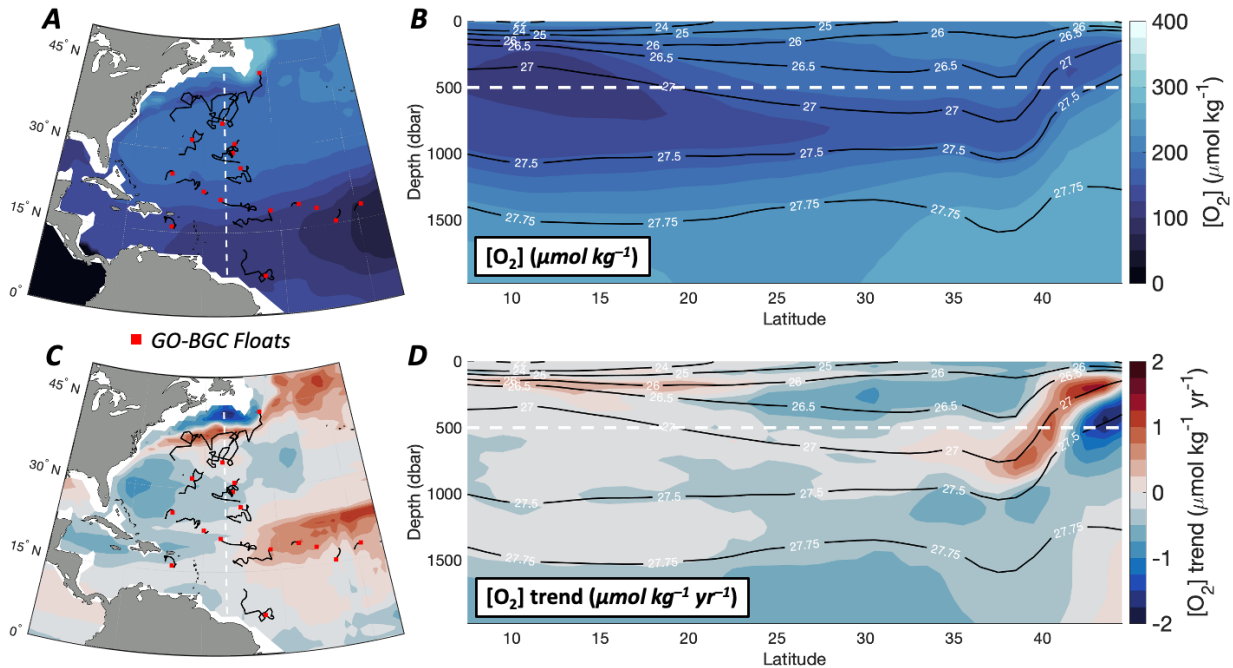# GO-BGC Data Example #2:
Quantifying Ocean Deoxygenation

The ocean's dissolved oxygen inventory responds to changes in gas solubility and density stratification caused by warming. As a result, the ocean has been losing oxygen for the past several decades, a trend that is expected to continue. To quantify ocean deoxygenation across the early 21st century, and to lay the groundwork for continued monitoring, dissolved oxygen measurements from the global Biogeochemical Argo array (114,620 total profiles) have been combined with discrete oxygen measurements from hydrographic research cruises (23,584 total profiles) to construct a global gridded dissolved oxygen product in the upper ocean (0 to 2000 meters) using machine learning models. This gridded data product reveals global ocean deoxygenation from 2004 to 2021, with both positive and negative trends in dissolved oxygen at a regional scale. In the figure above, annual average dissolved oxygen concentrations (*A,B*) and trends (*C,D*) from 2004–2021 are shown on the 500 dbar pressure level in the western North Atlantic (*A,C*) and along the -55.5 °E meridional transect (white dashed line) from 0 to 1975 dbars (*B,D*). Black lines in B and D show surfaces of constant potential density anomalies (kg m^{-3}); red squares and black lines in panels *A* and *C* show the most recent locations and historical trajectories of active GO-BGC floats, respectively. A sharp transition from positive to negative dissolved oxygen trends north of 40 °N (*D*) is likely associated with the warming Gulf Stream (not shown) and a resulting shift in the depth of the oxygen minimum zone (*B*).

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