



Our policy briefs are summaries of scientific knowledge produced in BONUS BALTIMARI, connected to current management and policy actions concerning the Baltic Sea. The briefs engage in and respond to important issues that support long-term sustainability of ecosystem goods and services of the Baltic Sea.

Let's be sure to include the "unsure"

The Baltic Sea is an area of intense human activities for transportation, food and offshore energy production. While these activities are important for the livelihood of the region, they also exert pressure on the sensitive sea. There is high risk to human and wild lives, vessels and the ecosystem as a whole. It is no surprise then, that the Baltic Sea Region is committed to ensuring safety in maritime transportation.



Human lives,
sustainability

Ecological,
socio-economic
consequences

Challenges with
autonomous
shipping

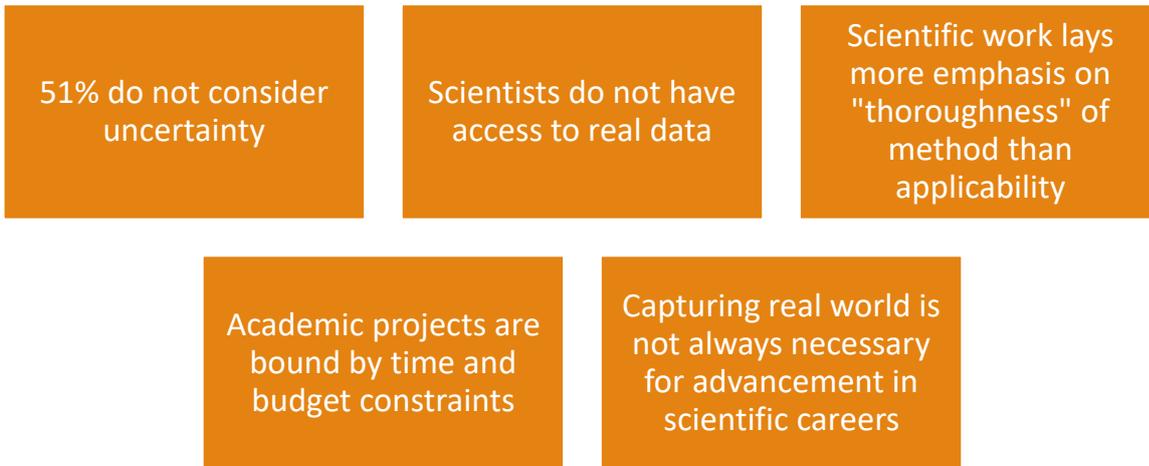
An assessment by Aalto University's Maritime Risk and Safety group under the project BONUS BALTIMARI shows that **the Baltic Sea Region leads the world in developing scientific solutions for reducing and responding to maritime risk**. However, for these solutions to be applied in practice, they need to capture real-world uncertainties. According to Policy Area on Maritime Safety and Security (PA Safe), maritime shipping industry is quite enthusiastic about adopting policies for cleaner, safer and more secure Baltic Sea, given that their livelihood and future depends on the condition of the Sea. Extensive reviews under BONUS BALTIMARI reveal that the gap between the scientific results and industry requirements lies in the handling of uncertainty conditions by the models proposed as solutions. A general consensus from stakeholder workshops under the BONUS BALTIMARI project was **that the industry desires tools and methods that capture real-world dynamics such as variabilities due to weather, conditions of the sea, human behaviour and traffic situation. The solution methodologies need to incorporate these factors and propose solutions that are robust in changing conditions**. This article and the work done under



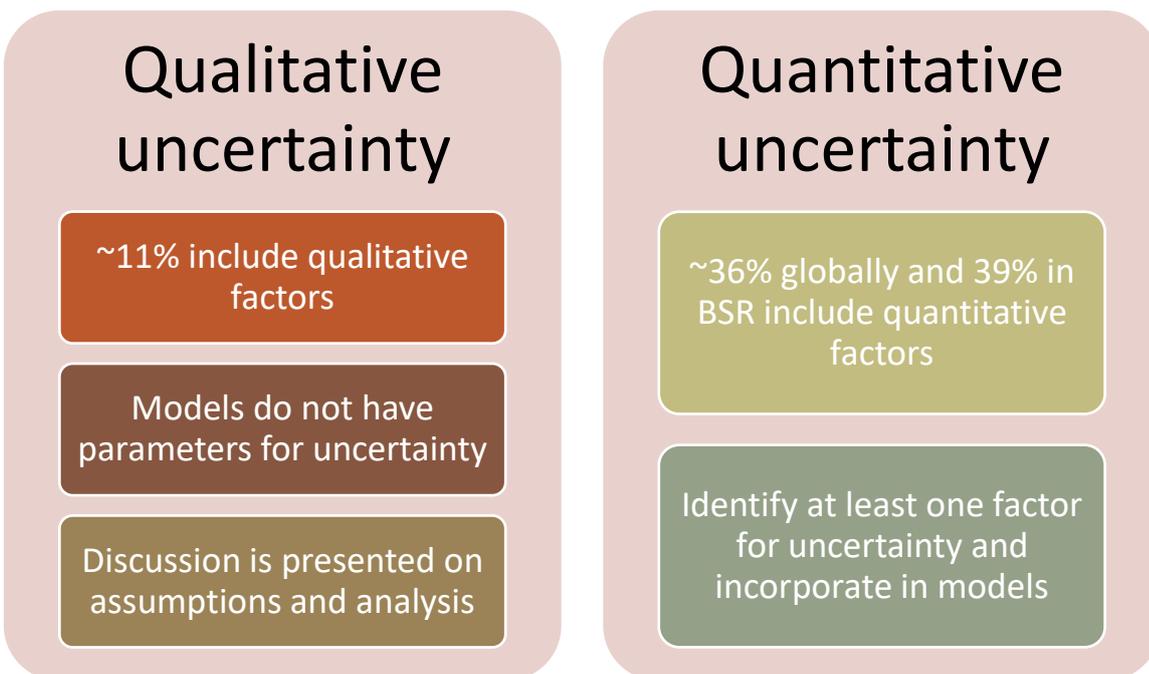
BONUS BALTIMARI aims to bridge this gap between researchers and practitioners by offering a wider perspective on capturing uncertainty to both groups.

Where do we stand today?

BONUS BALTIMARI summarizes key observations of how the scientific community has handled uncertainty over the last 50 years:



Among the efforts that have considered uncertainty, there have been two approaches: qualitative and quantitative.



Interactions with stakeholders during BONUS BALTIMARI workshops also brought to light that even qualitative discussions on uncertainty in the context of scientific solutions are highly valued and useful.



What are the next steps?

The good news is that current trends indicate more awareness in the scientific community about incorporation of uncertainty. There has also been a steady flow of collaborative projects involving industries, universities, research organizations and even government agencies since 2005 which include real world situations. In Finland alone, more than 33 projects have been successfully completed in the last 15 years. These findings are based on a review of projects and articles both within and outside of scientific databases conducted by BONUS BALTIMARI.

To keep the momentum going and to ensure that future scientific work is more relevant to industry through capturing of uncertain elements, a few recommendations are listed below for both groups.



Industry

- Help design case studies based on real-world challenges
- Provide data (even masked) or information for modelling
- Share expert views and inputs
- Help identify problems of the future.



Scientific community

- Include discussion about uncertainty for every solution proposed
- Encourage new researchers to take up industry based topics
- Disseminate research output in easy to understand formats
- Regular dialogues with practitioners.



BALTIMARI



BONUS
SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION

BONUS BALTIMARI policy brief no. 1

Industry stakeholders have a lot to benefit from the Baltic Sea Region scientific community, who are currently world leaders in maritime risk management. By investing more time in discussions with academia, better strategies for improving regional safety may be achievable. The scientific community can benefit by extending the outreach of their work through industry. By involving industry opinions and needs while shaping their research, future scientific output could be more progressive and relevant.

THROUGH A COMPILATION AND COMPARISON OF AVAILABLE REGIONAL AND GLOBAL KNOWLEDGE OVER THE LAST 50 YEARS IN PREVENTION-ORIENTED RISK MANAGEMENT, IT IS HOPED THAT SCIENTIFIC RESEARCHERS MAY IDENTIFY NEW FUTURE DIRECTIONS FOR RESEARCH WHICH ARE BETTER ALIGNED WITH INDUSTRY NEEDS. AT THE SAME TIME, THE INDUSTRY STAKEHOLDERS MAY BENEFIT FROM SUMMARIZED INSIGHTS OF LEADING SCIENTIFIC WORK GUIDING THE POLICIES OF NEAR FUTURE AND ENCOURAGING A MORE INFORMED DIALOGUE WITH SCIENTISTS IN ORDER TO MAKE MODELS MORE USEFUL IN THE REAL WORLD.

This policy brief summarizes the key highlights from the journal article: “Preventing shipping accidents: Past, present, and future of waterway risk management with Baltic Sea focus” by Ketki Kulkarni, Floris Goerlandt, Jie Li, Osiris Valdez Banda, and Pentti Kujala. For sources, citations and more detailed analysis, please visit: <https://www.aalto.fi/en/departement-of-mechanical-engineering/bonus-baltimari> or email us at Ketki.kulkarni@aalto.fi. This work was supported by the BONUS BALTIMARI project. The project has received funding from BONUS (Art. 185), funded jointly by the EU and the Swedish Research Council For-
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