

## **A FRAMEWORK FOR KOREA-CANADA-USA ARCTIC RESEARCH USING THE ARAON RESEARCH VESSEL**

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### **ABSTRACT**

In December 2011 a new international collaboration was initiated to undertake geoscience and oceanographic studies in the Canadian Arctic. During the first phase of the research (2011 to 2015), we hope to conduct new geological, geophysical and oceanographic investigations of the Beaufort Sea shelf to study the stability of decomposing permafrost and gas hydrate and the mechanisms for gas migration and release at the sea floor. Our hypothesis is that shelf areas of the Arctic less than 100m water depth, which make up ~32% of the area of the Arctic Ocean, are underlain by permafrost and gas hydrate stability conditions that formed during past glacial periods and are only now being altered by the thermal effects of marine transgression which may promote their degradation. Our research will allow assessment of the importance of Arctic shelves as past and present sources of methane for the atmosphere and will quantify a range of geohazard/environmental processes associated with gas migration and release that have not been documented to date.

The Beaufort Shelf is an ideal study area because: (1) significant amounts of thermally disturbed permafrost gas hydrate are known to exist in the subsurface, (2) gas venting has been documented in association with unique physical features on the sea floor (i.e. active submarine pingo like features, pockmarks, sub-marine slope failures and permafrost taliks), suggesting there are unique point sources and transitional pathways for fluid and gas movements from decomposing gas hydrates, and (3) the surface sediments in this area are predominantly fine-grained, permitting collection of good sediment cores to enable stratigraphic, biostratigraphic and geochemical studies. We believe that research in the Beaufort Sea will contribute to our understanding of other larger Arctic shelves (e.g. the Siberian shelf) and will be greatly valued by the international research community. Both the Integrated Ocean Drilling Program (IODP) and the Integrated Continental Scientific Drilling Program (ICDP) are also considering research in the Beaufort Sea and our research would provide site survey data in support of active drilling proposals.