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Title: *A sea-ice forecast system in the Barents and Kara Seas including a newly developed marginal ice zone model*

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Offshore activities in the Barents and Kara Seas have increased during the last years leading to much higher demands on forecast capabilities related to offshore operations at platforms, shipping, rescue operations, and oil-spill recovery. The Barents and Kara Seas are at the doorstep to the Arctic Ocean and characterised by large variability in the weather conditions, as well as strong seasonal and inter annual variability in the sea-ice cover. The present forecast system distinguishes between the sea-ice rheology in the consolidated ice pack and in the marginal ice zone. An elastic-viscous-plastic (EVP) formulation is used in the pack ice while a rheology based on statistics of random collisions between solid ice floes is used in the marginal ice zone. The present forecast system propagates surface waves into the ice and may break large pieces of sea ice into smaller floes. The waves at the boundary of the ice edge are taken from forecasts given by a surface wave model. A floe sizes based criterion then determines the transition from pack ice rheology to marginal ice zone rheology. A nested configuration of HYCOM was set up for the area, where the TOPAZ operational forecasting system provide boundary conditions to a high resolution model (5 km) covering the Barents and the Kara Sea. The daily forecast is available in real time attopaz.nersc.no/Knut/IceForecast/Barents, together with validations against remote observation of sea-ice concentrations. Work is ongoing to validate the model performance and forecast products.