

Making regional and local sea level information accessible: Examples from Northern Germany

 by Elke Meyer
Helmholtz Zentrum Hereon
elke.meyer(at)hereon.de

Abstract

Although a wealth of information on ongoing and future mean and extreme sea level change is available in the scientific community, there is often a substantial gap in usability and tailored products. At the Hereon Institute of Coastal Systems, there are a long experiences and expertise in undertaking transdisciplinary research with the objective to co-design products and information tailored to user needs.

Here several examples are presented that have been particularly successful: (A) Several monitors for sea level, storm surges and driving storms were developed to address in near-real time the recurring question: "To what extent is the ongoing season or an event unusual?"

(B) Perception of climatic and other risks in Hamburg is now being monitored for 15 years providing a unique insight how perception of storm surge risk varies over time.

(C) A series of IPCC like regional assessments for Hamburg, the North and the Baltic Seas were produced providing regional detailed information and knowledge. Mapping of flooding associated with present and future sea level conditions was contextualized.

(D) Products have benefited and are iteratively co-developed in transdisciplinary projects. Here two examples related to unexpectedly severe storm surges, and compound risks, and cascading effects and measures to adapt are presented.

More Information

 www.hereon.de/coastalsystems

 <https://coastal-hazard-monitor.eu>

 <https://hereon.de/hamburgrisiko>

 www.kuestenschutzbedarf.de

 <https://hereon.de/extremeness>

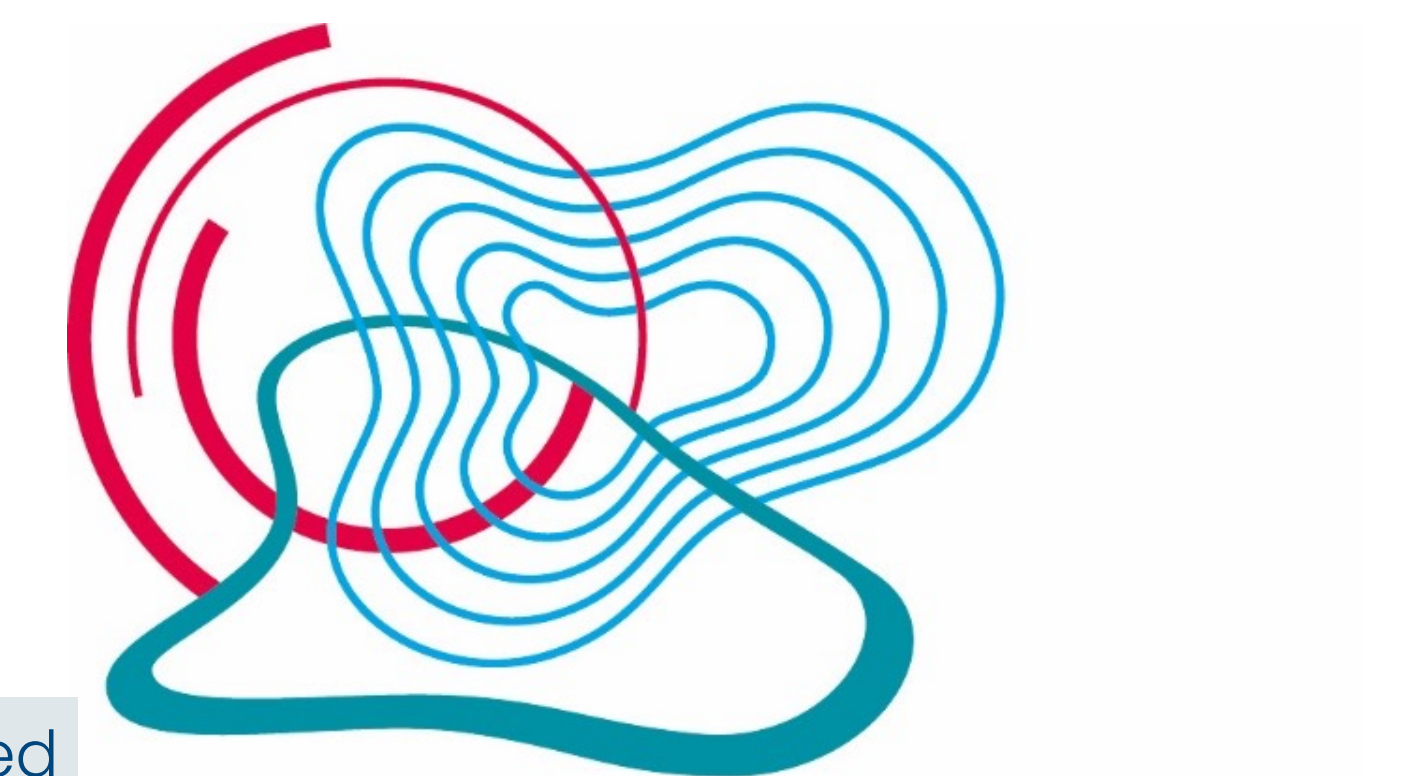
 <https://hereon.de/wakos>

 https://www.hereon.de/institutes/coastal_systems_analysis_modeling/information_products/reports/index.php.en

Making regional and local sea level information accessible

Examples from Northern Germany

Elke M.I. Meyer, Xin Liu, Insa Meinke, Beate M.W. Ratter, Annika Runge, Ralf Weisse



Helmholtz-Zentrum
hereon

The links to the websites
are in light blue.

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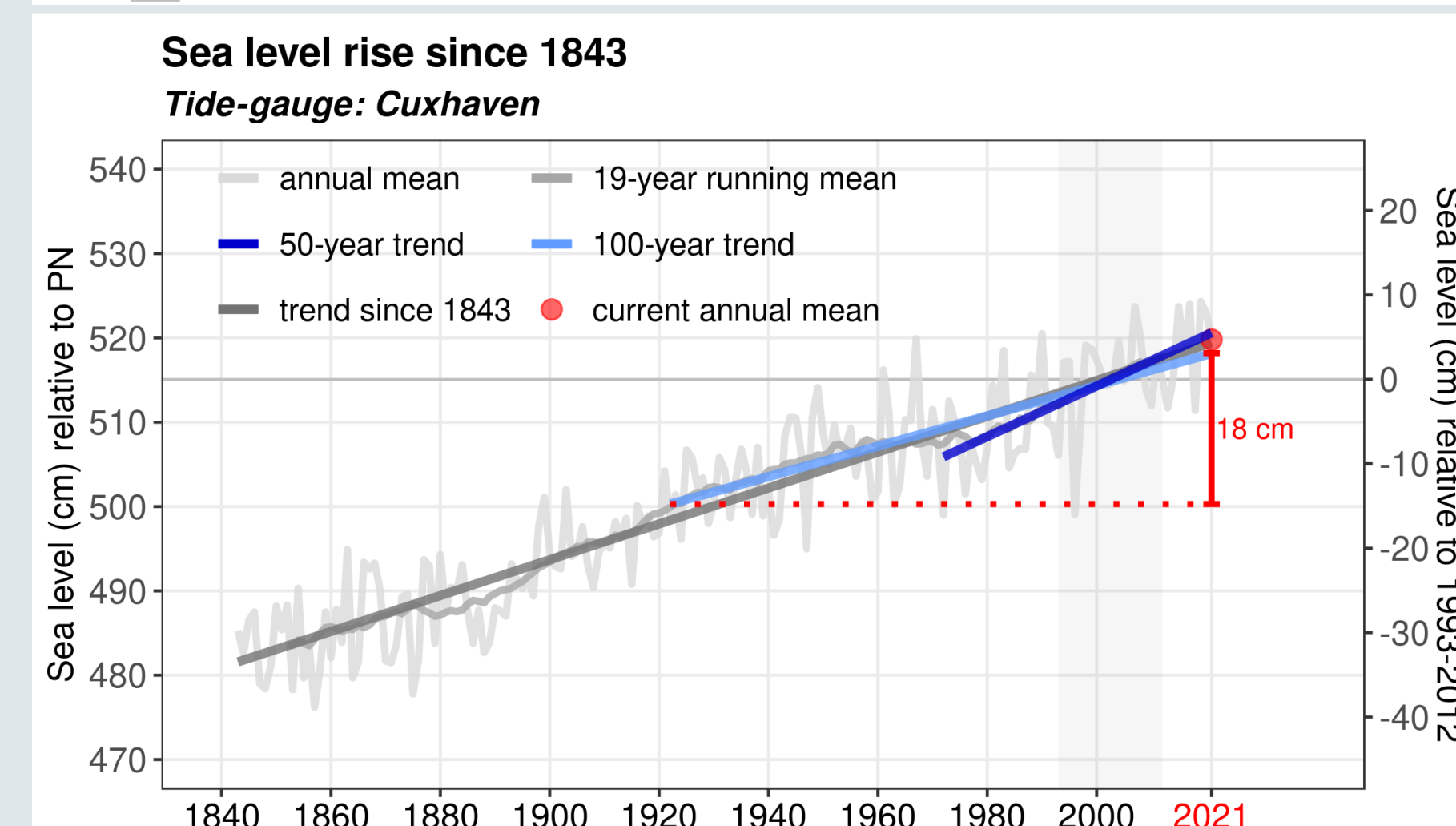
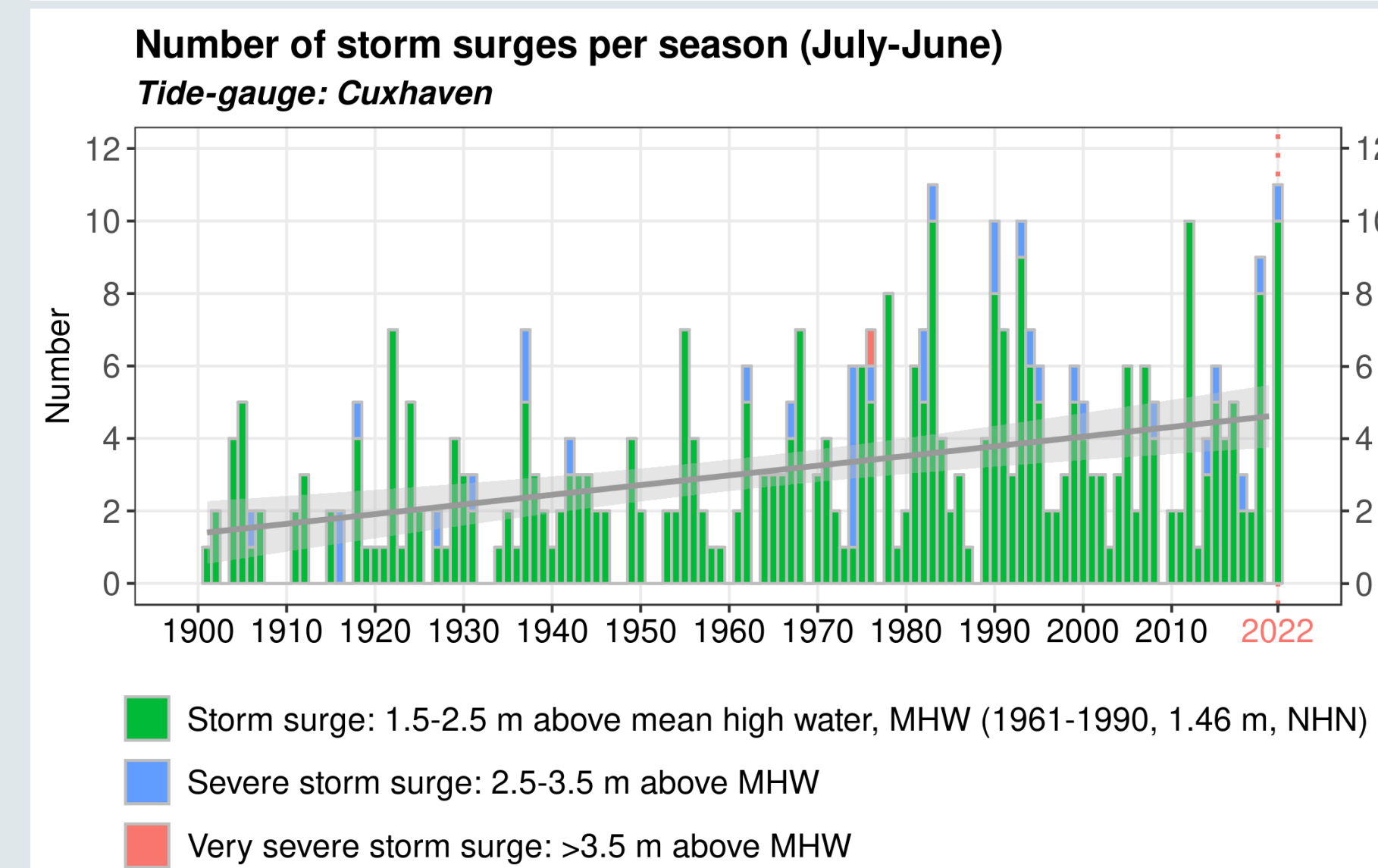
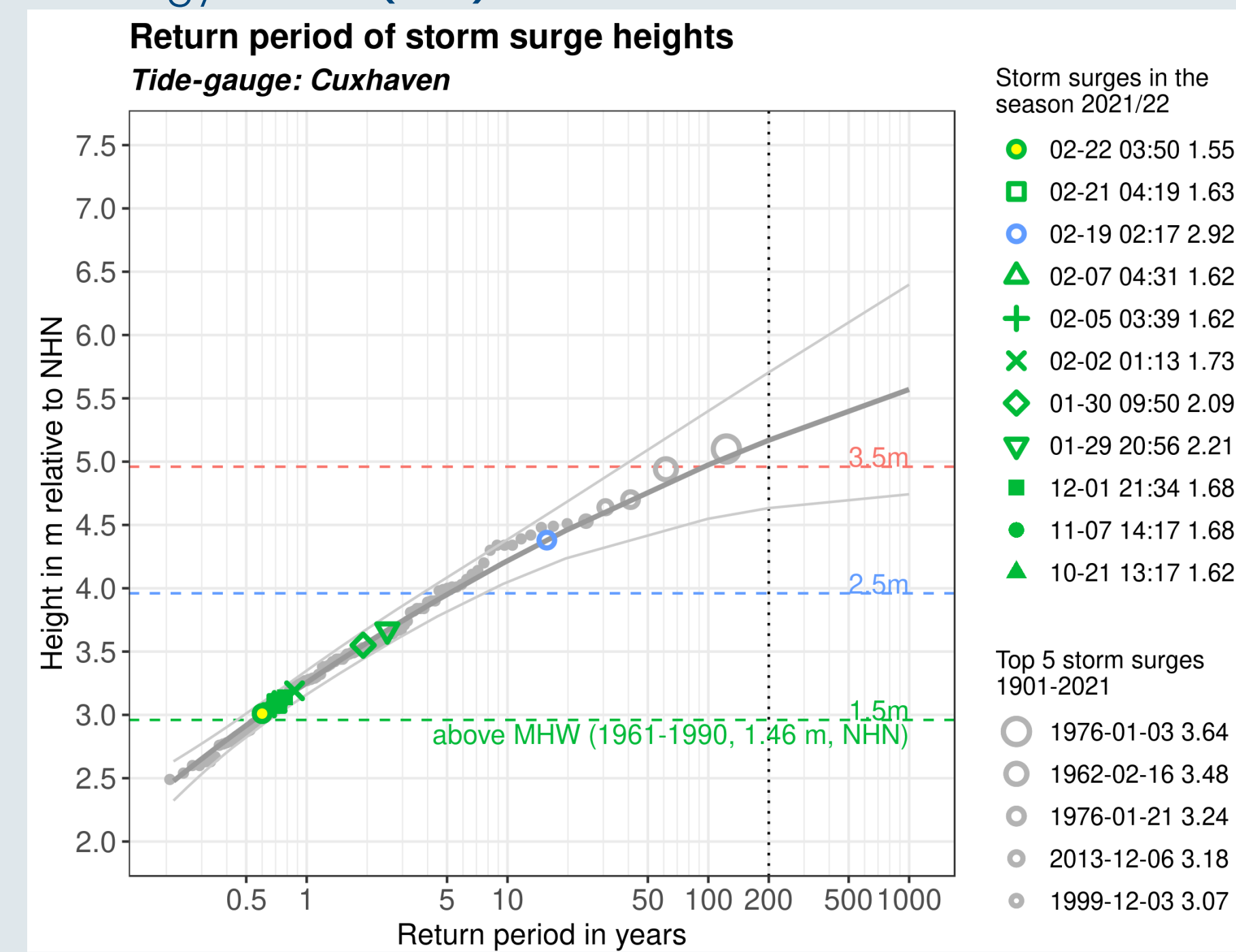
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and the Baltic Seas were produced providing regional detailed information and knowledge. Mapping of flooding associated with present and future sea level conditions was contextualized.
(D) Products have benefited and are iteratively co-developed in transdisciplinary projects. Here two examples related to unexpectedly severe storm surges, and compound risks, and cascading effects and measures to adapt are presented.

(A) Monitoring sea level hazards and their contextualization

<https://coastal-hazard-monitor.eu>

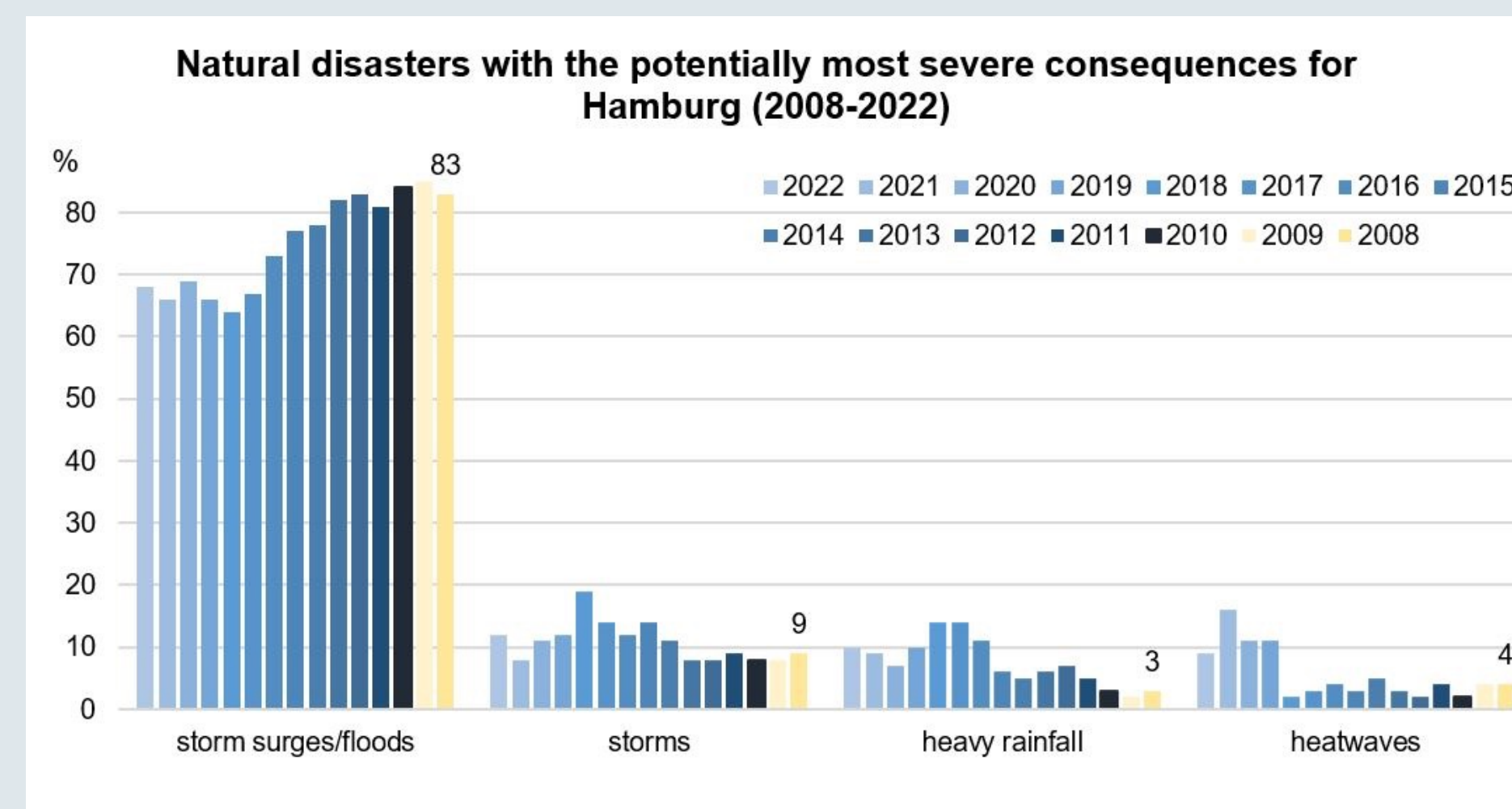
Several monitors for storms, storm surges, and mean sea level provide a real-time assessment of ongoing events against climatology. **Is this (still) normal?**



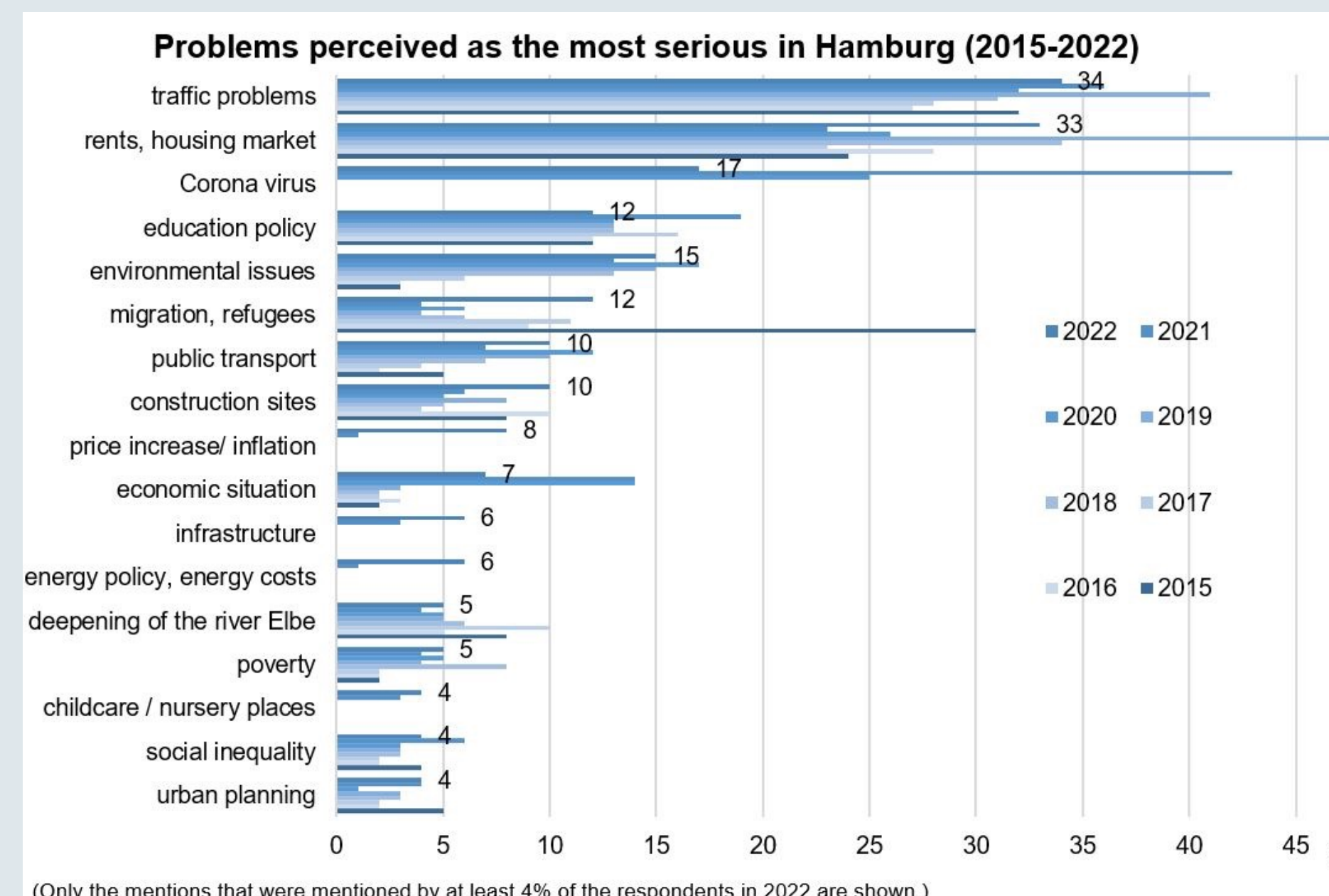
(B) Risk perception in Hamburg, Germany

<https://hereon.de/hamburgrisiko>

The perception of risk associated with storm surges is now being monitored for 15 years. Compared to other climatic risks the perception is high, although steadily declining. Some inter-annual variability is explained mainly by recent extreme weather events such as the flood in the Ahr valley in 2021.



Overall, environmental issues, including natural disasters such as storm surges, rank high among Hamburg's perceived problems. However, when considered individually, storm surges do not play a central role compared to other problems.



(C) Regional assessments



Motivation:

Scientific results on coastal & climate change are scattered on regional scales

→ many single & sometimes contradicting statements in the public

What was needed?

- Systematic documentation of scientific knowledge according to:
 - agreement / disagreement and knowledge gaps
- Incl. review-process
- Basis: peer-reviewed articles



Risk mapping



www.kuestenschutzbedarf.de

Motivation

- High information need according to risk of flooding due to climate change
- Many visualizations show unrealistic flooding

What was needed?

Mapping taking into account existing coastal protection measures and regional climate scenarios

(D) Transdisciplinary projects with co-development

EXTREMENESS

"Can we manage the unexpected?"

To answer this question together with more than 20 regional stakeholders from administration, coastal protection, disaster risk management etc. EXTREMENESS aimed at identifying extreme storm tides that are **highly unlikely** but still **physically possible** and **plausible** and which may have **extreme consequences**.

<https://hereon.de/extremeness>

WAKOS

- What happens if storm surges and heavy rain events occur simultaneously and over a longer period of time?
- What effects do these events have on coastal protection, inland drainage, and freshwater supply and thus on life?
- What influence does climate change have on these scenarios?

Together with our partners in the region, we investigate how the region can be sustainably protected against compound events, cascading effects, and climate change.

<https://hereon.de/wakos>

