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ADAPTABILITY TO ENVIRONMENTAL CHANGE IN A HIGH-LATITUDE FJORD ECOSYSTEM: THE KONGSFJORDEN ECOSYSTEM FLAGSHIP PROGRAM

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The ecosystem of Kongsfjorden is situated in the transition of an Arctic to Atlantic fjord system, and is, thus, regarded as a system particularly susceptible to the impacts of climate change. Being directly influenced by variable climate signals in the Arctic, Kongsfjorden functions as a sensitive climate change indicator. Kongsfjorden is located at 79 °N, but is much influenced by Atlantic water advected from the West Spitsbergen Current. The inner part of the fjord is rather “Arctic” because the Atlantic water circulates in mid-fjord outside the sills and because the inner basin is influenced strongly by glacial run-off from large tidal glaciers. Because of the dual Atlantic/Arctic inputs, the fjord has pelagic and benthic communities that comprise a mixture of boreal and Arctic flora and fauna, which varies seasonally as well as interannually. However, recent hydrographic changes have resulted in a pronounced influx of Atlantic water into the fjord system during winter, which may have driven the system into “regime-shift” from a cold system (prior to 2006) to a “warm system” with winter temperatures > 0 °C and little fastice in the fjord. Because long-term trends in temperature of waters outside West Spitsbergen indicate an increase, it is unlikely that Kongsfjorden will revert to a “cold system”.

Intense oceanographic, atmospheric and biological monitoring activities are essential in order to identify the responses to climate forcings. Numerous biological and ecological studies have used the fjord as “natural laboratory” in the Arctic and thus established Kongsfjorden as a reference site for Arctic marine studies in international collaborative science projects. Kongsfjorden’s data sets contain long-term data-series, conducted as part of Environmental Monitoring of Svalbard and Jan Mayen (MOSJ), and the adjacent atmospheric Zeppelin Station represents one of the most important atmospheric monitoring locations in the Arctic. Many research activities with associated data sets need to be amalgamated and international, multidisciplinary projects should be more coordinated.

The Kongsfjorden Ecosystem Flagship Program is set up to meet these important demands to facilitate the integration of multinational experimental field research, consecutive monitoring field surveys, and long-term data recording in order to address past, present and future ecosystem functioning of Kongsfjorden and its adaptability in the context of climate change.

In March 2014, a workshop *Kongsfjorden Ecosystem – new views after more than a decade of research* was held in Hamn i Senja, Norway. This workshop will result in two published volumes: special issue in *Polar Biology* and a book with review papers in *Advances in Polar Ecology*. These publications will identify gaps in our knowledge with regard to biodiversity, physiology and ecosystem functions, and set the stage for future research focuses in Kongsfjorden as well as other Arctic marine ecosystems with regard to impacts of climate change.