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$\delta^{13}\text{C}$ of dissolved inorganic carbon and dissolved O_2/Ar gas ratios

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A. Objectives

$\delta^{13}\text{C}$ - To determine the spatial distribution of $\delta^{13}\text{C}$ and correlation with trace metal distributions. $\delta^{13}\text{C}$ and many trace metals have nutrient-like distributions and yet the processes that control these distributions in the ocean remains unclear. This lack of understanding limits our ability to resolve the role of metals in the ocean's biological pump and utilize metals and $\delta^{13}\text{C}$ as proxies for examining the biological pump in the past.

O_2/Ar - Underway measurement of the dissolved O_2/Ar gas ratio in the surface layer yields estimates of organic carbon export rate. Additionally, the measured diurnal cycle of O_2/Ar yield estimates of primary production rates. Estimating the rate of organic carbon export is important for understanding the role of the biological pump in controlling certain trace metal distributions in the ocean.

B. Sampling Needs

$\delta^{13}\text{C}$ - Approximately 500ml of water (including rinse water) collected from a Niskin cast at each station.

O_2/Ar - Continuous flow of seawater from on board seawater line. Approximately 250 mls of seawater from occasional Niskin cast for discrete samples for calibration.

C. Potential Collaborators

All PIs measuring trace metals affected by the biological pump.

D. Logistics

On past Geotraces cruises we have relied on someone from another research group to collect $\delta^{13}\text{C}$ samples and oversee the operation of the gas analyzer used for underway O_2/Ar measurements. This approach has been successful and could be used on future Geotraces cruises. We need access to a clean continuous flow seawater line in one of the labs and counter space to set up the gas analyzer system.