

## Measurement of dissolved Ga, Ba, V, and CH<sub>4</sub> during US Arctic GEOTRACES

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We intend to propose measurement of dissolved gallium, barium, vanadium, and methane during the US Arctic GEOTRACES cruise. A brief rationale is as follows:

**Gallium:** We have primarily used Ga as a less-reactive analog for Al, thereby informing interpretations of the Al distribution. We will continue to do that on this cruise, partly with an eye towards looking at regenerations and boundary scavenging. However, Ga will also prove useful as a tracer to distinguish Pacific and Atlantic water components in the Arctic due to both the interocean contrast in Ga and its low reactivity. In fact, evidence from other researchers suggests it may prove more useful than tracers like N\*.

**Barium:** Barium is of interest for two reasons. First, it has been used in the Arctic as an indicator of fluvial inputs and second because of a desire to better understand the processes controlling its distribution so as to better exploit it as a paleoceanographic tracer. We have completed the North Atlantic section of dissolved Ba and this thus fits into the scope of work in our lab.

**Vanadium:** We are still uncertain as to the extent to which surface ocean V depletion relates to surface ocean biological uptake versus removal in reducing shelf sediments. The large shelf area of the Arctic will be useful in helping resolve this.

**Methane:** Arctic waters are a significant source of methane to the atmosphere and global change is likely exacerbating the release of this potent Greenhouse Gas. Indeed, high levels of methane have recently been observed in surface waters of the East Siberian Shelf. Determination of the methane distribution will therefore be of interest in and of itself. However, it is also a potentially useful indicator of inputs from highly reducing shelf sediments or sediments characterized by destabilizing hydrates.

**Synergies:** The Ga work will entail collaboration with those doing Al analysis as well as others working on aeolian input and boundary scavenging. The Ba work will be of interest to those working on Ra as well as those wanting some indication of fluvial influences. The V work will entail collaboration with others working on interactions with reducing shelf sediments. The methane work will be of interest to others working on the carbon system as well as shelf interactions.

Sample requirements: For trace elements, 125-mL samples from the GEOTRACES rosette. For methane, approx. 250 mL from the Niskins.

Berthing: One berth required to do methane. This is a full-time job.