

From indicators to impacts: early findings from the DrIVER project

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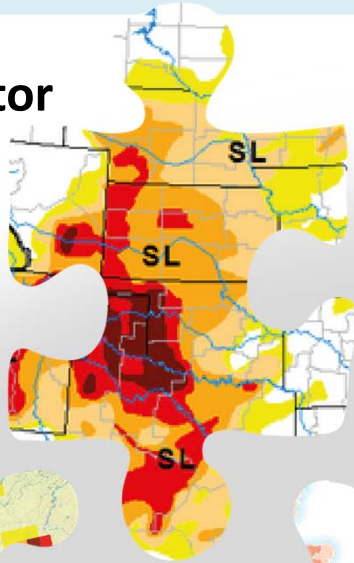
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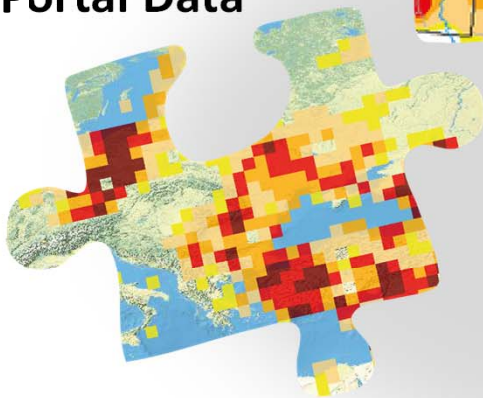
Drought Impacts and Vulnerability thresholds in
monitoring and Early warning Research

Need for ground truthing drought indicators with impact data to identify meaningful indicators for monitoring and early warning

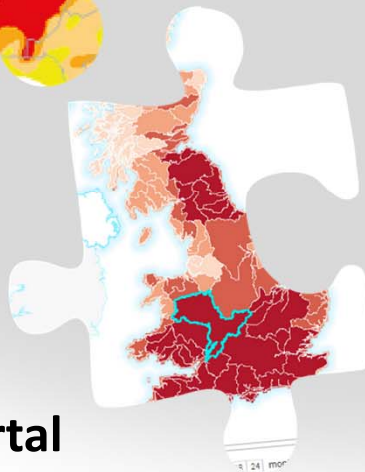
US Drought Monitor



Global Drought Portal Data



UK Drought Portal



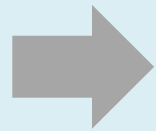
Link



- Which drought indicators best represent occurrence of drought impacts on
 - ✓ water supply
 - ✓ agriculture
 - ✓ ecosystems
 - ✓ other sectors and/or systems...
- What are critical indicator thresholds for drought impacts to occur?



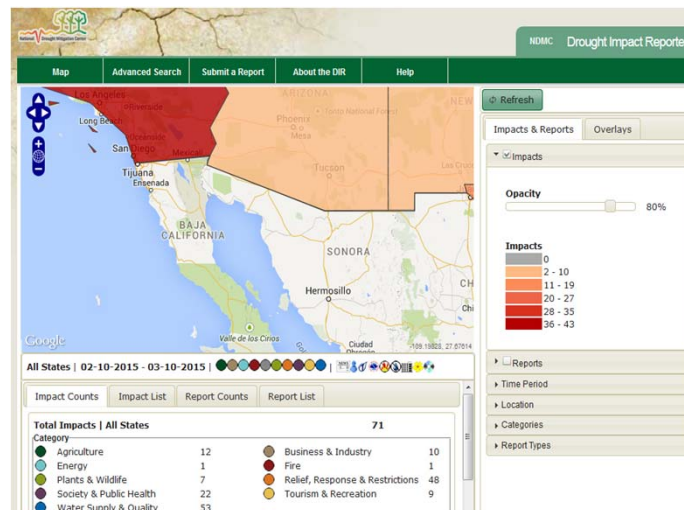
Information on drought impacts is sparse and fragmented



Textual evidence of drought impacts

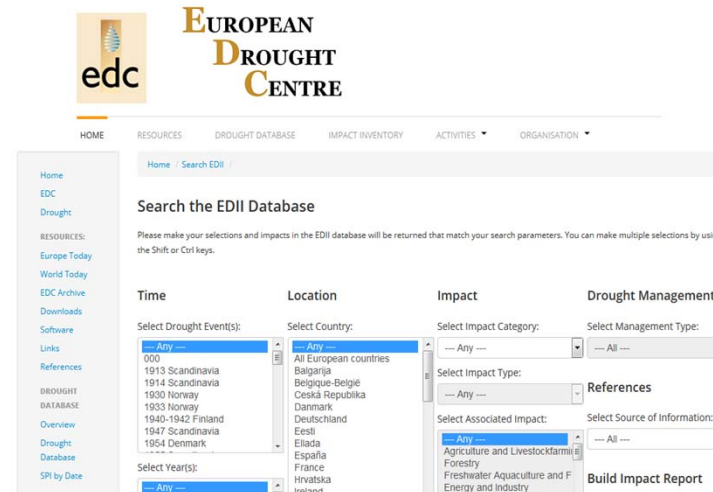
US Drought Impact Reporter (DIR)

<http://droughtreporter.unl.edu/>



European Drought Impact report Inventory (EDII)

<http://www.geo.uio.no/edc/droughtdb/>



EDC EUROPEAN DROUGHT CENTRE

HOME / Search EDII

Search the EDII Database

Please make your selections and impacts in the EDII database will be returned that match your search parameters. You can make multiple selections by using the Shift or Ctrl keys.

Time	Location	Impact	Drought Management
Select Drought Event(s): 000 1913 Scandinavia 1914 Scandinavia 1930 Norway 1933 Norway 1940-1942 Finland 1947 Scandinavia 1954 Denmark	Select Country: All European countries Bulgaria Belgique-Belgie Ceska Republika Danmark Deutschland Eesti Ellada Espana France Hrvatska Ireland	Select Impact Category: Any Select Impact Type: Any Select Associated Impact: Agriculture and Livestock Forestry Freshwater Aquaculture and F Energy and Industry	Select Management Type: All References Build Impact Report

Impact information from the European Drought Impact report Inventory (EDII)



Report source

Location

Timing

Impacts

Archive



Impact categories

- Recreation and tourism
- Conflicts
- Human health and public safety
- Energy and industry
- Waterborne transportation
- Public water supply
- Water quality
- Freshwater ecosystems
- Air quality
- Forestry
- Wildfires
- Agriculture and livestockfarming



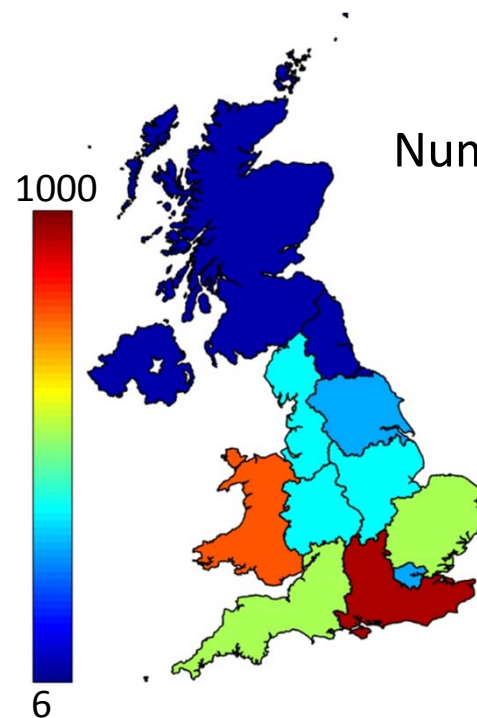
ID	Location		
	Country	NUTS 1	NUTS 2
bf_1	Switzerland	Switzerland	Espace Mittellan
ik_1	Switzerland	Switzerland	Nordwes
		NUTS 3	Location
bf	Bern		nuclear power plant Mühleberg in Mühleberg
Aargau			nuclear power plant Beznau in Döttingen (Zurzach)
Bern/Luzern			several parts of
Impact details			
YYYY	categ.	type	description
2003	4	4.2;	Due to a lack of cool were needed to redu
2003	4	4.2;	Due to a lack of cool were needed to redu and August 2003.
	7	7.3;7 .4	Limitations and bans the lawn, filling of po actions were necess

Correlation between **monthly timeseries of mean indicator values** and **number of impact occurrences** per major socio-economic region (1970-2012)

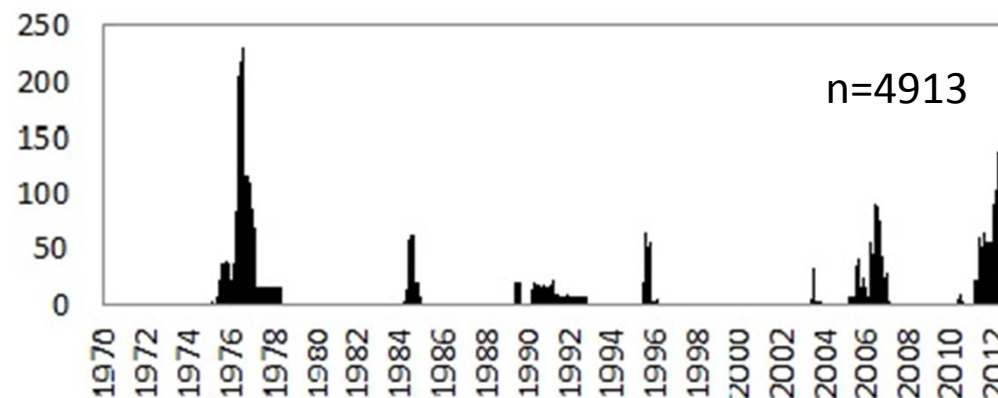
Indicators

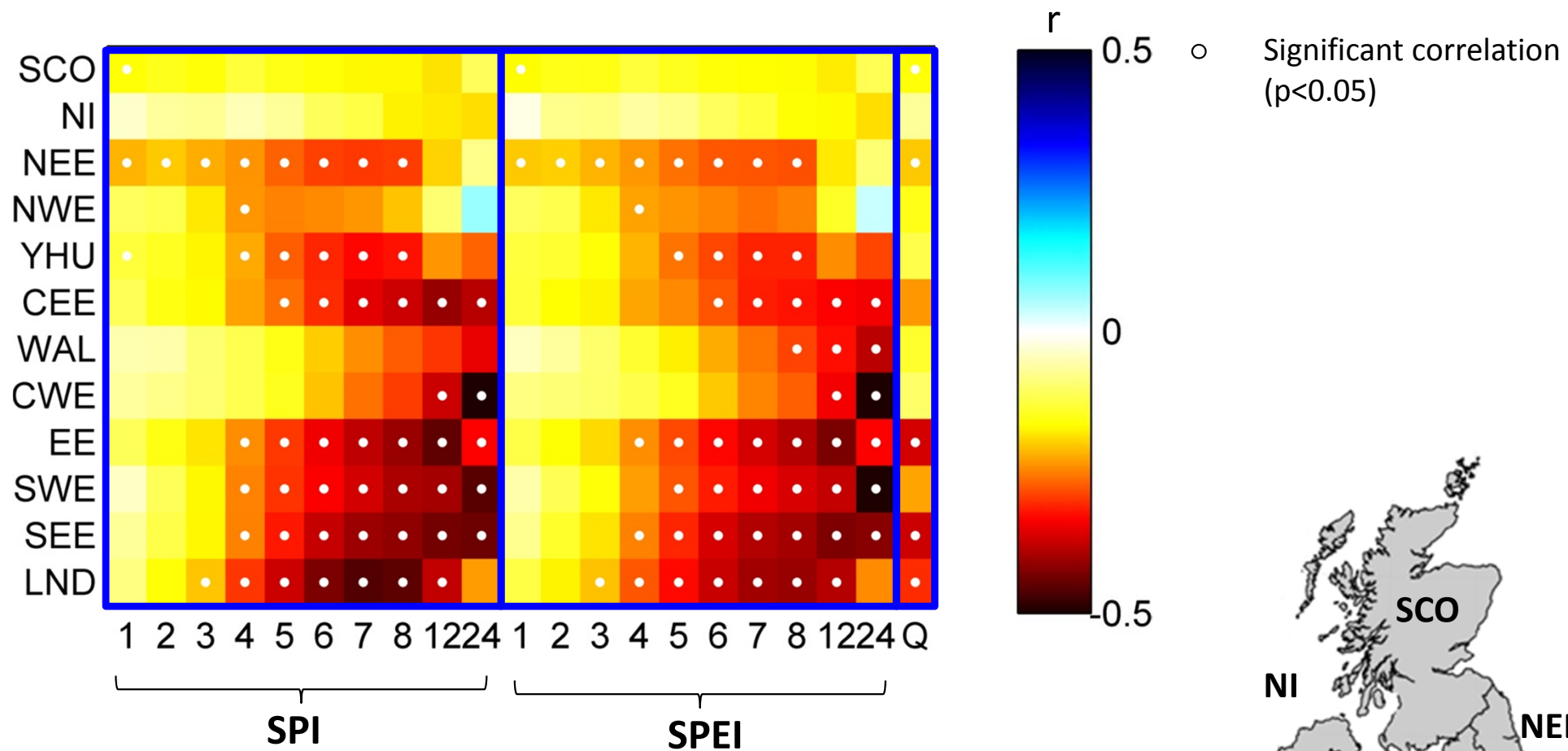
- (1) Standardized Precipitation Index of different timescales (**SPI-*n***)
- (2) Standardized Precipitation Evaporation Index of different timescales (**SPEI-*n***)
- (3) Streamflow percentiles (**Q**)

Impacts



Number of impacts in the UK in space and time



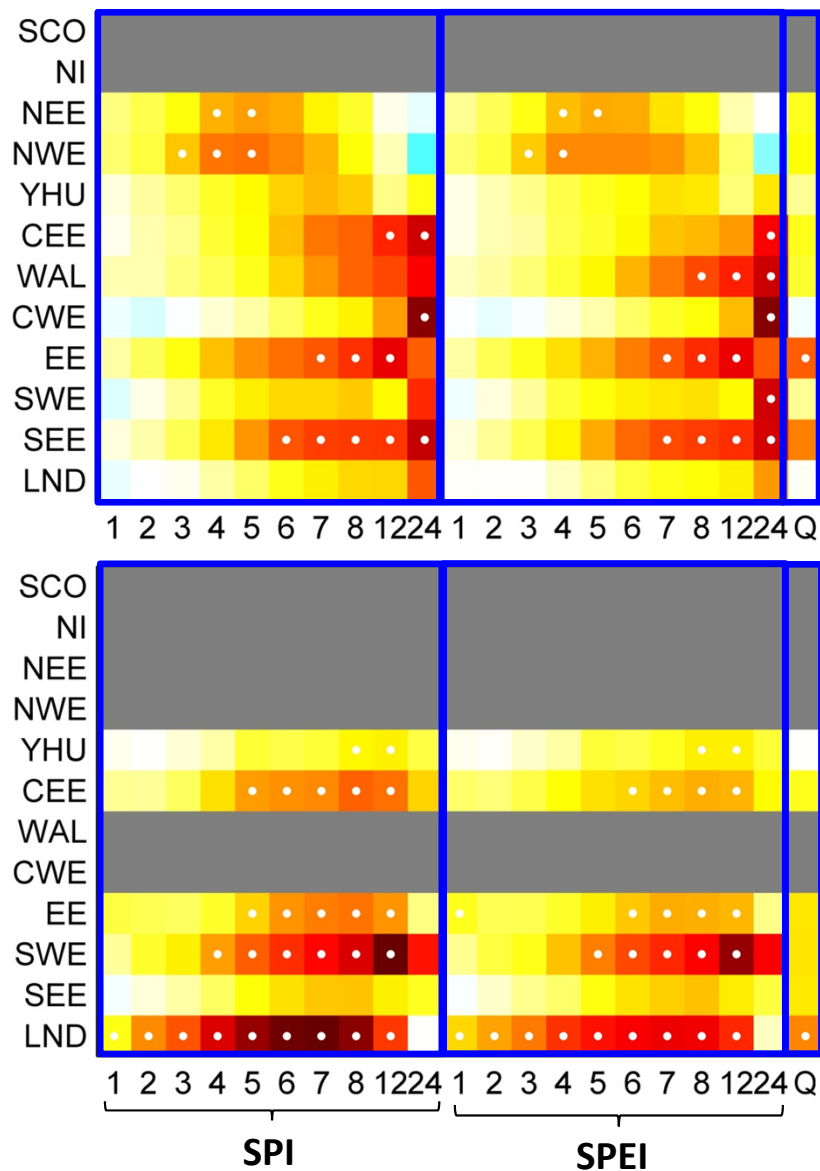


Long SPI and SPEI timescales are best explanatory variables in the southern regions, while in the central/northern regions intermediate SPI and SPEI timescales show highest correlation

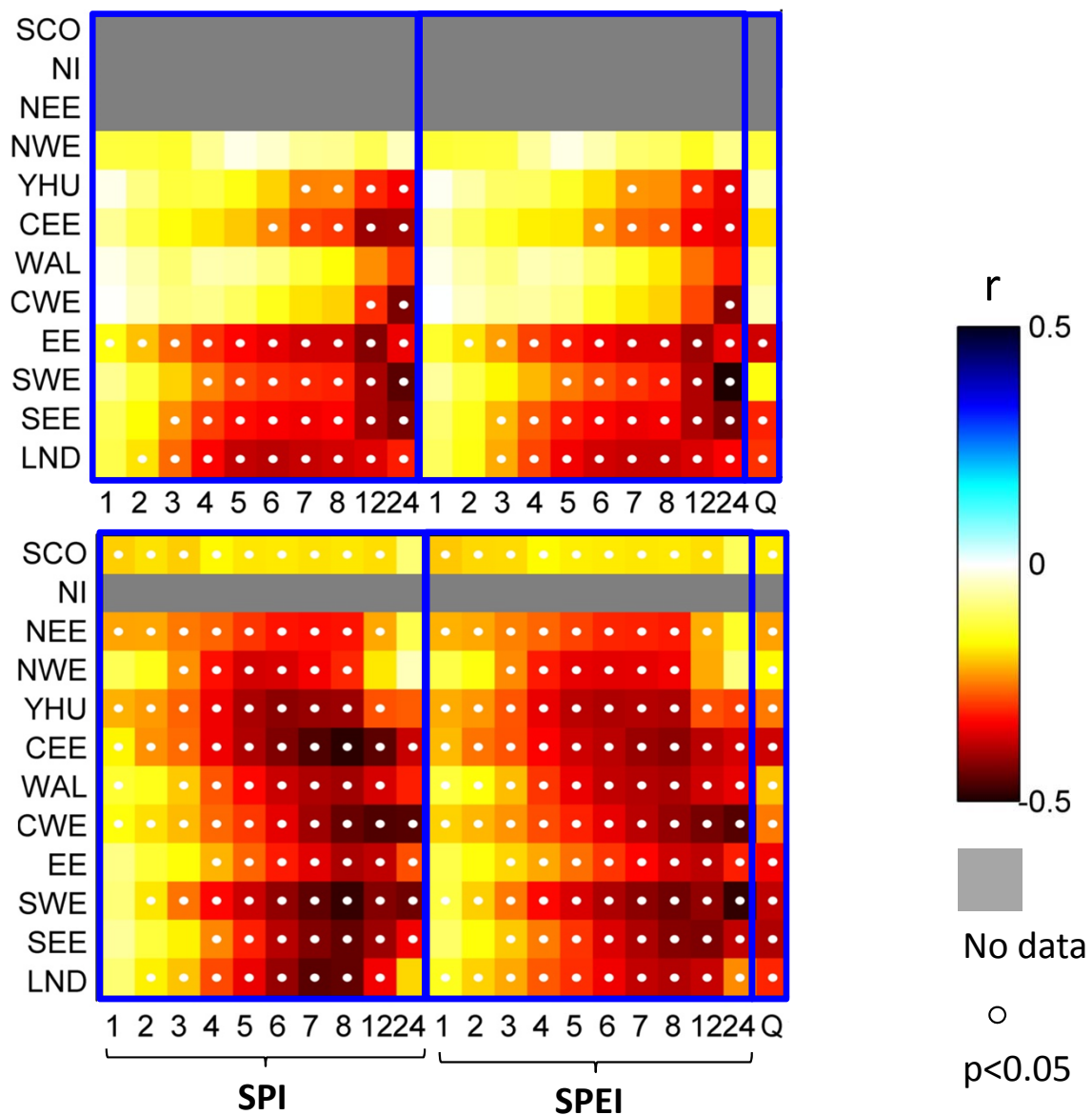
Q= Streamflow percentiles

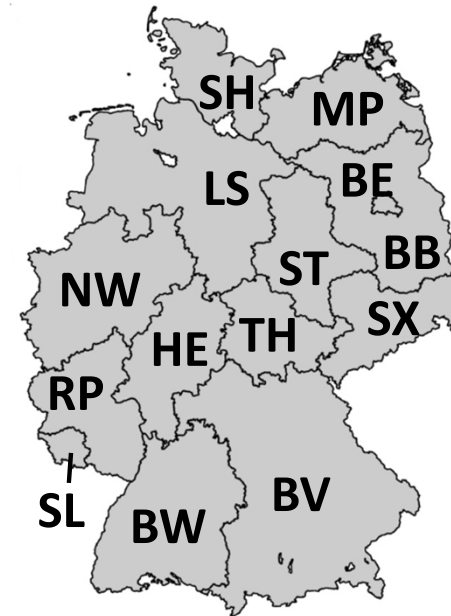
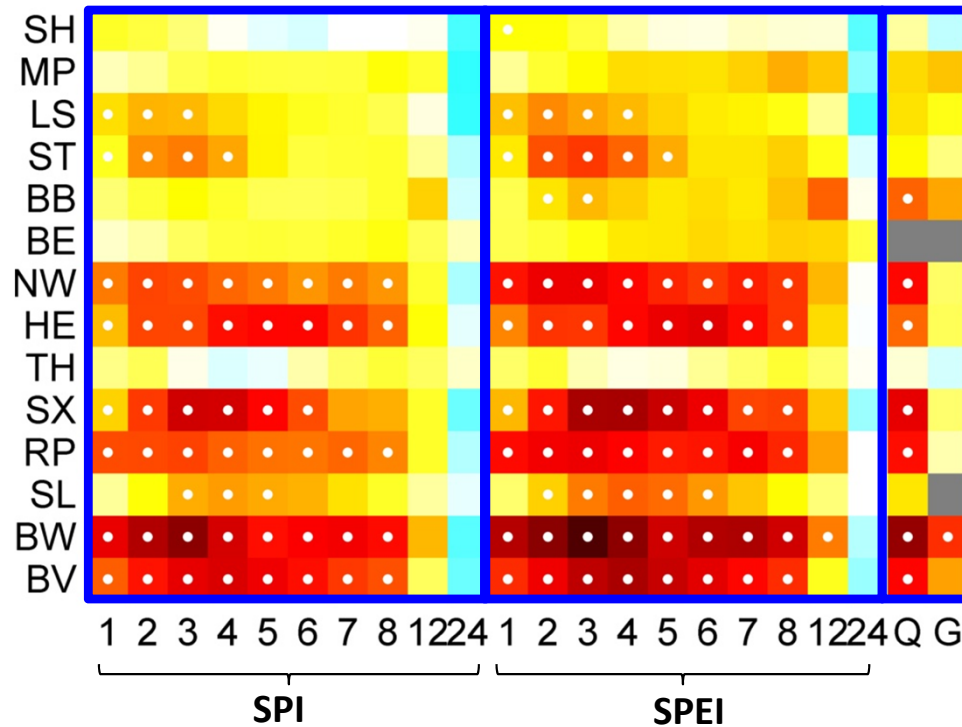


Impacts on water supply (top)
vs. water quality (bottom)



Impacts in winter&spring (top)
vs. summer&fall (bottom)

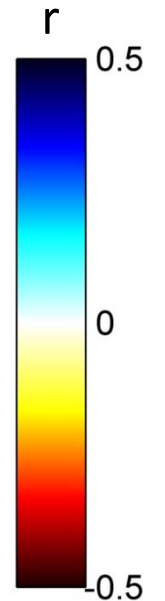




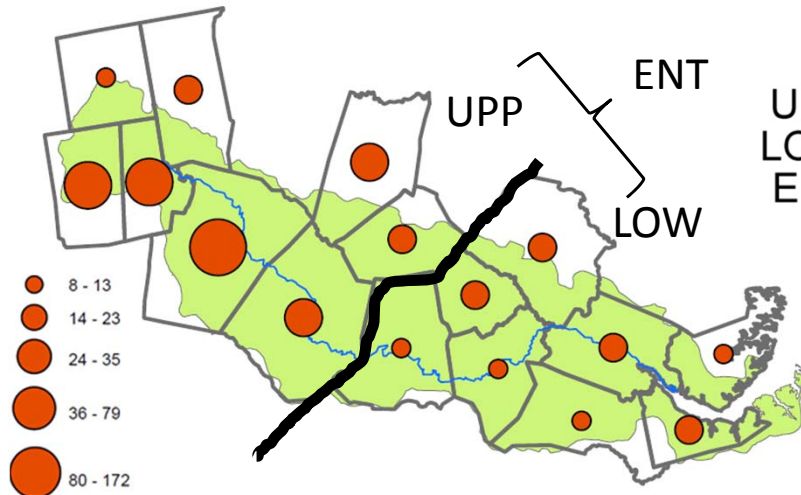
1970-2012

Q= Streamflow percentiles

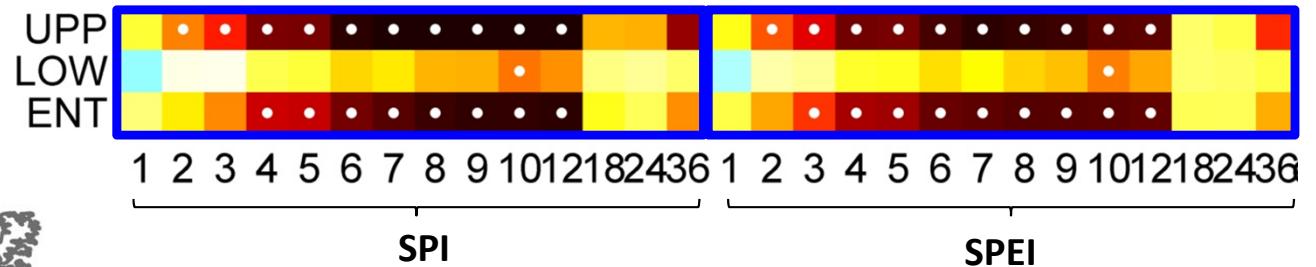
G= Groundwater level percentiles

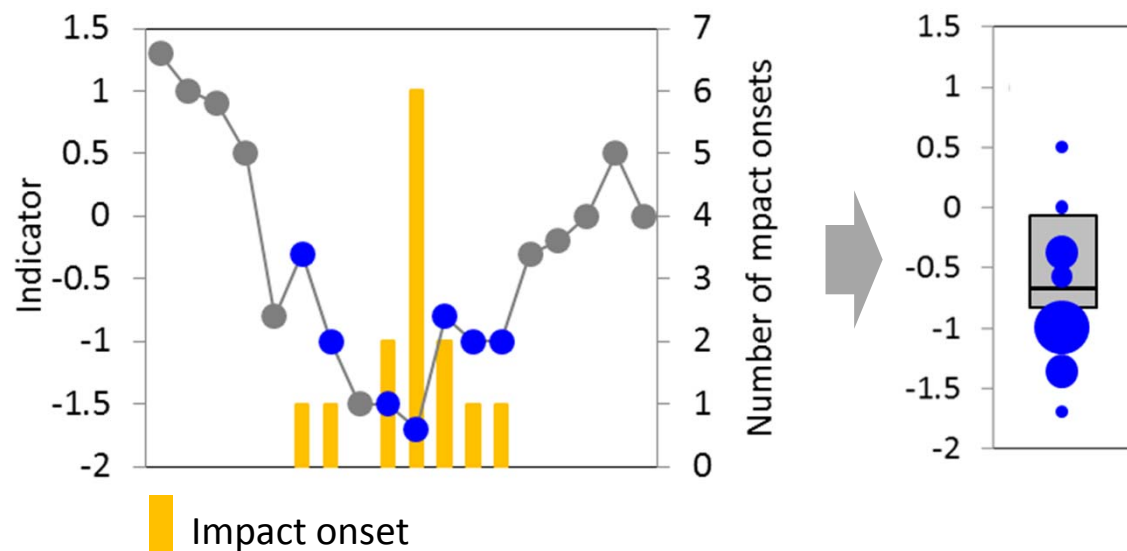


Number of impacts 2005-2012



Neuse basin in North Carolina (USA)

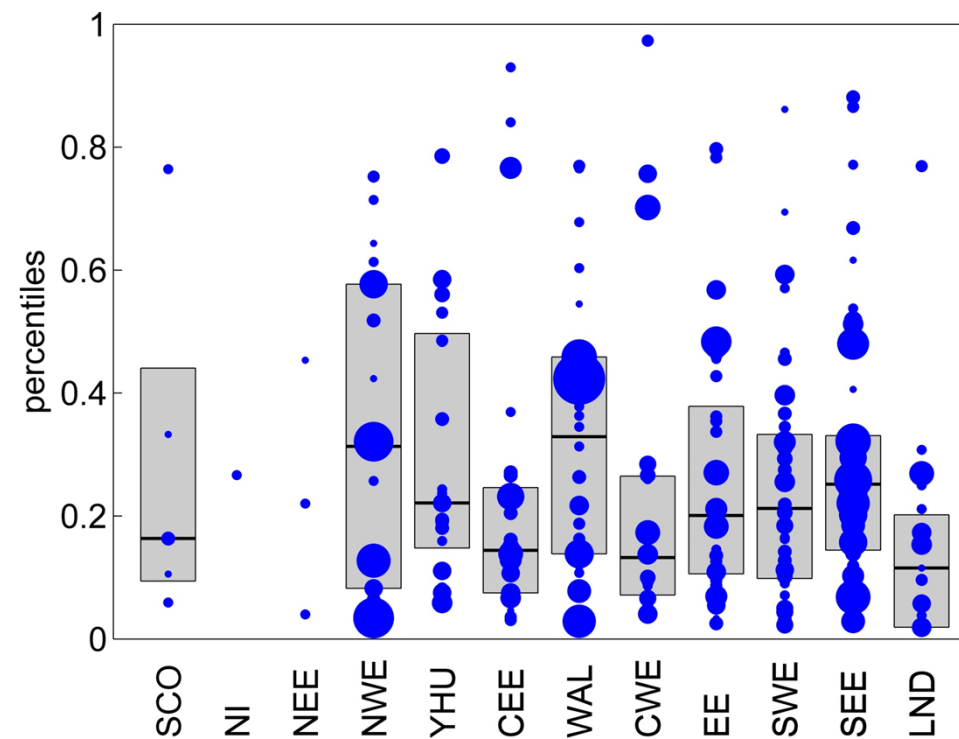
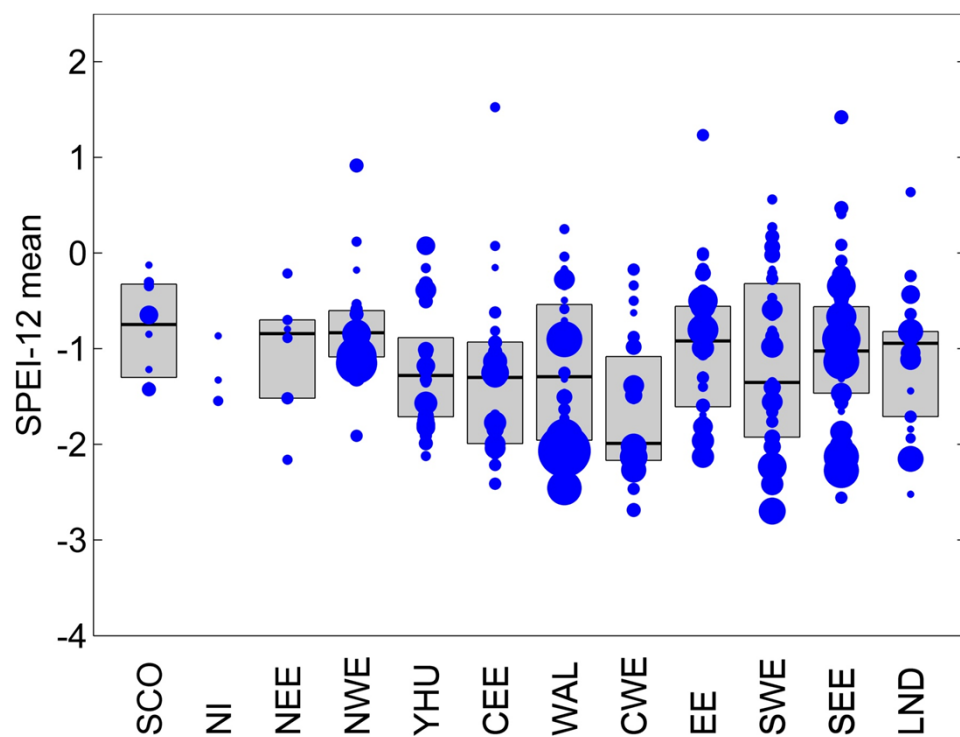




Extraction of indicator values associated with impact onset → "threshold"

Bottom left: SPEI-12

Bottom right: Streamflow percentiles



- Linking text-based impact data with drought indicators shows strong potential for ground truthing drought indicators
- Different regions and sectors/drought affected systems show different “best” indicators and thresholds
- Need for further developing drought impact inventories and exploiting other sources of impact information

Pictures from:

www.bbc.com

www.dailymail.co.uk

www.theguardian.com

