

Synoptic Arctic Survey (SAS); Pan-Arctic Ocean Observation Research Program

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The Arctic Ocean environment has already changed as New Arctic due to global warming. It is suggested from not only observational evidences but also numerical results that changes of oceanographic condition have significantly impact environmental changes in the Arctic Ocean, especially for mid- and long-term. However, necessary observation data in the Arctic Ocean for understanding the present and future states with high accuracies are very limited.

SYNOPTIC ARCTIC SURVEY (SAS) is a bottom-up, researcher-driven initiative that seeks to define the present state of the Arctic Ocean. The objective of the SAS is the multi-national coordinated engagement of research vessels in the summer of 2020-2021 in an unprecedented effort to jointly address the Arctic Ocean. THE GOAL is to generate an unprecedented dataset that allows for a complete characterization of Arctic Ocean hydrography and circulation, ecosystem functioning and productivity, and carbon uptake and ocean acidification. The comprehensive dataset from the SAS will provide a unique and critically needed baseline for future studies as it will allow us to track climate change and its impacts as they unfold in the Arctic over the coming years, decades and centuries.

SAS international science team had several workshops and compiled “Synoptic Arctic Survey Science and Implementation Plan”. The Science and Implementation Plan shows a single overarching question, “What are the present state and major ongoing transformations of the Arctic marine system?”, and three key foci, “Physical driver”, “Ecosystem response”, and “Carbon cycle and ocean acidification”. Each focal area has three specific questions. The next important step forward for SAS now is assembling national SAS-teams that can meet and discuss how they best can address the 9 research questions we have formulated in the Science and Implementation Plan and also how we can secure funding and ship time for potential projects. Following Sweden hold the first national meeting for SAS, we had a meeting to assemble Japan SAS national team during the 5th International Symposium of Arctic Research (ISAR-5). Also, we plan to conduct R/V Mirai cruise for SAS in 2020/2021, which can cover the SAS observation area in the Pacific sector of the Arctic Ocean. In this presentation, we introduce Synoptic Arctic Survey and the plan of R/V Mirai 2020/2021 SAS cruise.

Keywords: Arctic Ocean, Observation Research Program, Changes of Ocean environment, Physical driver, Ecosystem response, Carbon cycle and ocean acidification