

The Scripps O₂ Program: Insights from Ongoing Flask Sampling of Atmospheric O₂/N₂, CO₂, and Ar/N₂ at 10 Sites Spanning the Globe.

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The Scripps O₂ program maintains the longest ongoing time series of atmospheric O₂/N₂ and Ar/N₂ ratios in the world at ten background sites. Flasks are collected at biweekly intervals and analyzed for O₂/N₂, Ar/N₂, and CO₂ through a combination of interferometric, mass spectrometric, and infrared detection methods. These measurements are calibrated using an extensive suite of reference gases maintained by the Scripps O₂ program since the mid 1980s. These measurements provide several valuable products: 1) O₂/N₂ measurements, when paired with measurements of CO₂, provide an independent, top-down constraint on both the global land and ocean carbon sinks at a decadal resolution. 2) O₂/N₂ can be combined with CO₂ to yield the tracer atmospheric potential oxygen (APO), which is insensitive to land biosphere exchange, and can provide insights into marine processes at regional to global scales. 3) The trend in APO provides a constraint on global ocean heat content, and is a tracer for air-sea fluxes of O₂ on seasonal to decadal time scales. 4) Variations of Ar/N₂, which is an excellent tracer for air-sea heat fluxes, and also stratosphere-troposphere exchange. Here we present updates of the time series and the global products in relation to synergies with NOAA-GMLD program and the Scripps CO₂ program.

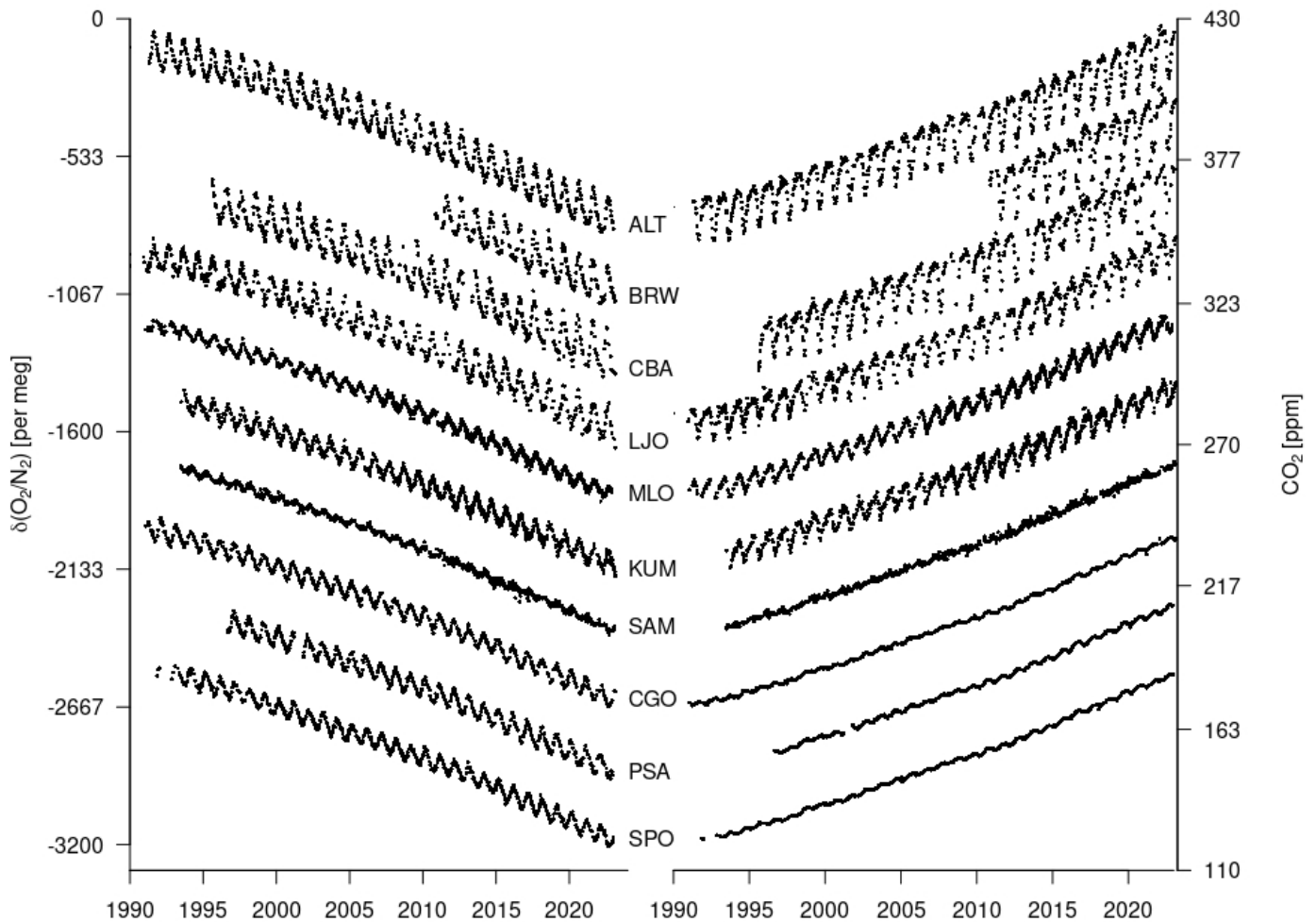


Figure 1. Time series of δ