

# SALIENSEAS

**Enhancing the Saliency of Climate Services for marine mobility sectors in European Arctic Seas**

<https://www.wur.nl/en/project/Climate-information-systems-in-the-Arctic-Ocean-use-and-implications-.htm>



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## **Areas of contribution**

User-aspects and verification

Education

Policy-relevant / cultural aspects

Economic aspects

Societal and/or behavioural aspects

## **Summary**

The rapid warming in the Arctic Ocean environment has profound socio-economic consequences, which generates a strong call from local communities and various marine sectors for more user-specified climate services. Currently, there is limited availability of, and accessibility to, high-quality Arctic climate information for operational and strategic decision making. The SALIENSEAS project will co-develop, in a team of social and natural scientists, met-ocean service personnel, and end-users, climate Arctic forecast products tailored to key social, environmental and economic needs. In the project, Arctic sub-seasonal and seasonal prediction capabilities and climate projections in the Arctic will be systematically exploited, in order to establish baseline expectations for predictive power and to guide advances in predictive capability. Based on a thorough understanding of the current uptake and need for climate services in several mobile Arctic Ocean end-user groups, a range of demonstration services will be co-defined and co-produced with these stakeholders. During the project period we will conduct in-depth social science research in relevant end-user practices, disseminate

forecast products to end-users of climate information, and develop a more participatory, flexible and tailored approach to developing forecast products. The SALIENSEAS project brings together a strong consortium of international research institutes, whereby high-level experts on Arctic socio-economic sectors and governance processes, weather and climate prediction, and data dissemination will work in line with stakeholder representatives. The developed tailored forecast products will be merged into Norway's and Denmark's met-ocean and sea-ice forecasting infrastructures.

## **Description**

Climate change is rapidly turning the Arctic region into a focal point of economic and geopolitical development, with potential implications for wildlife, ecosystems and indigenous communities (Lamers et al. 2016). It is expected that the Arctic will attract economic investments in excess of \$100bn in the coming decade and there is a great demand by local communities, public and private sector organisations for user-specified climate services (WMO/EC-PHORS, 2014; WMO/WCP, 2015). Research and co-production of climate service products is highly needed to support the actors and sectors operating in remote, dynamic and resource-rich Arctic marine environments (Jung et al., 2013; Emmerson and Lahn et al., 2012).

SALIENSEAS will address three key objectives:

1. To ensure optimal benefit of novel climate services by mapping the mobility patterns of marine sectors in the European Arctic and assessing the climate risks related to these mobility patterns by means of participatory GIS techniques.
2. To assess how vulnerable or resilient Arctic marine end-users are in different sectors, what their information needs are and how they routinely interact with weather and sea-ice services, in planning and operational decision-making contexts by means of companion modelling.
3. To increase and enhance the saliency and availability of sector specific climate services and dissemination systems dedicated for Arctic end-users by demonstration of seamless weather-to-climate Arctic climate services tailored to key social, environmental and economic needs.

Methodology:

1. The project is user-driven, has an inherent participatory character, and applies cutting edge participatory GIS, companion modelling, statistical downscaling methods, and data dissemination approaches.
2. A strong collaboration of world leading Arctic social scientists and Weather, Ocean and Sea Ice Services (MET Services). The social scientists have a longstanding experience with research on climate vulnerability and adaptation in the Arctic on a wide range of communities and sectors. The MET Services have established dissemination systems and long-standing relationships in providing met-ocean products to public and commercial end-users in Greenland waters and the Arctic.
3. The co-development of demonstrator climate service products will be built on the expertise and research results of social and natural scientists, data dissemination systems, and end-user requirements and expectations. The project will strongly involve end-user representatives from marine based sectors in research workshops (e.g. Oceanwide Expeditions), as well as stakeholder representative groups in an stakeholder advisory group, for instance AECO and MaritimT Forum Nord.
4. The project plan is aligned with national and international research activities. The project will seek endorsement from the WMO-PPP and particularly the SERA core group within this initiative (Leading PI Lamers is co-chair of PPP-SERA, Partner PI Olsen is PPP Steering Group member and coordinator of H2020 Blue-Action), providing opportunities for collaboration with US-Alaska and Canadian institutions. The project will be implemented within large international programs, such as the PPP (WWRP), the S2S project

(WWRP/WCRP), the Copernicus Climate Change Service (EU), the WMO PRCC, and the Arctic CORDEX project (WCRP).

5. The project will establish a stakeholder advisory group (SAG) in order to ensure an end-user focused research project and outreach to end-users not part of the project. Furthermore, it will be aligned with ongoing Arctic climate services projects in which researchers and end-users are involved (e.g. Nordic Arctic Cooperation Programme, H2020 Blue-Action).

The project is divided in work packages, involving five leading institutes:

- WP 1: Project coordination. The project will involve post-doc researchers based in, and supervised by leading knowledge institutions in the Netherlands (Wageningen University), Norway (University of Tromso, MET.no), Denmark (Danish Meteorological Institute) and Sweden (Umea University). Overall coordination: Wageningen UR University, Netherlands. The coordinator will ensure efficient communication and dissemination of knowledge, be responsible for the project implementation, and the engagement and exploitation of project results in cooperation with stakeholders.
- WP 2: Mapping Arctic marine mobilities. Mapping the mobility patterns of European Arctic marine sectors of shipping, expedition cruising and fisheries, through participatory GIS, and analysing climate risks. Involving a post-doc researcher at Umea University (lead) and staff from University of Tromso.
- WP 3: Modelling practices: Modelling marine sector practices in interaction with sea ice and extreme weather events using an companion modelling approach. Involving a post-doc researcher at Wageningen University (lead).
- WP 4: Co-producing services: Co-producing a series of tailored, novel demonstration services addressing coupled physical events with relevance to Arctic marine sectors, such as around fast-ice formation and breakup with potential of episodic discharges of icebergs in the coastal zone, extreme weather events combined with icing, opening and closure of coastal leads in anomalous atmospheric conditions. Involving staff at the Danish Meteorological Institute (lead) and MET Norway.

The project will contribute to the YOPP objectives by 1) enhancing our understanding of information services use by marine sectors in the European Arctic; 2) bridging provider and user relevant aspects; 3) providing tailor-made information services to a selection of users; 4) learning for and enhancing co-production methods and feedback mechanisms in the creation and delivery of weather and sea-ice services.

## **Timeline**

2017-07-01 - 2020-07-25

## **User relevant aspects**

The project will ensure efficient communication and dissemination of knowledge, be responsible for the project implementation, and the engagement and exploitation of project results in cooperation with stakeholders. Through intensive fieldwork, based on document review, user surveys, interviews and participant observation, the project will obtain an in-depth understanding of the vulnerability and resilience of these sectors, the relevant decision-making practices and spatial-temporal contexts in which climate services come into play, and key information needs. Further, through a companion modelling approach - i.e. participatory agent-based modelling, involving users in serious games - a simulation model will be developed and used to experiment with

different biophysical scenarios and forms of tailored information delivery, to test out their effectiveness. Finally, insights and interaction with end-users will be sought through a series of workshops for the development of tailored demonstration services.

### **Provider relevant aspects**

Provider relevant aspects will be included through the key providers part of the project consortium, i.e. MET Norway and the Danish Meteorological Institute.

### **Regional emphasis**

Northern hemisphere: Yes

Southern hemisphere: No

### **Key project deliverables**

The project will be organised around a series of end-user workshops during which participatory approaches developed in WP2 and WP3 will be carried out. The development of the demonstration projects in WP4 will follow the insights generated during these end-user workshops and will feed into the companion modelling approach carried out in the context of WP3 during later end-user workshops. Centering the work around the end-user workshops enables parallel research activities in the three key work packages (next to the coordination WPs), while warranting the integrated character of the project.

A series of social science and natural science articles on the integration of weather and sea-ice information in various marine mobility sectors in the European Arctic, companion modelling and demonstration projects (expected early 2020).

Further, the project will result in a social simulation model that can be used for testing and developing weather and climate information services (expected early 2020).

The product development will in part be based on advanced empirical statistical downscaling methods (Benestad et al. 2015). In addition, weather generators will be used to downscale or disaggregate from sub-seasonal into daily to sub daily timescales (Mezghani and Hingray 2009). The statistical programs will be interfaced with newly established sub-seasonal to seasonal forecasts (WWRP/WCRP S2S project database), seasonal climate predictions (C3S), and climate projections (CMIP5, HighResMIP). The calibration of the forecasts will further rely on the availability of high-quality reanalysis, satellite monitoring datasets and other observations. An important aspect will be to include expertise on IT infrastructure in order to enable the operational delivery of products and data to stakeholders/end-users. Demonstration services will be selected and tailored based on insights from, and interactions with, end-users (expected early 2020).

## **Data management**

Regarding social science data (interviews): Research reports and publications resulting from this project will explicitly list all data sources used. We will take care about the data protection; all recordings will be transcribed and archived after completion of the project following procedures set by the institutions and following national guidelines. Participation of respondents in this project happens based on prior and informed consent, and privacy considerations require that confidentiality will be guaranteed to all informants and interviewees participating in this project, as is customary in the social sciences. Interview transcriptions will be made available only to integrity committees when this would be demanded.

## **Is data provided to WMO Global Telecommunication System**

No

## **Real-time provision**

The developed tailored forecast products will be merged into Norway's and Denmark's met-ocean and sea-ice forecasting infrastructures and maintained and developed beyond the lifetime of this project.

## **Other information**

Funding is sought through the European Research Area for Climate Services ERA4CS Joint Call for Transnational Collaborative Research Projects 2016

Topic A- Researching and Advancing Climate Service Development by Advanced co-development with users  
The SALIENSEAS project has made it through the pre-proposal stage: a full proposal is to be submitted mid November.

The project team seeks endorsement to support the proposal in this competitive process.