Development of ARCTIC Biological INDicators for the impact assessment of (new) human activities: the ARCIND Project

Ariadna S. Szczybeliski1, Martine J. van den Heuvel-Greve2, Nico W. van den Brink3, Anita Evenset4, Geir Wing Gabrielsen5 and Albert A. Koelmans1,2

Bioindicators
Monitoring tools for the assessment of human impacts on marine Arctic ecosystems are needed.

Benthic organisms are highly relevant in the Arctic ecosystem due to their crucial role in nutrients recycling and food webs.

The seafloor of the polar oceans is a sink for hydrophobic and persistent chemicals.

Benthic organisms are in direct contact with sediment and are relatively immobile, and are therefore better reflecting local conditions. Polar benthic organisms can grow old and have a low metabolic capacity which may enhance accumulation of chemicals.

Measuring effects and contaminant concentrations in benthic organisms can form an important tool for assessing and monitoring impacts of OG & S activities on marine Arctic ecosystems.

Research goal
This PhD project (2013-2016) aims to develop a signalling system based on biological indicators for the prediction, assessment and reduction of impacts emerging from the increase of economic activities in the Arctic.

Research question
What drives the uptake of chemicals related to human activities such as OG & S by Arctic benthic species and what are potential sub-lethal effects after chronic exposure? Do these effects differ under changing conditions?

Research approach
Identification and selection of chemicals related to OG & S in the Arctic that show persistence and/or bioaccumulation.

Tracking causal relationships between exposure and sub-lethal effects of selected chemicals in Arctic benthic species, in the laboratory as well as in the field. Identifying primary factors governing these relationships (e.g. temperature, food availability, seasonality).

Research location: Svalbard and the Barents Sea.

Expected output
• Inventories of chemical release profiles associated with OG & S in the Arctic.

Acknowledgements
Statoil and the TripleP@Sea innovation programme of Wageningen UR for funding this project.

References