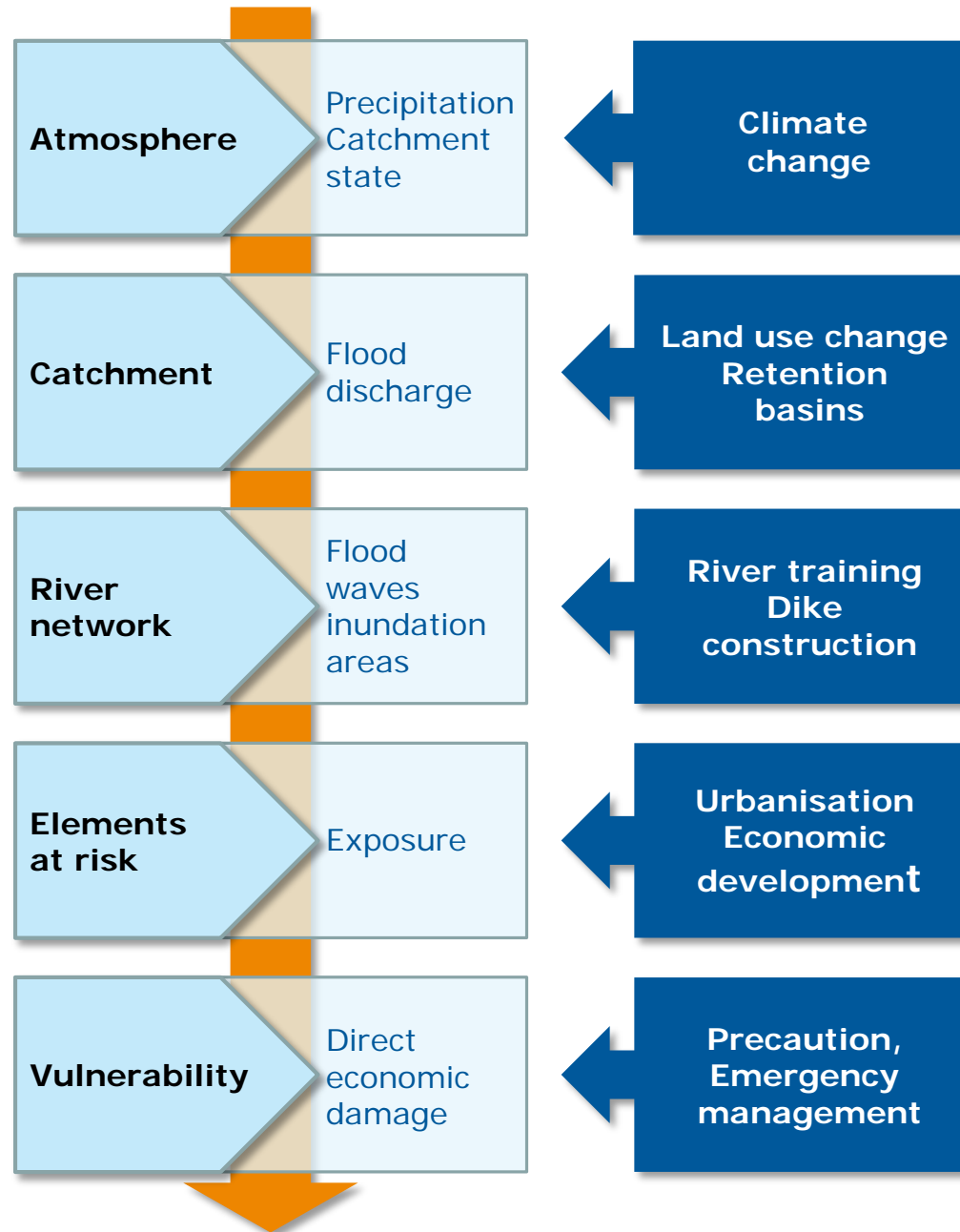


# Community initiative: collection of paired event case studies of riverine, pluvial and coastal floods

Heidi Kreibich

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# Example: Drivers of flood risk change



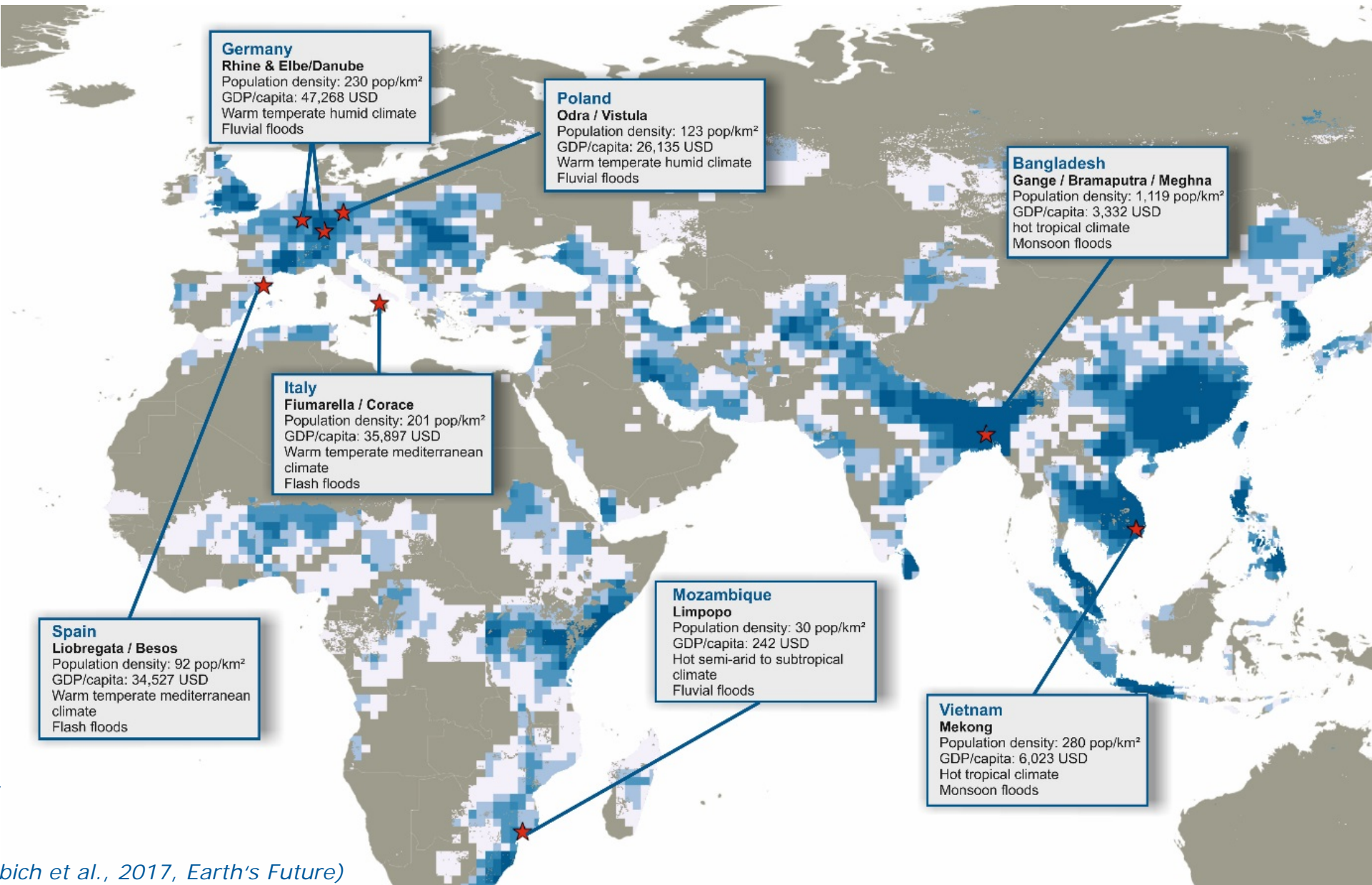
# Challenges

- Lack of consistent, long time series of impacts (e.g. reporting bias)
- Hazard, exposure and vulnerability that influence the impacts can only be roughly accounted for over time and their effects cannot be separated nor analysed in detail
- Vulnerability indicators (e.g. insurance cover, unemployment rate) often coarse, unclear in meaning
- Vulnerability is very much context dependent
- Etc.

# Paired event analyses

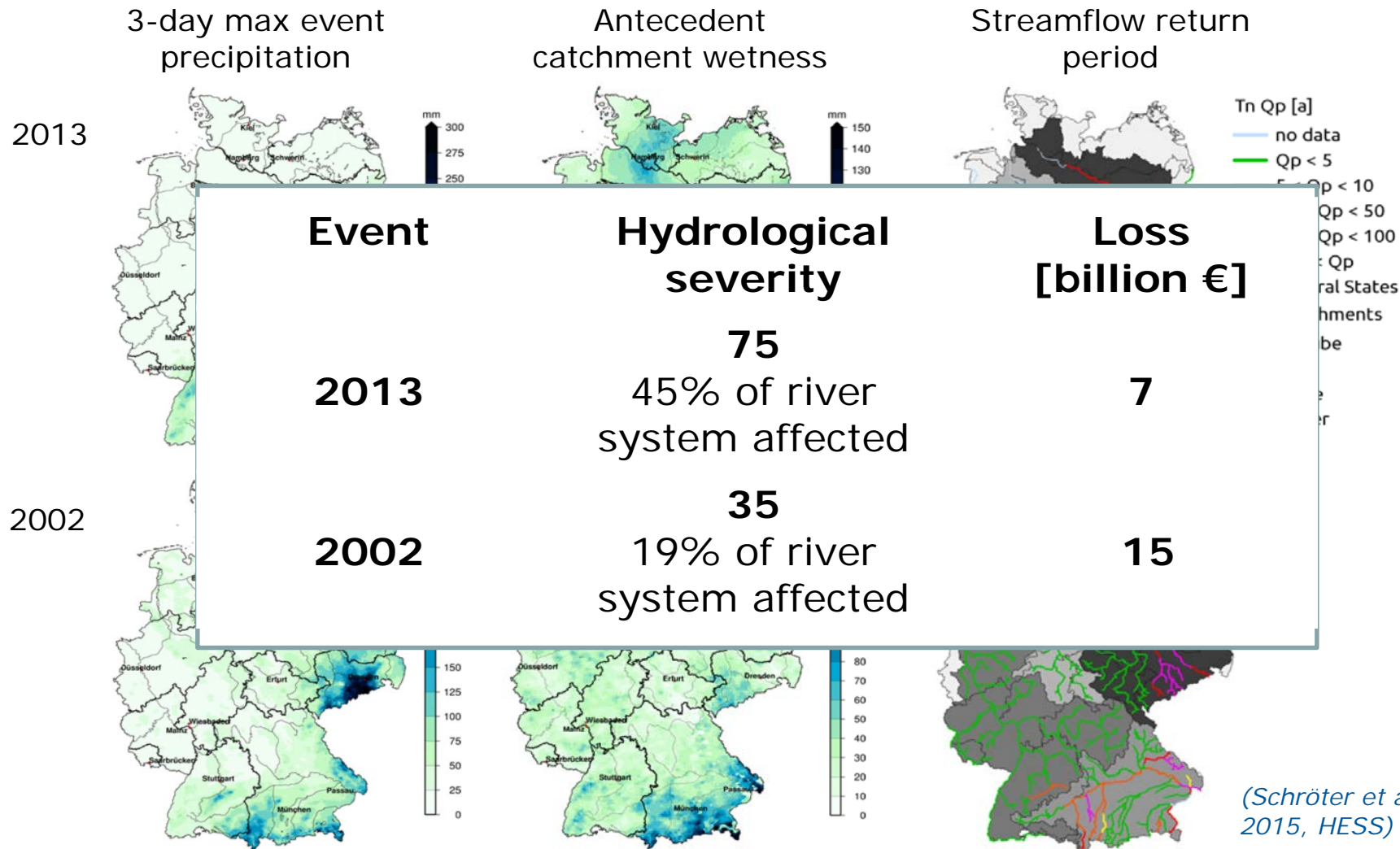
- **Paired event analyses**, i.e. consecutive droughts or floods that occurred in the same region  
(analog to 'Paired catchment studies' Brown et al., 2005)
- **Trading-space-for-time approach**, understanding of spatial variability between case studies, which cover only change between two points in time, can provide a first order assessment of potential long term temporal change (Wagener et al. 2010)
- **Comparative analysis**, by analyzing a (large) set of case studies to find general patterns  
(analog to PUB approach Blöschl et al., 2013)

➤ Eight success stories of flood risk reduction selected across different socio-economic and hydro-climatic contexts



# Detailed analysis of paired events

## Example 2002 and 2013 floods in Germany



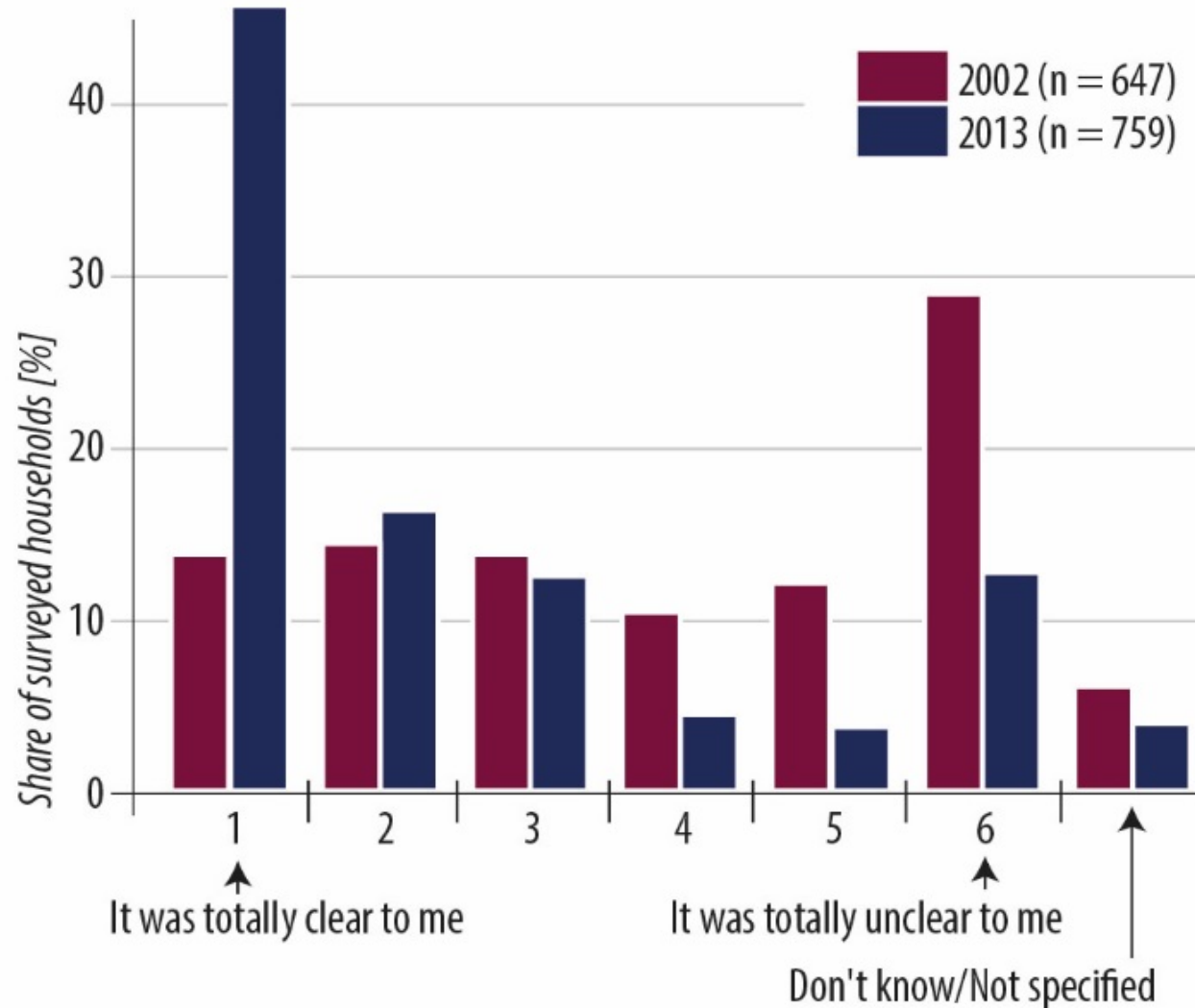
(Schröter et al., 2015, HESS)

# Detailed analysis of paired events

## Example: 2002 and 2013 floods in Germany

74% (2002) and 95% (2013) of residents received a warning.

Did you know what to do when you received the flood warning?





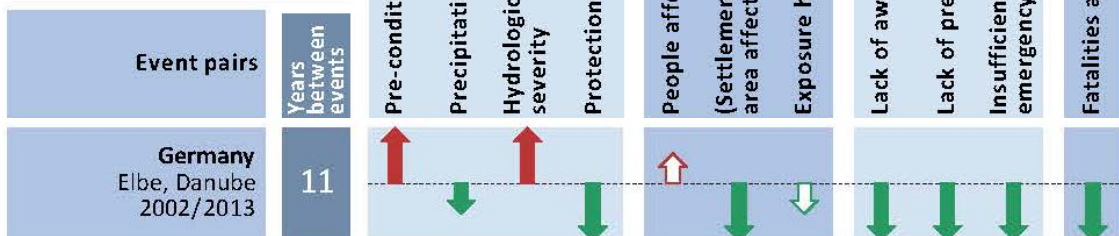
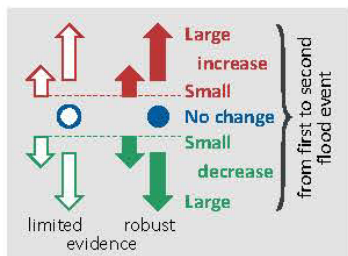
# Summary: 2002 and 2013 floods in Germany

		2002 flood	2013 flood
Hazard	Pre-conditions (Schröter et al. 2015)	Wetnessindex: 47	Wetnessindex: 114
	Precipitation (Schröter et al. 2015)	Precipitationindex: 30	Precipitationindex: 17
	Hydrological severity (Schröter et al. 2015)	Severityindex: 35	Severityindex: 75
	Protection failures	131 dike failures	30 dike failures including 3 major breaches
Exposure	Number of people affected	330,000	600,000
	Settlement area affected	30 km <sup>2</sup>	No data
	Exposure hotspots	Dresden, municipalities on the river Mulde (e.g. Grimma, Eilenburg, Bitterfeld, Dessau)	Passau, Deggendorf, Halle (Saale), Magdeburg, Lauenburg
Vulnerability	Awareness	Last severe floods were in 1974 and 1954 respectively, major administrative and societal changes due to reunification of Germany	Several consecutive floods in Elbe and Danube catchments since 2002; but hazard and risk maps are hardly known by the public
	Preparedness	Warnings were relatively late and imprecise, administration as well as affected people and companies were not well prepared for emergency management	Considerably improved chain of detection, warning and alerting, reaction and behaviour on community, household/company level
	Organisational emergency management	Exercises within individual relief organisations	Every two years, there is a trans-organisational national crisis management exercise (LÜKEX); changes and improvements also on municipality level



# Summary: 2002 and 2013 floods in Germany

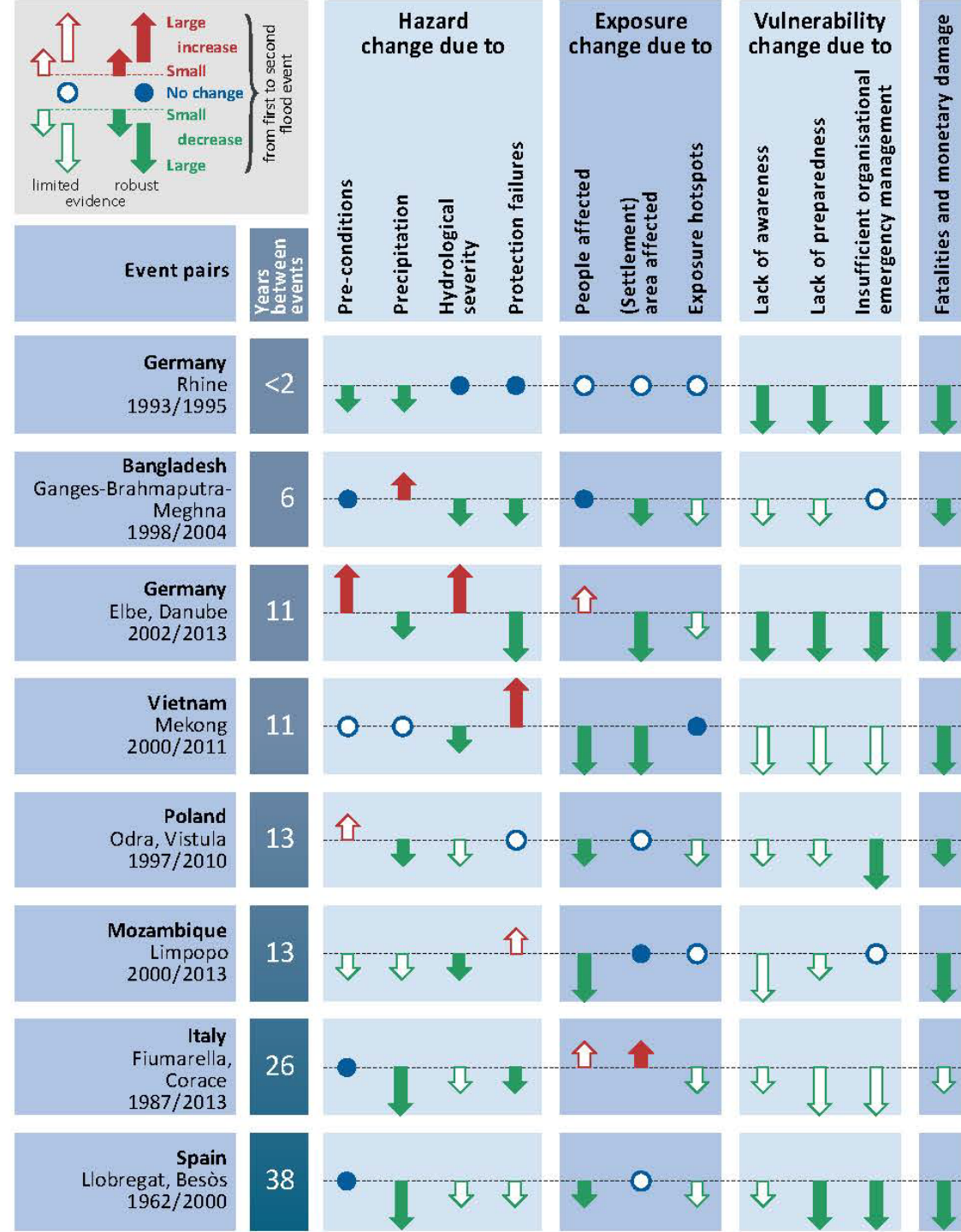
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(Kreibich et al., 2017, Earth's Future)

# Pattern of paired flood event analyses

- Across different socio-economic and hydro-climatic contexts there is high potential for sustainable flood risk management
- Vulnerability reduction is key for successful risk management
- The challenge remains to stimulate risk reduction when no extreme events occur

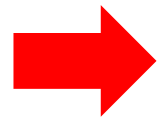


# Advantages of paired event analyses

- Context of vulnerability and risk in the different areas can be considered in the detailed paired case study analyses
- Due to semi-quantitative analyses, using the first event as base line, it is not necessary that the same data is available in all regions
- Differences in the characteristics and processes between floods and droughts can be easily accommodated

*(Kreibich et al., 2019, HSJ)*

***International paired event collection initiative for droughts and floods  
in the framework of IAHS Panta Rhei decade***



***Get involved – contribute your case study until mid October 2019!  
Heidi.Kreibich@gfz-Potsdam.de***

# Paired event collection initiative

- Write a **joint paper** about the comparative analyses of paired events. All authors/co-authors of paired event case study descriptions will be co-authors of this joint paper.
- This Panta Rhei data collection, i.e. comprising all the individual paired event case study descriptions shall be published as a **“data publication”**. All authors/co-authors of paired event case study descriptions will be co-authors of this data publication.
- This Panta Rhei data collection shall be **open access** and shall hopefully be **used further for other (Panta Rhei-) studies**. Additionally, the data collection shall be extendable, so that more paired event case studies can be added.

# Paired event collection initiative

in the framework of IAHS Panta Rhei decade

Germany  
Rhine & Elbe/Danube  
Population density: 230 pop/km<sup>2</sup>  
GDP/capita: 47,268 USD  
Warm temperate humid climate  
F

Poland  
Odra / Weichsel

Meghna  
119 pop/km<sup>2</sup>  
SD

New Initiative:  
Confirmed paired flood and drought event analyses  
until today

Floods		Droughts	
Pluvial	6	Meteorological	4
Riverine	13	Hydrological	7
Coastal	4	Unspecified	5
<i>total</i>	<i>23</i>	<i>total</i>	<i>16</i>

Received so far: 18

Spain  
Liobregata / Besos  
Population density: 92 pop/km<sup>2</sup>  
GDP/capita: 34,527 USD  
Warm temperate mediterranean  
climate  
Flash floods

Mozambique  
Limpopo  
Population density: 30 pop/km<sup>2</sup>  
GDP/capita: 242 USD  
Hot semi-arid to subtropical

**Get involved – contribute your case study  
until mid October 2019!  
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