The flow of land-derived groundwater in the ocean environment (or submarine groundwater discharge - SGD) is a common global observation however poorly studied so far. The groundwater discharge has been recognized as an important source of freshwater and chemical substances for some coastal areas. In addition, the strength of SGD is known to associate with climate changes, especially in the Arctic region. Large bodies of ice, such as glaciers in the ocean and frozen soils on land, can change the flow of groundwater; the shrinking of these ice bodies could therefore have immense impact on the water cycle. Up to date, scientists know very little about how much of this fresh groundwater is discharged to Arctic Ocean, SGD composition, and SGD influence on the benthos organisms living in the ocean.

We propose to conduct detailed surveys to 1) determine the factors controlling SGD; 2) reconstruct SGD history; 3) quantify the fluxes of groundwater and accompanying solutes; 4) investigate the impact of SGD on benthic meio- & macro-fauna.

The scheme presenting the field investigations is presented in Fig. 1. We intend to answer some of these questions by using the state-of-art technology, such as the unmanned underwater robot, to study sites in the Arctic Ocean where the flow of land-derived groundwater has been found from 200-800 meters below the sea level. This project intends to deliver a novel and coherent knowledge about the influnce of SGD on chemical elements cycling and biota which will greatly improve our understnading of the groundwater systems in the Arctic region.
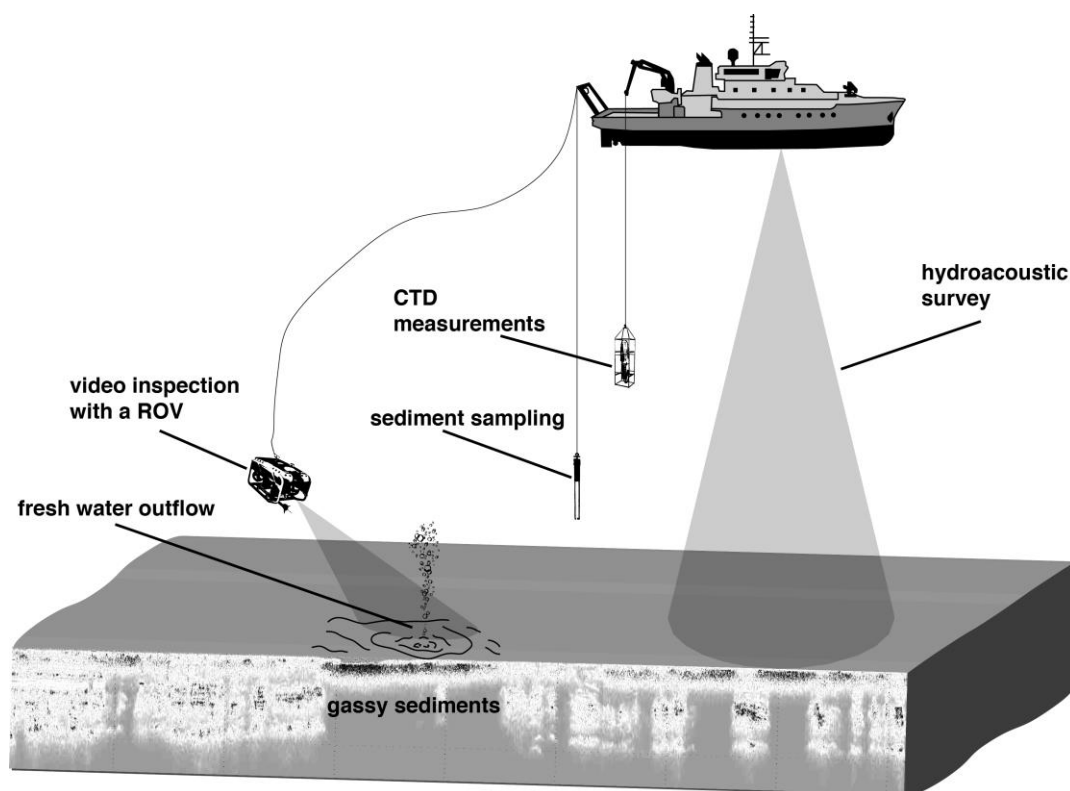

Fig.1. The proposed sampling scheme.