluster with simultaneous deficits



# Regional Drought Indices and the NAOI






# Current Research Projects

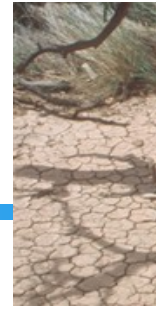
# Current and Future Research Questions

- Do the recent severe events influence trends and frequency stats?
- How does a drought signal propagate through the hydrological cycle and in space?
- Which processes dominate drought in different climates & how are these modelled?
- How well are hydrological extremes simulated by climate+LS model, how can we quantify uncertainty?

# Current Research Projects

- FRIEND/UNESCO trend analysis update using recent data from small uninfluenced catchments
- EU- COST Action
  - Comparison of objective weather patterns
  - Correlation with drought
- 
  - Droughts in the past and future century from observed, reanalysis and scenario data
  - Extremes in (operational) river basin models vs coupled land-surface schemes





# Research Networks



- Home
- EDC
- Drought
- Resources:
  - Europe Today
  - World Today
  - EDC Archive
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  - Network Groups
- Organisation:
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## Home

### EUROPEAN DROUGHT CENTRE WEBSITE

The European Drought Centre (EDC) is a virtual centre of European drought research and drought management organisations to promote collaboration and capacity building between scientists and the user community. The long term objective of the centre is to enhance European co-operation in order to mitigate the impacts of droughts on society, economy and the environment. Although the EDC primarily has a European dimension, it will also link with other international projects, organisations and experts outside Europe. You are invited to sign up.

#### EDC NEWS

- **Announcement (pdf): International Summer School on Hydrological Drought & Global Change, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, 22 - 27 June 2008**
- **1st announcement (pdf): International Conference on Drought Management Systems – Development of WFD and comparison with other experiences, Lisbon, Portugal, 16 November 2007**
- **Policy document: Drought and Climate Change. Annex to: Commission Staff Working Document Impact Assessment (SEC(2007) 993) Belgium 2007**  
 – Water policy in the European Union: [Communication on Water Scar city and Droughts](#)
- **The discussion document 'Towards a European Drought Policy' was published in November 2004 by the EurAdvis network of Europe's leading freshwater research**

- Virtual centre of European drought research and management organisations
- promoting collaboration and capacity building between scientists and the user community.
- enhancing European co-operation in order to mitigate the impacts of droughts on society, economy and the environment.

# EDC – Objectives

- towards a better understanding of the drought phenomenon;
- platform to initiate and discuss scientific progress on drought research within the academic society
- forum for discussion on policy issues related to sustainable water resources management in a pan-European context (WFD and drought management);
- liaise with national and international organisations and programs (e.g. UNESCO, WMO-HWRP, IAHS, IAH, EGU), EU framework programs, and regional drought centers;
- support the development of national drought mitigation plans based on best practices guidelines.

- Access to updated and relevant information on
  - drought activities in Europe and outside;
  - the current drought situation in Europe;
  - archived information on historical droughts in Europe and outside;
- Dissemination of key publications;
- Increased possibility to get involved in new initiatives, find experts
- Dissemination of regional and country specific information and research initiatives on drought

- Training
- ....
- ....
- *....to be determined*

# EDC – Int. Training Courses

- ❑ **Montpellier, France (2003)**
- ❑ **Wageningen, the Netherlands (2003)**
- ❑ **Kuala Lumpur, Malaysia (2005)**
- ❑ **Rabat, Morocco (2006)**
- ❑ **Trieste, Italy (2008)**
- ❑ **Southern Africa (planning is ongoing)**
- ❑ **Bhutan (exploring)**

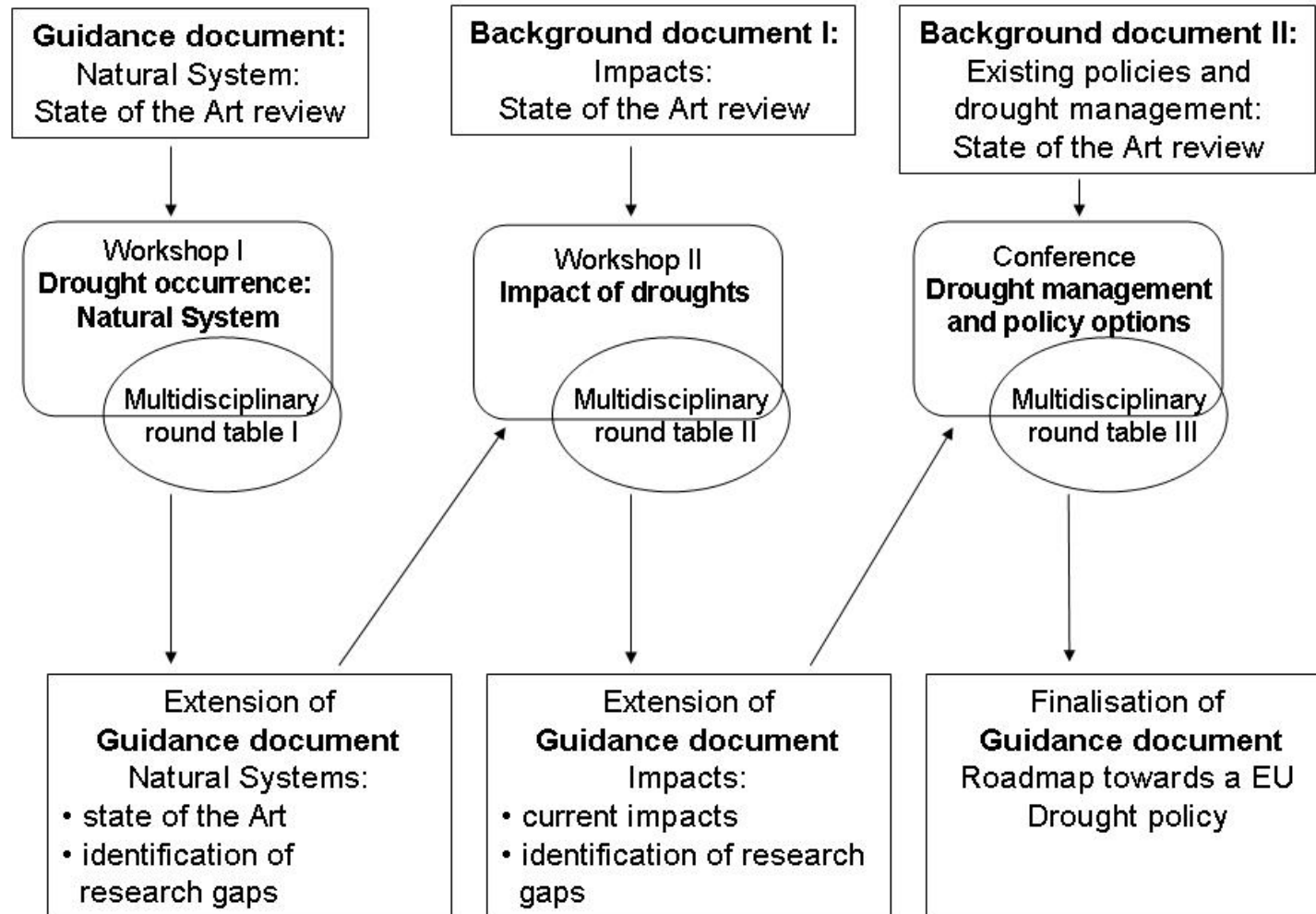


# Xerochore - Objectives

- Main research gaps through a state-of-the-art review
  - natural system
  - impacts (socio-economic and environment)
  - drought management
- Provide a ROADMAP to assist with development of a European Drought Policy in accordance with the EU-Water Framework Directive (EU-WFD)



# XEROCHORE – Work Plan



- EDC – Core Group Members
- Particularly
  - Lena Tallaksen, Hege Hisdal (Oslo)
  - Henny van Lanen (Wageningen)