Ideas for Call "Water naar de Pool" of the Netherlands Polar Program, organised by NWO

For more information about the call: http://www.nwo.nl/en/funding/our-funding-instruments/alw/arctic-research-for-the-top-sector-water/arctic-research-for-the-top-sector-water.html

Theme	Proposer	Title	Description
1. Capability of Ships in Ice	By: TU Delft, OE + MUN Dr. Hoving. Contact: J.S.Hoving@tudelft.nl	Modelling of ship-ice interaction to determine ice impact damage on ships in transit.	As the Arctic is becoming more accessible for shipping, the hulls of many of the current ships are not equipped or designed for interaction with ice. Although the interaction of stationary structures with ice is nowadays reasonably well understood, this is not the case for ships in transit for which the relative ice velocity is significantly higher. To determine the capability of current ships as well as to improve future designs, a better understanding of ship-ice interaction at high ice impact velocities and an assessment of the resulting damage is required. Cooperation with DMO (Ministry of Defense), NTNU (Norway) and MUN (Canada) envisaged.
2. Spray Water	By : TU Delft, CT, Contact: w.s.j.uijttewaal@tudelft.nl	Break-up of spray water in air	Spray amounts going up can be quite large, especially in building-up (choppy) sea states. The break-up of this spray jets into drops and blobs under the influence of gravity is a largely unknown process, but worthwhile to improve modeling of deck wetness. Spray wetting in cold weather leads to significant icing problems. Use of in-kind measurement data from full scale trials from SprayWater JIP envisaged.
2. Changes in sea ice cover	By: KNMI, Prof. R. Bintanja. Contact: Bintanja@gmail.com	Accurately predicting future changes in Arctic sea ice cover	With ongoing Arctic warming, sea ice will continue to recede, with impacts on ecology but also on potential economic activities that can benefit from open water (fishery, transport, oil drilling, tourism). Projections of sea ice, however, are very uncertain. We propose to use state-of-the-art high resolution climate models (such as EC-Earth, the in-house model of KNMI) to make accurate predictions of sea ice cover and thickness for the (near) future, focusing on the geographical location, seasonality and timing (what year) of regions becoming ice-free.

3. Icebergs versus Marine Pipelines	By: TU Delft, OE Dr. Hoving. Contact: J.S.Hoving@tudelft.nl	Dynamic iceberg-soil interaction during seabed gouging.	In the (sub-)Arctic, icebergs are a danger to marine pipelines due to seabed gouging. For economic feasibility, these pipelines are buried at depths where the soil experiences significant deformations. Current models do not properly account for the dynamics in the iceberg-soil interaction and the extent of sub-gouge soil deformations on the geotechnical parameters is not well understood. For offshore pipeline design and in particular to determine required depth of pipeline trenches it is vital to improve the understanding of this problem.
4. Thruster Noise	By: TU Delft, Mar. Eng. Prof. T. van Terwisga Contact: A.B.Aalbers@marin.nl	Noise emission of ducted propellers, in open water and in ice breaking transit	For ducted thrusters and bow tunnels the noise signature is hardly investigated (one of the conclusions of the AQUO and SONIC EU projects). In some conditions, e.g. at high loading, the noise emission is reportedly high. To prepare for acceptable regulation in environmentally sensitive areas, the signature will be investigated and noise generation be modelled. Use is envisaged of measurements to be carried out in 2018 during the Finland Centennial Arctic Expedition, in which project the TU will then have to participate a JIP participant.
5. Noise impact	By: WUR, WMR and TNO Contact: martine.vandenheuvel-greve@wur.nl	Impact of ship emitted noise on sea life in Arctic waters; effect of ice cover	For development of acceptable noise emission regulation in Arctic/Antarctic waters better understanding of noise impact on the behaviour of –especially- sea mammals is needed. Use is envisaged of measurements to be carried out in 2018 during the Finland Centennial Arctic Expedition. WMR will on behalf of WUR participate in the expedition, TNO will focus on sound propagation in ice covered water.
6. Far-field / Near-field Ice model	By: TU Delft ODE + NTNU Prof. A. Metrikine Contact: J.v.d.Berg@marin.nl	Coupling a continuous far field ice model to a DEM model to compute ice loads on ships and structures.	In co-operation between TU Delft and NTNU a Discrete Element method is being developed which has very promising potential for use in design and simulation for training. Especially because of the computational efficiency. In MARIN a proof of concept has been made of a continuous pack-ice model. The proposal is to combine these models so that the DEM model will therewith have the boundary conditions it needs for realistic results. The method thus allows to integrate ice-induced ship movements, giving feed-back of forces into the ice.

7. Finding Growlers	By: TU Delft EWI Prof A. Yarovoy Contact: a.yarovoy@tudelft.nl	Small Glacial Ice Detection by Radar	Small glacial ice bits, so-called 'Growlers', may still be 50-1000 tons. These are floating low and are hardly visible, even in the rare case of good visibility in areas as offshore Newfoundland, the Bering Sea or Barents Sea. A recent initiative to improve an FMCW radar for wave detection has led to the proposal to also investigate the capability of the radar to detect growlers. This requires investigation of the radar raw data and new pattern detection algorithms. Some trial data available from the Do-It Radar JIP will be made in-kind available.
8. Arctic ice atlas	By TUD? Remote Sensing. Contact: wim_jolles@canatec.ca	Central ice repository	Arctic ice atlases may exist but the industry and research establishments do not have easy access to a central repository of factual ice conditions. This hampers the proper planning but also execution for arctic operations. Geographic ice conditions can be collated based on existing systems and produced for easy access and use, providing statistical information and exceedances from which proper operating windows could be developed.
9. Safe-Rescue	By TUD? Contact: wim_jolles@canatec.ca	Safe rescue systems for personnel in arctic climates	Deployment of people in harsh offshore climates may lead to challenges in safety and safe rescue. Various part systems and procedures may exist but finding, monitoring and retrieving personnel from such arctic deployments in a controlled and safe manner must be developed. Simulations can be conducted such that all part systems, communication and collaboration is optimized.
10. Arctic strain	By VU?, WUR?, TNO support? Contact: wim_jolles@canatec.ca	The effects of arctic operations on personnel strain	During the development of various new ISO Standards for Arctic Operations, the effect of the Arctic 'strain' was discussed. A lot of experience and expertise exists in Holland and various operations are being carried out. A proper data collection program can be conducted during the Arctic 100 Expedition planned for 2018 to record the actual strains and possible information overload to various operational personnel. Results can be used to improve data dissemination, bridge designs, working schemes and machinery controls.

11. Arctic Living Lakes	By: University of Groningen, Arctic Centre, Bureau Biota, RWS, foreign partners Contact: m.j.j.e.loonen@rug.nl	Developing a monitoring standard for the state of Arctic lakes	The Netherlands has been fore runner on the assessment of the quality of waterbodies via biological assessments. These have been used intensively with the European Water Framework Directive to determine a measuring stick and management tool for water improvement. This project aims to develop a similar index for water quality, based on biodiversity of sensitive species. We will develop a methodology and a determination key and train people to use the key to assess environmental impact and the effect of climate change on Arctic tundra lakes. The project links to the Arctic Council working group Conservation of Arctic Flora and Fauna and their Arctic Freshwater Biodiversity Monitoring Plan.
12. Arctic oil dispersant-induced marine snow formation	By: NIOZ / WUR Contact: Corina.Brussaard@nioz.nl martine.vandenheuvel-greve@wur.nl	Induction potential and ecological impact of oil dispersants-induced marine snow formation by Arctic marine algae	Dispersant application as oil spill response method can induce the formation of oil containing marine snow at sea, affecting both water column and sea bed ecosystems. Knowledge from the Deep Water Horizon spill will be used to assess the potential of oil marine snow formation in the Arctic. With the brief growth season expected ecological effects of oil containing marine snow on the Arctic food web are extensive. Results will be used to develop a strategy how to clean up oil in the Arctic without the formation of oil containing marine snow or a strong impact on the ecological system.