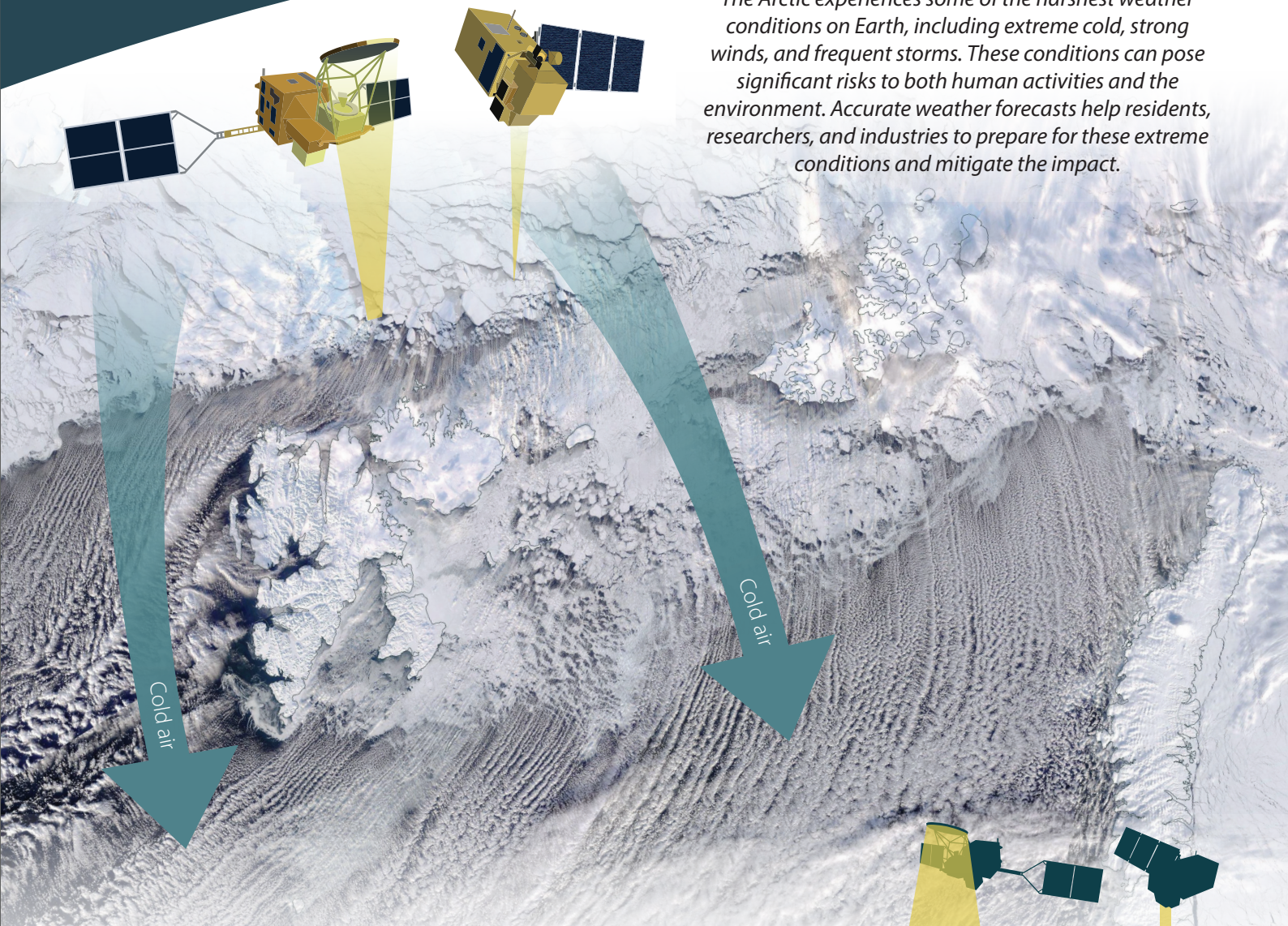


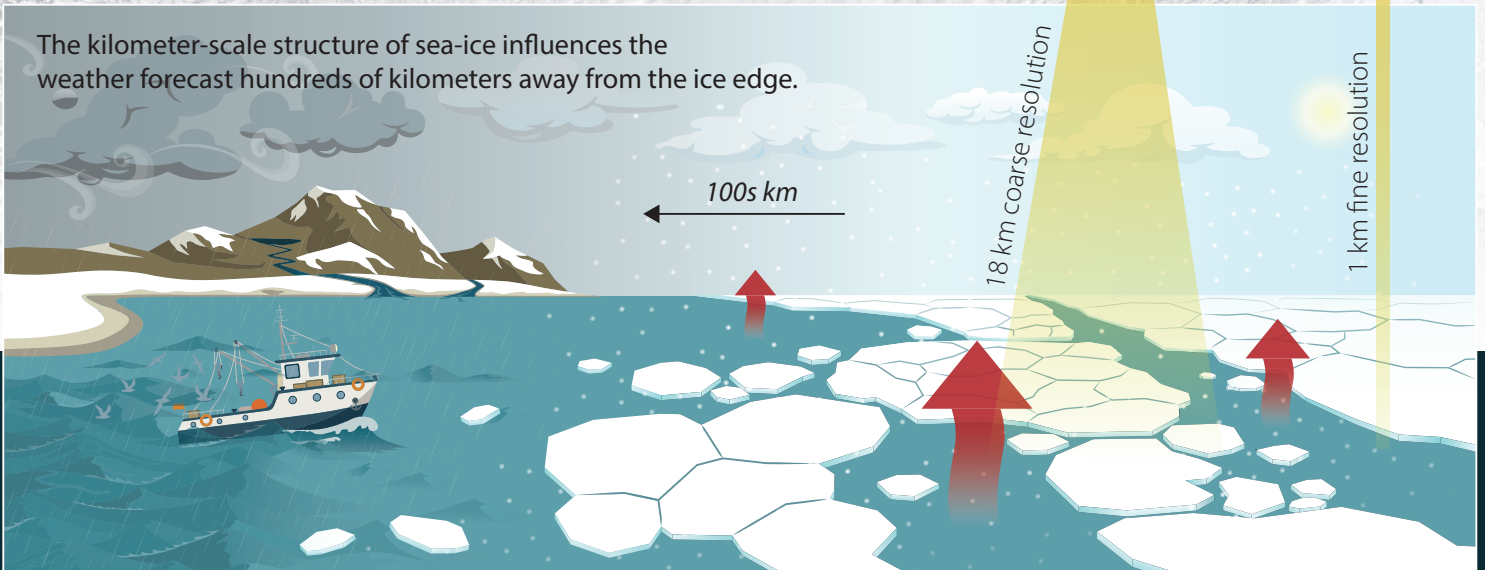


Arctic weather prediction

The Arctic experiences some of the harshest weather conditions on Earth, including extreme cold, strong winds, and frequent storms. These conditions can pose significant risks to both human activities and the environment. Accurate weather forecasts help residents, researchers, and industries to prepare for these extreme conditions and mitigate the impact.

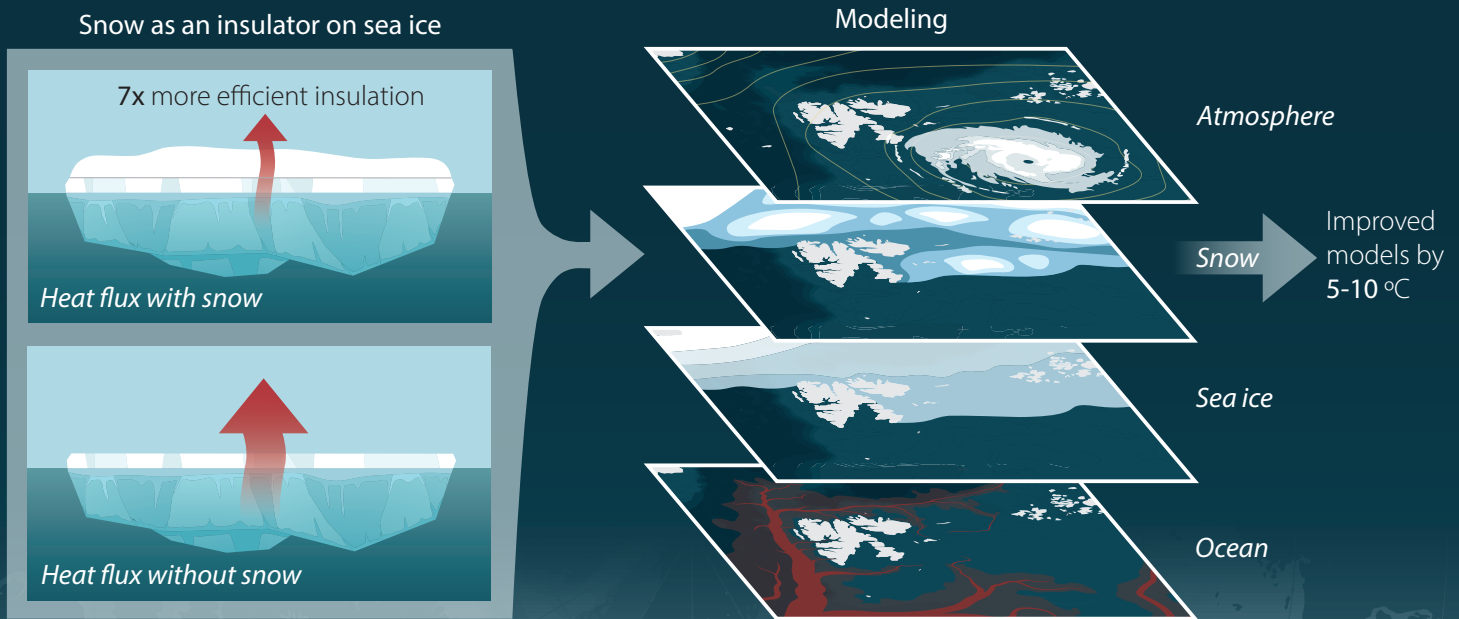


The kilometer-scale structure of sea-ice influences the weather forecast hundreds of kilometers away from the ice edge.

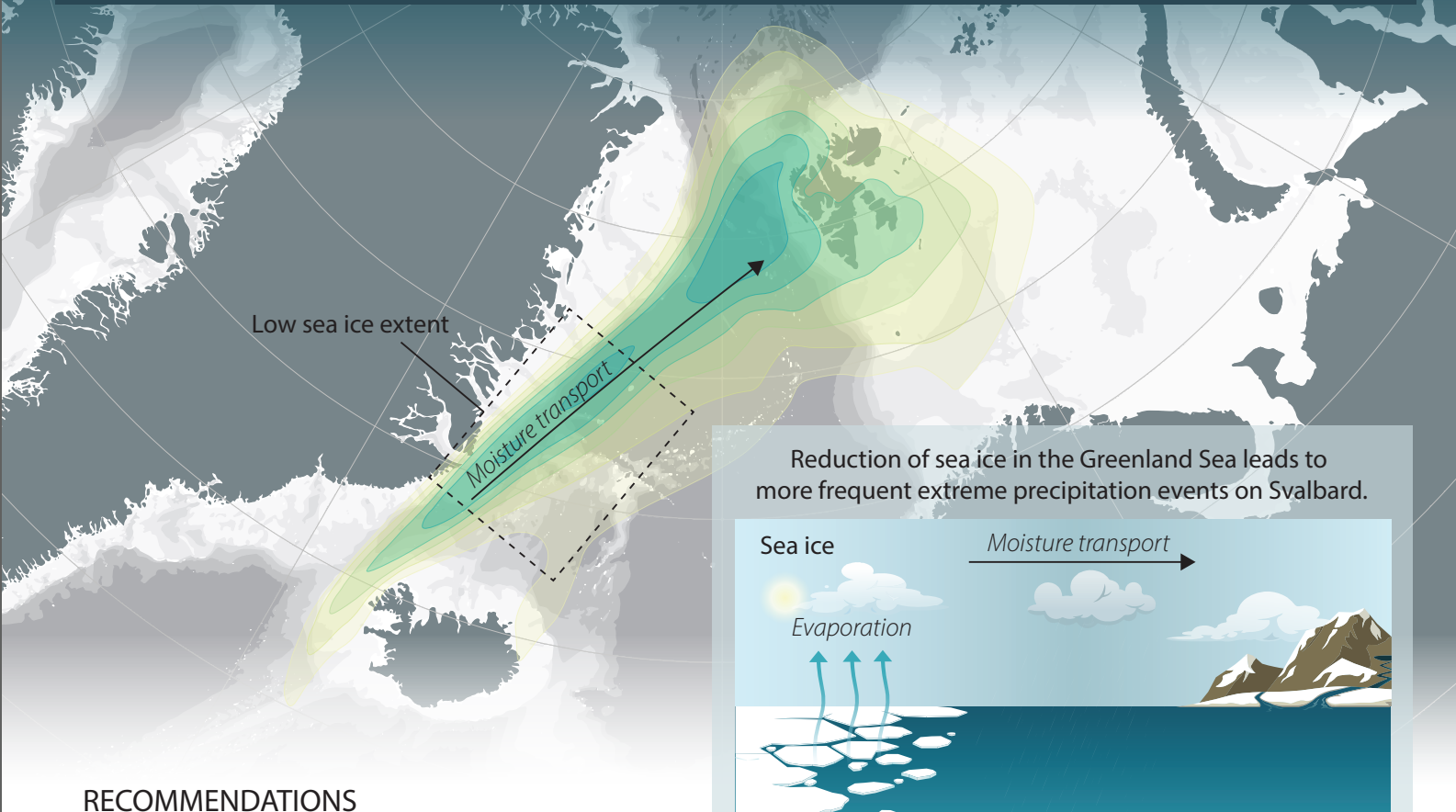


The increase in Arctic shipping underscores the critical importance of accurate weather forecasting. Weather services not only enhance the safety of maritime operations but also support economic development, environmental protection, and scientific exploration in this unique and environmentally sensitive area. There are many challenges in the development of Arctic weather forecast systems. An important factor to improve on the forecast accuracy is to advance the representation of kilometer-scale sea-ice and snow processes by using satellite information and novel model approaches.

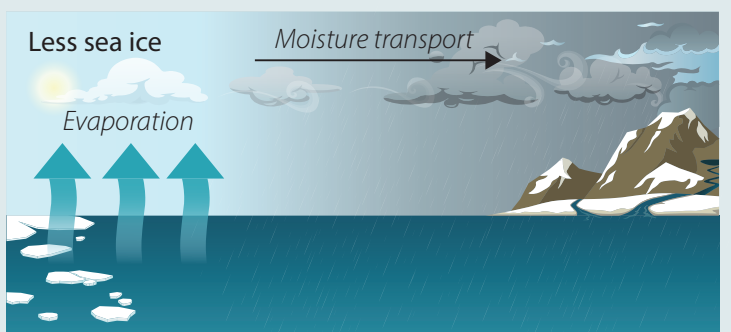
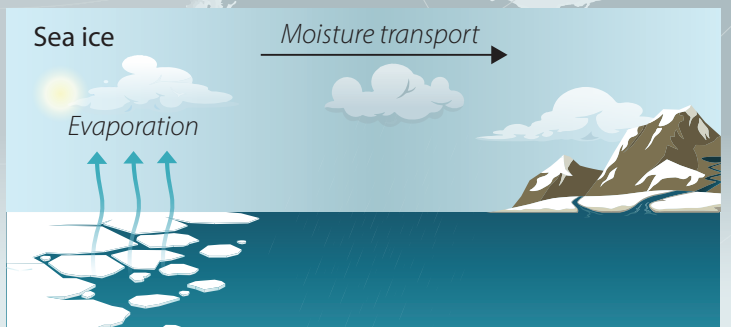
Incorporating snow on sea ice into weather models



Sea ice reduction and precipitation



Reduction of sea ice in the Greenland Sea leads to more frequent extreme precipitation events on Svalbard.



Greenland Sea

Ocean

Svalbard

RECOMMENDATIONS

The weather forecasting system for the European Arctic is developed and operated by the Norwegian Meteorological Institute. It serves as one of the central tools for providing input to the global maritime distress and safety system, as well as when issuing regular weather forecasts and warnings for this region. In the future a strong focus will be to advance the coupling of the weather forecast system to sea-ice, snow and surface ocean processes by using novel machine learning approaches.