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COORDINATING AND INTEGRATING INTERNATIONAL STUDIES OF MARINE BIODIVERSITY AND ECOSYSTEM DYNAMICS IN THE ATLANTIC SECTOR OF THE ARCTIC OCEAN – A KEY ACTIVITY OF THE SVALBARD INTEGRATED EARTH OBSERVING SYSTEM

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Svalbard is located at the centre of a region where both Atlantic and Arctic marine ecosystems occur and is a region now seeing rapid changes in the balance of these ecosystems. Certain areas, such as the Barents Sea to the east have well established ecosystem monitoring directed at fisheries management whereas to the north the still largely ice covered Arctic Basin ecosystems are very poorly understood due to the difficulties in operating in that environment. The deep Fram Strait to the west is a conduit for heat exchange (and biological migration) between the Atlantic and the Arctic. Atlantic biota have been steadily advancing northwards over recent decades as the oceans warm and the region around Svalbard is a key area for studying the effects on Arctic marine communities. It has been a focus for national research activities for many years and there are relatively extensive biological and environmental data available, though there has been limited integration of these disparate projects to date.

The developing Svalbard Integrated Earth Observing System (SIOS) is an international collaboration, already involving both European and Asian nations. It aims to coordinate and integrate the many existing national research activities in the region within an internationally agreed programme focussing on Earth System science issues. The SIOS observational programme includes a series of defined ship stations in waters around the archipelago that are regularly occupied to monitor key environmental and biological parameters. In addition, moorings have been established both in a range of fjords characterized by Atlantic or Arctic influenced food webs and in open ocean areas through which major currents and various marine animals transit. The SIOS observing infrastructure also includes what is currently the only subsea marine observatory (Hausgarten) in the Arctic and is studying both pelagic and benthic environments. The coordination of these diverse facilities and integration with existing data sets from previous projects offers a major opportunity to document the biodiversity and dynamics of existing Arctic marine ecosystems over time. The SIOS observing system is being designed with a system perspective to enhance the ability to make cross-disciplinary interpretations of why changes are occurring. SIOS will also be linking its work with other sites elsewhere in the Arctic to contribute to a more pan-Arctic view. These strategic approaches will lead to better understanding of the likely responses of these biota and ecosystems to the rapid changes currently being experienced in the Arctic region.