A high-resolution biogeochemical surface transect of the Florida Current of the Southern Gulf Stream along 26.8°N between Southeast Florida and the Bahamas

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The Gulf Stream plays a pivotal role in the transport of heat from the tropics to higher latitudes, linking the warm waters of the Gulf of Mexico and the Carribean Sea with the North Atlantic. In the subtropical North Atlantic, the Gulf Stream also separates the nutrient-rich colder Slope Waters from the nutrient-poor warm subtropical gyre. Recently, it has been shown that Slope Water eddies crossing the Gulf Stream can be an important souce of dissolved Fe to the subtropical gyre [1], as has been shown for dissolved phosphate [2]. Despite the potential of the Gulf Stream to influence regional biogeochemistry, however, trace metal data is scarce within the Gulf Stream and the constituent Loop, Florida and Antilles currents.

Here we present biogeochemical results from a surface transect of the Gulf Stream that transited from West End, Bahamas, across the Florida current, to West Palm Beach, USA aboard the R/V ANGARI in March 2019. We sampled and filtered surface waters using a towfish at ~1.5 mile resolution for dissolved macronutrients, dissolved trace metals and their isotopes, and chlorophyll. The Florida Current was characterised by oligotrophic low nutrient low chlorophyll conditions. Trace metals such as Zn and Cd were uniformly low across the section, with slight enrichments in dissolved Zn near the margins. Fe, however, was uniformly high for surface waters across the transect (0.4-0.6 nM), further increasing to >1nM near the margins. This could indicate that the Gulf Stream acts as an important Fe source to higher latitudes. We use δ^{56}Fe to investigate the sources of the Fe across the section.

[1] Conway et al., (2018). Nature Geoscience. **11**, 594-598.
[2] Palter et al. (2011). G.B.C. **25** (4), GB4007.