Business from technology

The effects of extreme weather on the European transport system: an analysis based on media reports

ECSS 2013

7th European Conference on Severe Storms, Helsinki

Riitta Molarius[1], Pekka Leviäkangas[2], Jaana Keränen[1], Ilkka Juga[3] and Andrea Vajda[3]

1 VTT Technical Research Centre of Finland

2 Economic Sciences and Business Studies, University of Oulu

3 Finnish Meteorological Institute

Introduction

- Find links between extreme weather events and the regional vulnerability of transportation in Europe.
- The same meteorological phenomenon has different impacts on societies in different parts of Europe.
- The study was implemented by using local and nationwide media reports as empirical material.
- The study was undertaken within the EWENT project (Extreme Weather impacts on European Networks of Transport 2010-2012, FP7) www.event.vtt.fi

Definitions

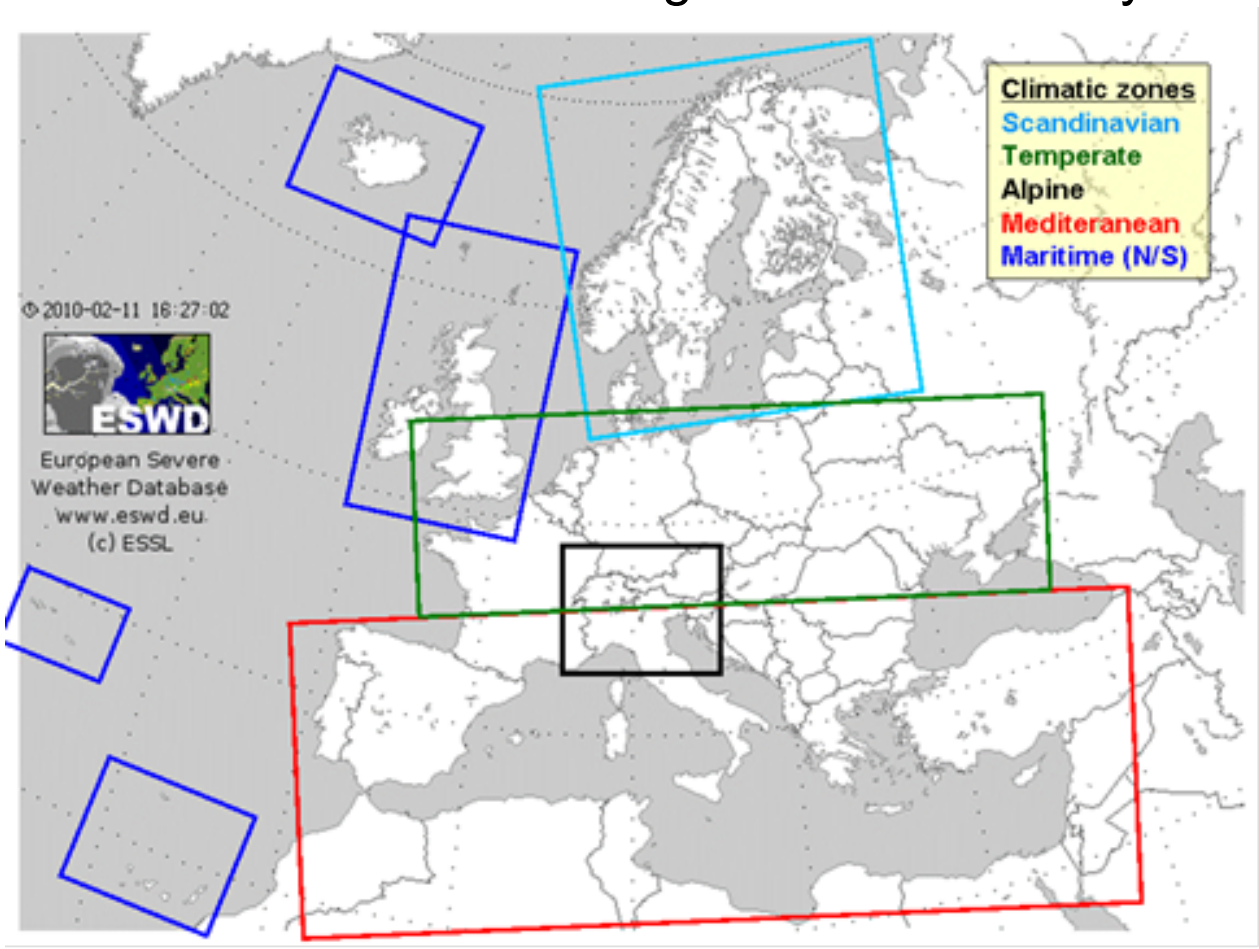
- The term ”extreme event”
  - The severe weather event that cause extensive impacts on transportation network in European countries.
  - Notable, that the high-impact weather does not always need to be very extreme (the consequences could nevertheless be major).
    - Frequency (return period)
    - Previous occurence of the event
    - The degree the society is prepared.

Temporal or long-lasting weather event

- A brief, high intensity event that causes immediate impacts
  - e.g storms, heavy rain, heavy snow
  - Damaged infrastructure, disruptions in transport flows.
- Slowly evolving weather events
  - e.g. long cold periods or heat waves
  - Delays of transportation system.

Classification of the climatologically similar European regions

- The classification was used as a ground for this study



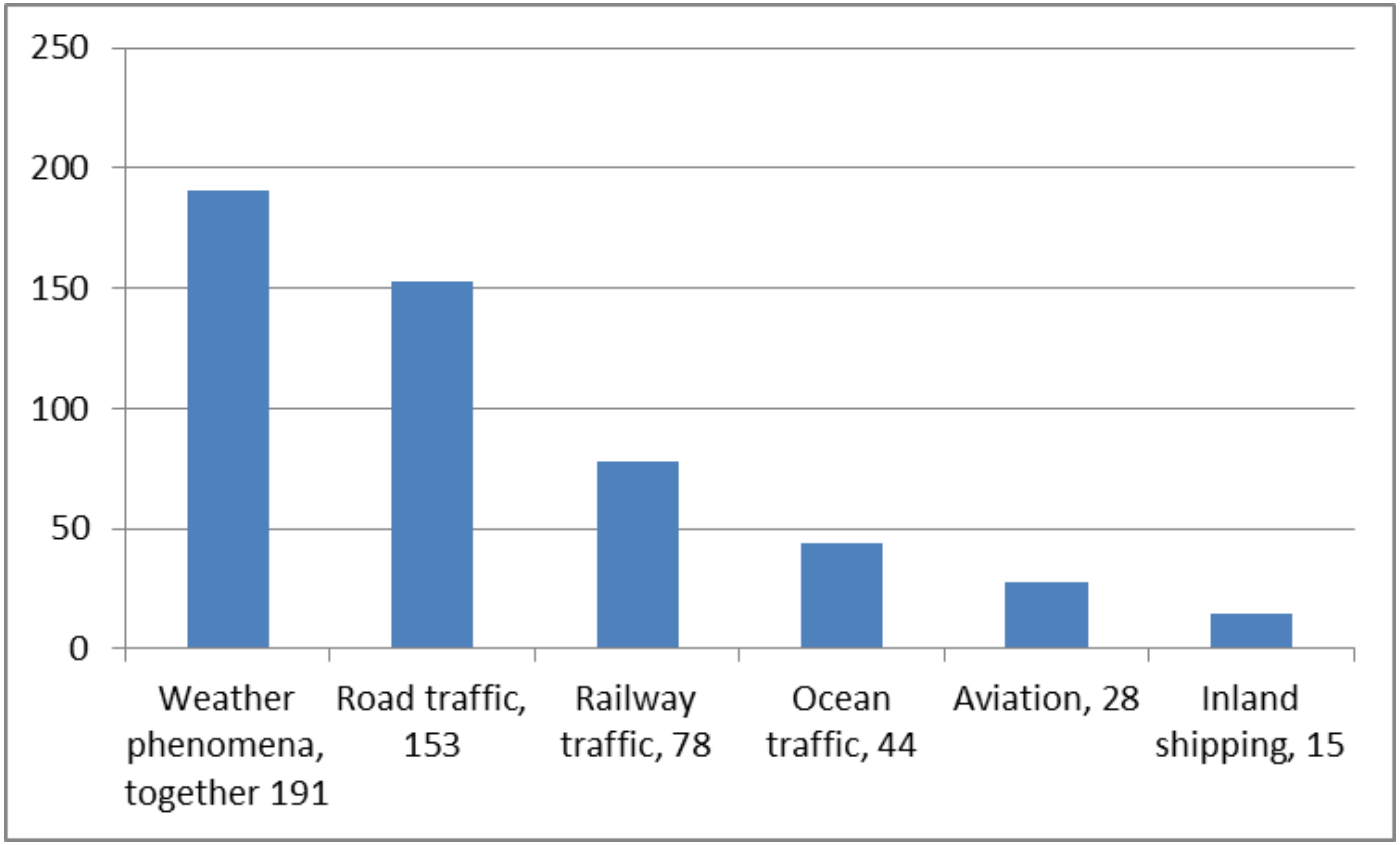
Reference ESSL

Content analysis of media data

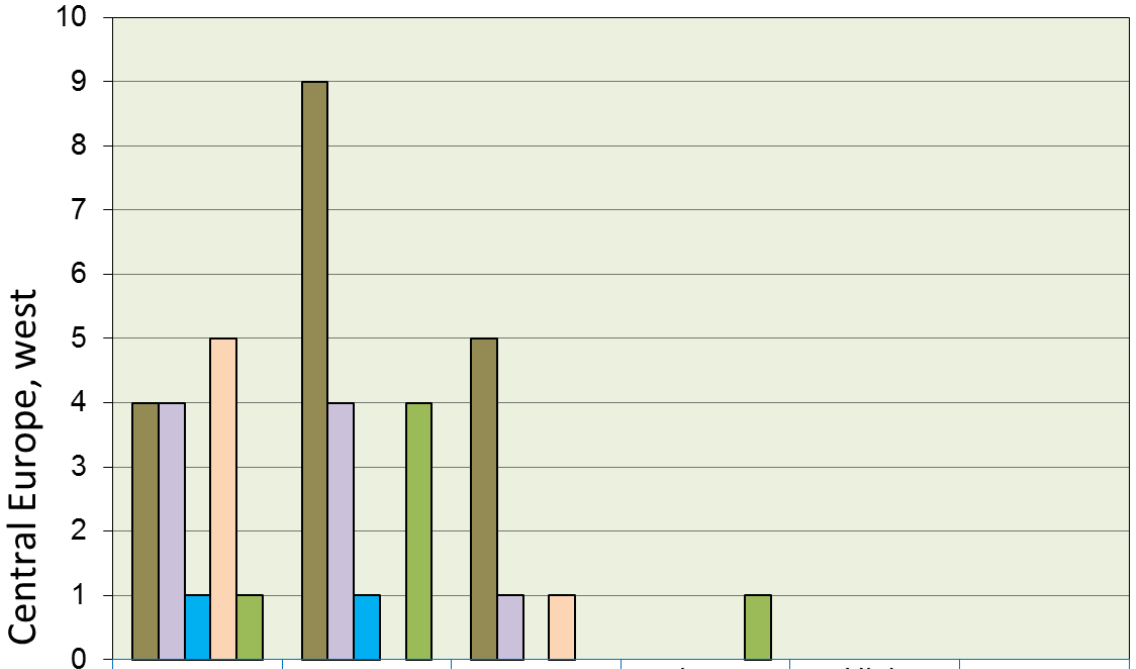
- What kind of weather is regarded as being extreme or adverse in different countries?
- A deeper insight into the disaster and its consequences from the injured society point of view
- The Europe-wide viewpoint made it necessary to compare the consequences in different parts of Europe
- Weather events in news were often exceptional by their nature

News data

- Media database include 191 different weather events (1.1.2000 –10.9.2010)
- 29 large autumn or winter storms (European-wide storms)

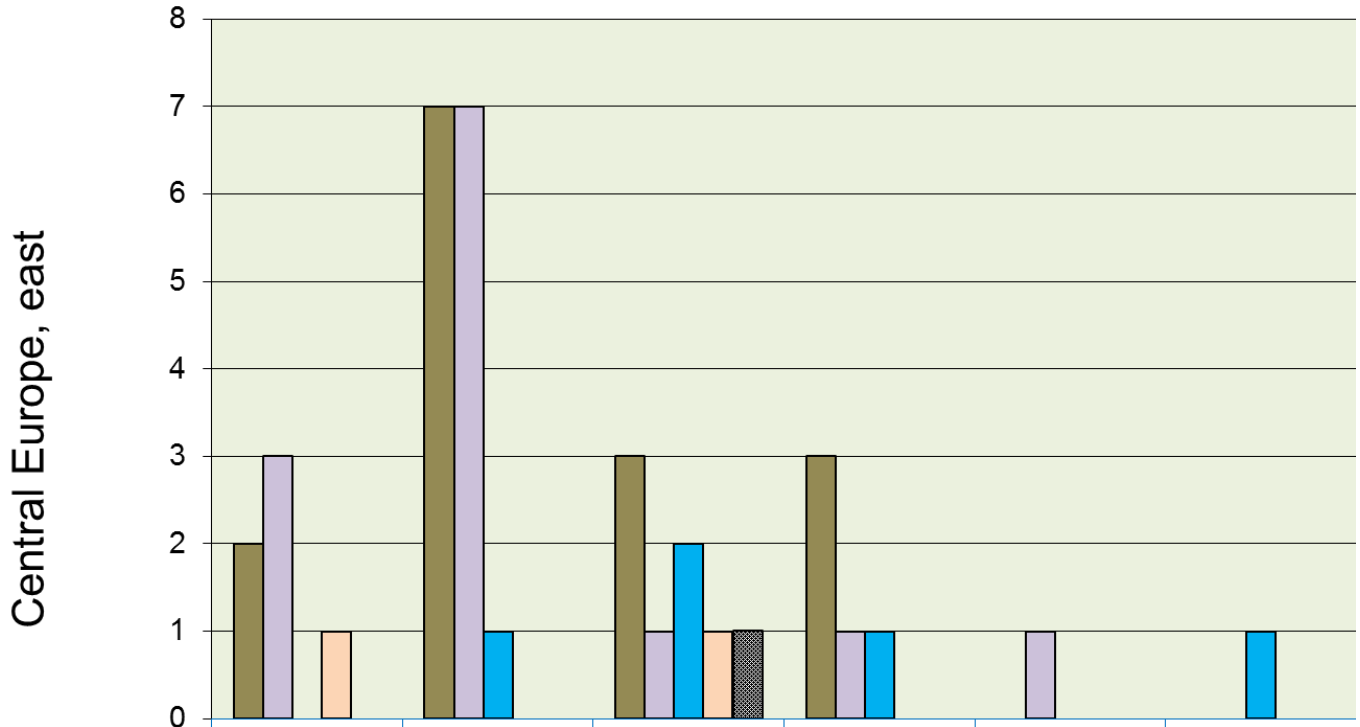


Western Central Europe



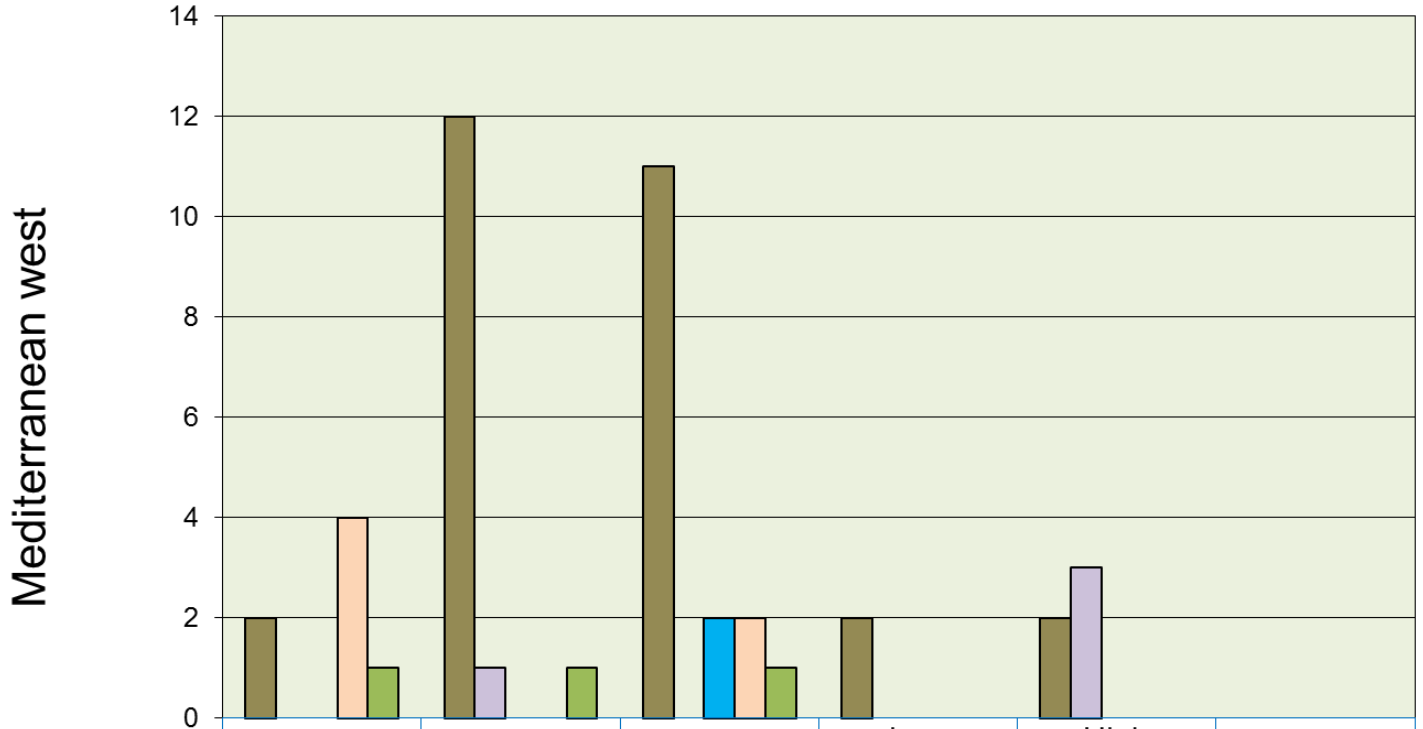
	Strong Wind	Heavy Rain	Heavy Snow	Low Temperature	High Temperature	Fog
Road transport	4	9	5	0	0	0
Railways	4	4	1	0	0	0
Aviation	1	1	0	0	0	0
Ocean Transport	5	0	1	0	0	0
Inland Shipping	1	4	0	1	0	0

Eastern Central Europe



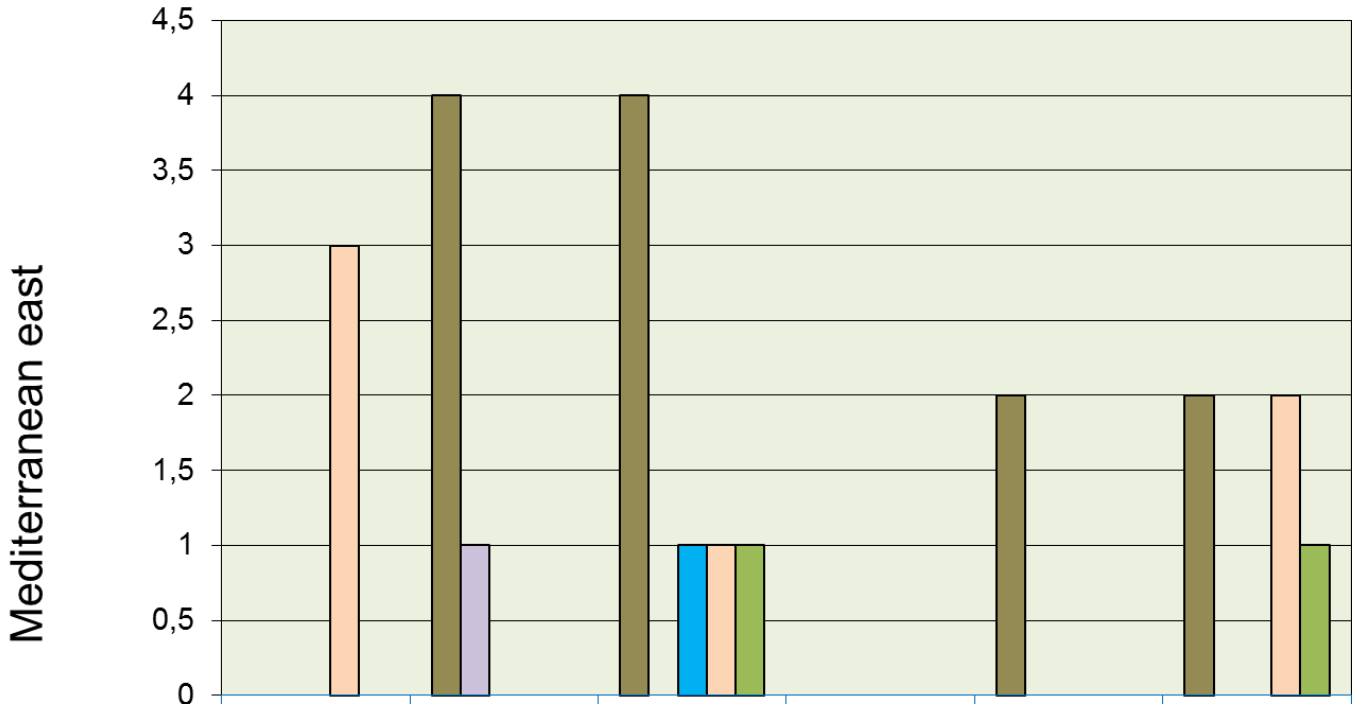
	Strong Wind	Heavy Rain	Heavy Snow	Low Temperature	High Temperature	Fog
Road Transport	2	7	3	3	0	0
Railways	3	7	1	1	1	0
Aviation	0	1	2	1	0	1
Ocean Transport	1	0	1	0	0	0
Inland Shipping	0	0	1	0	0	0

Western Mediterranean



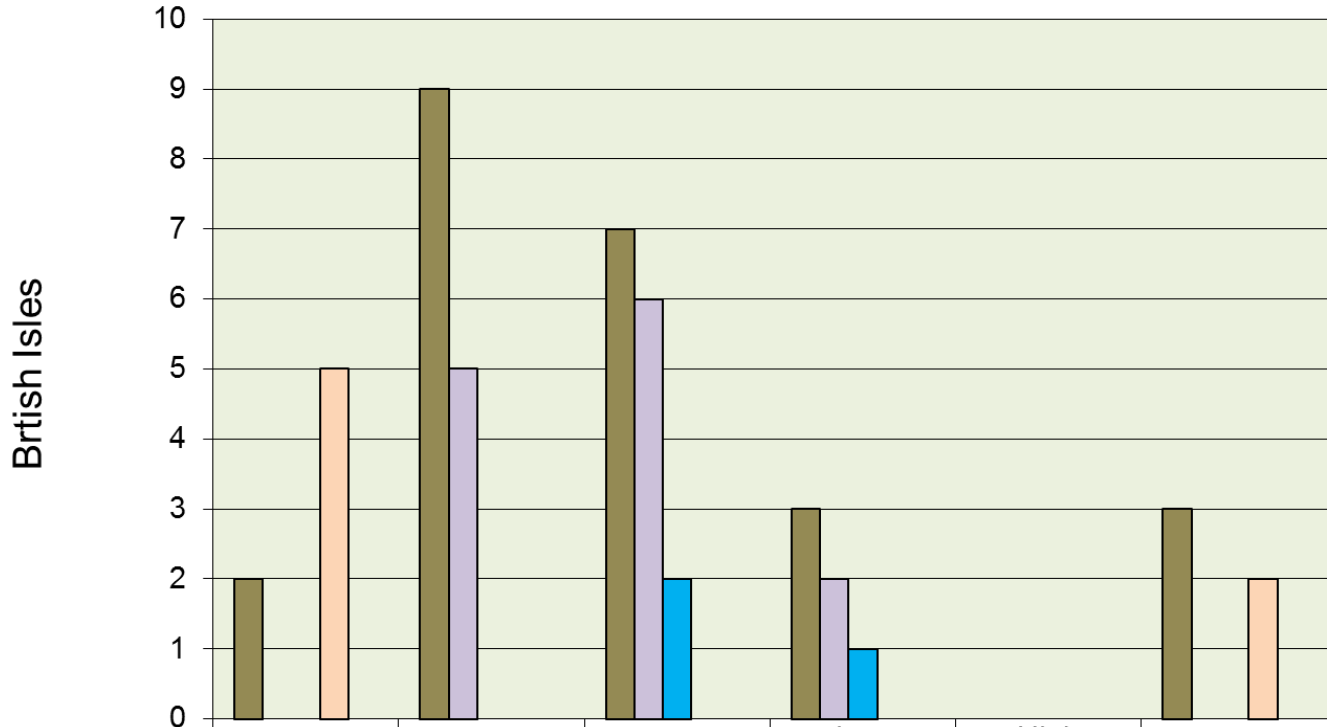
	Strong Wind	Heavy Rain	Heavy Snow	Low Temperature	High Temperature	Fog
Road Tranportation	2	12	11	2	2	0
Railways	0	1	0	0	3	0
Aviation	0	0	2	0	0	0
Ocean Transportation	4	0	2	0	0	0
Inland Shipping	1	1	1	0	0	0

Eastern Mediterranean



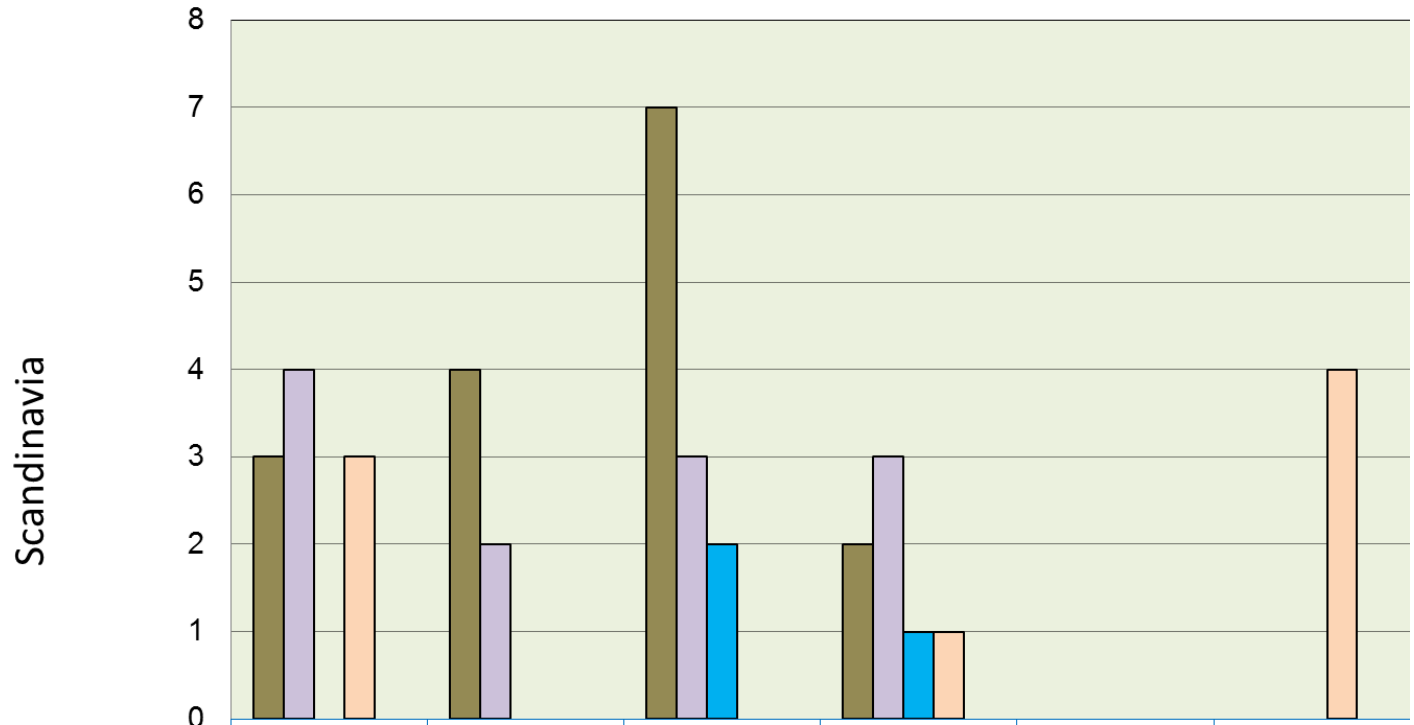
	Strong Wind	Heavy Rain	Heavy Snow	Low Temperature	High Temperature	Fog
Road Transportation	0	4	4	0	2	2
Railways	0	1	0	0	0	0
Aviation	0	0	1	0	0	0
Ocean Transportation	3	0	1	0	0	2
Inland Shipping	0	0	1	0	0	1

British Isles



	Strong Wind	Heavy Rain	Heavy Snow	Low Temperature	High Temperature	Fog
Road Transport	2	9	7	3	0	3
Railways	0	5	6	2	0	0
Aviation	0	0	2	1	0	0
Ocean Transportation	5	0	0	0	0	2
Inland Shipping	0	0	0	0	0	0

Scandinavia



	Strong Wind	Heavy Rain	Heavy Snow	Low Temperature	High Temperature	Fog
Road transport	3	4	7	2	0	0
Railways	4	2	3	3	0	0
Aviation	0	0	2	1	0	0
Ocean Transport	3	0	0	1	0	4
Inland Shipping	0	0	0	0	0	0

Conclusions

- ”Extreme events” are not the same in different parts of Europe.
- According to this study, the most harmful phenomenon is heavy rain, and road transportation system is most affected by it.
- The second harmful phenomenon is heavy snow, especially in Scandinavian, but also in British Isles and in Central part of Europe.
- Strong winds are affecting road and rail transportation systems, and the impacts on road and rail systems seem to be more often noted than on aviation.
- Aviation seems to be more resilient mode of the transportation that the usual media image would lead to believe.

Thank you for your attention!

VTT creates business from technology