

Airborne measurements of oxygen concentration from the surface to the lower stratosphere and pole to pole

Submitted
to AMTD

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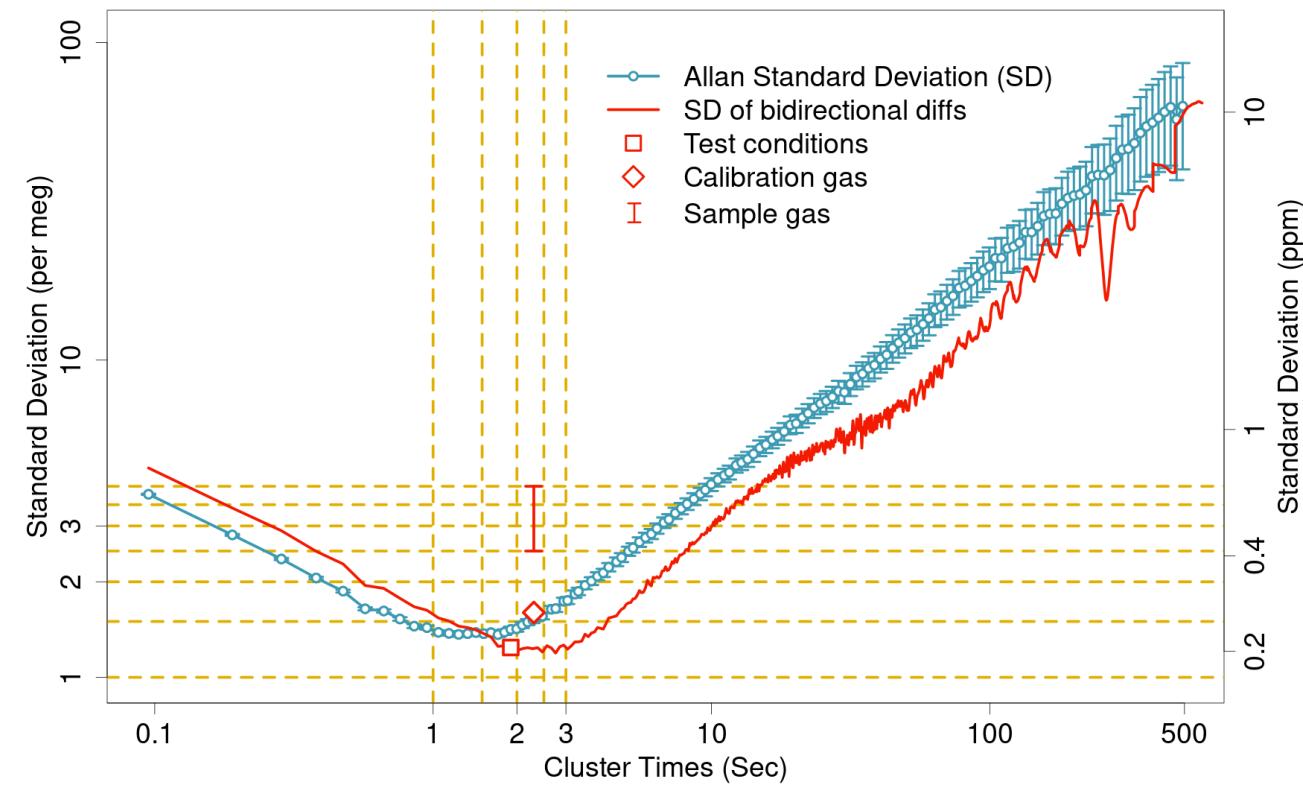
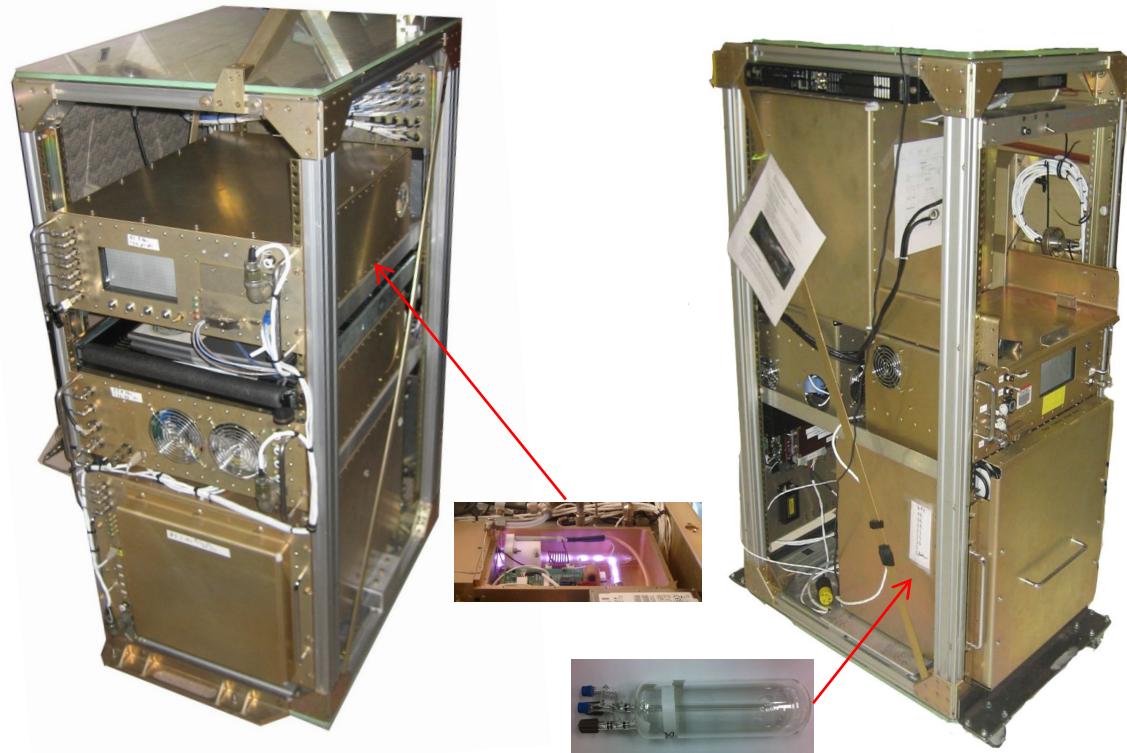
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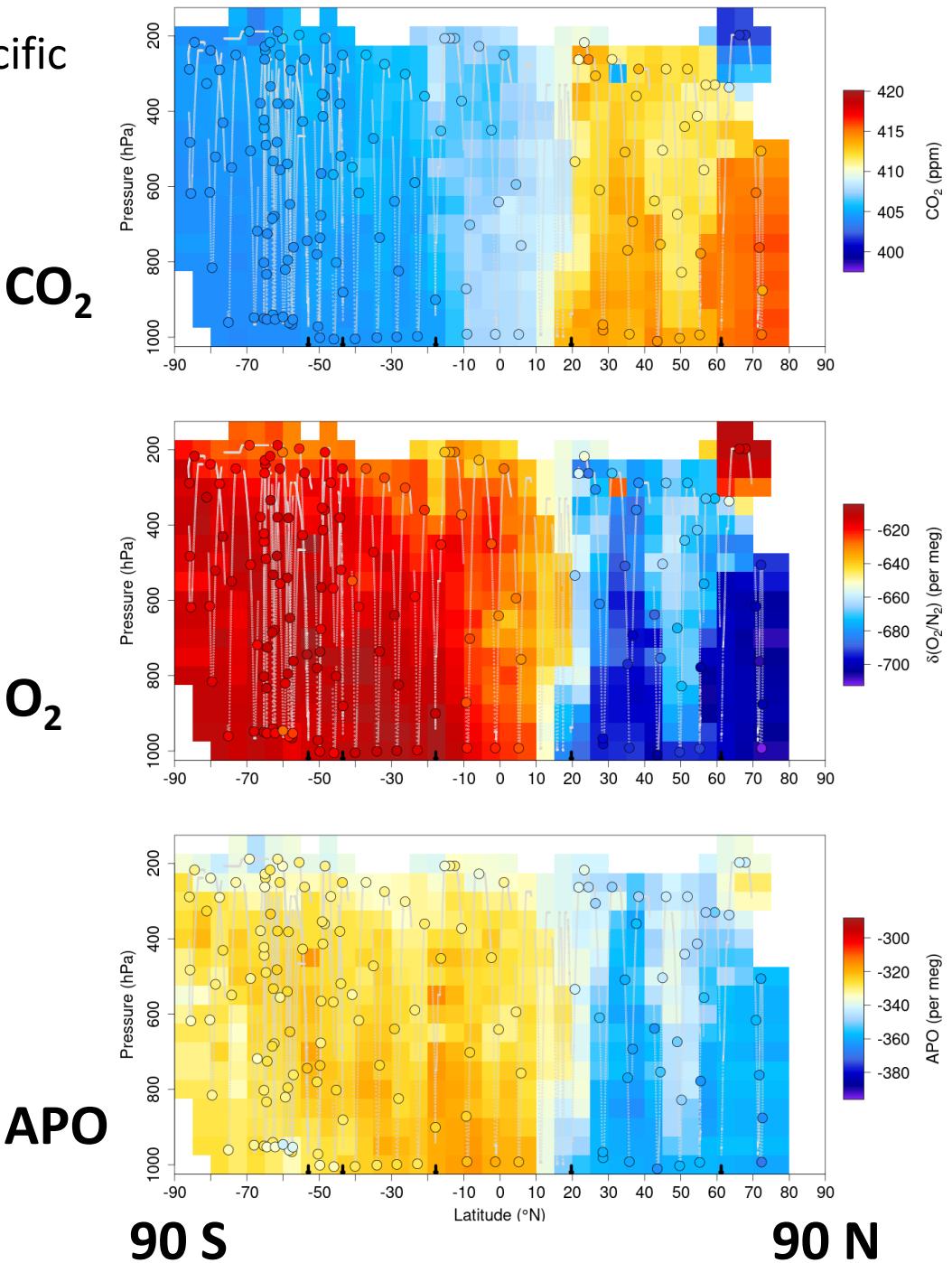
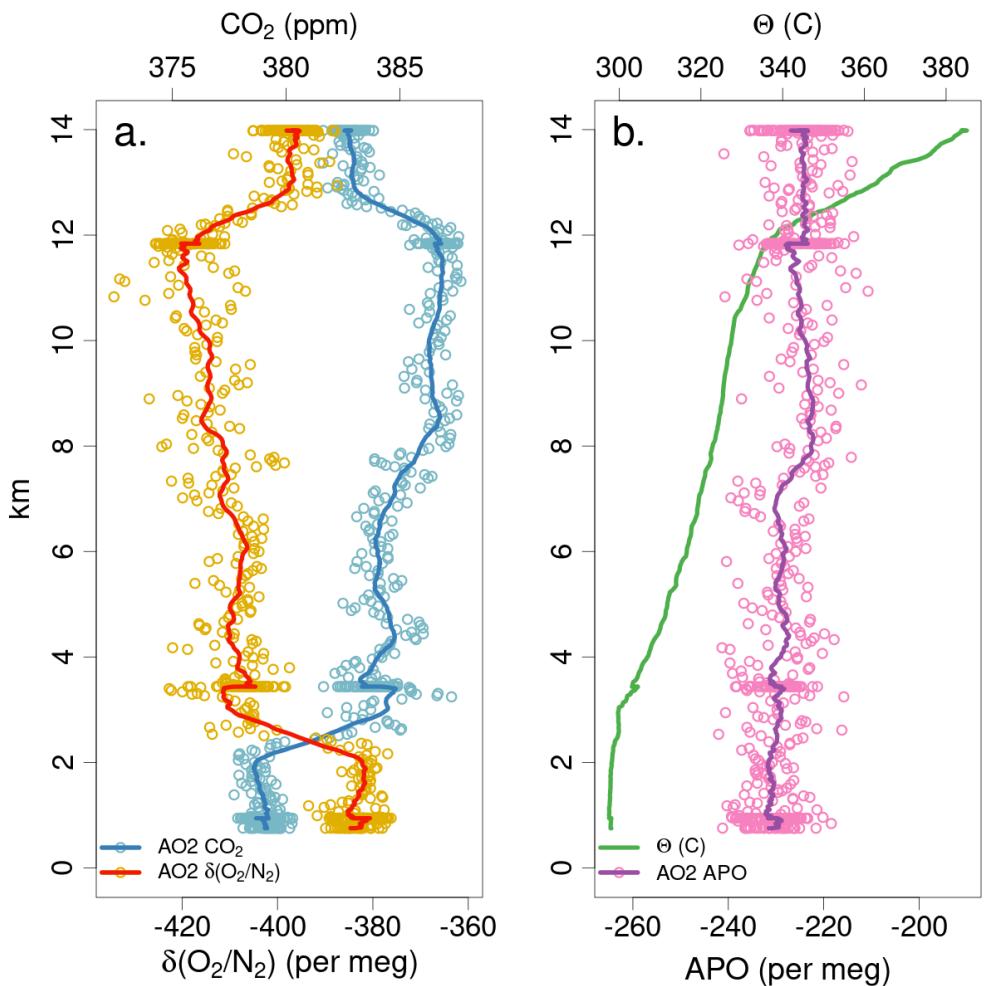
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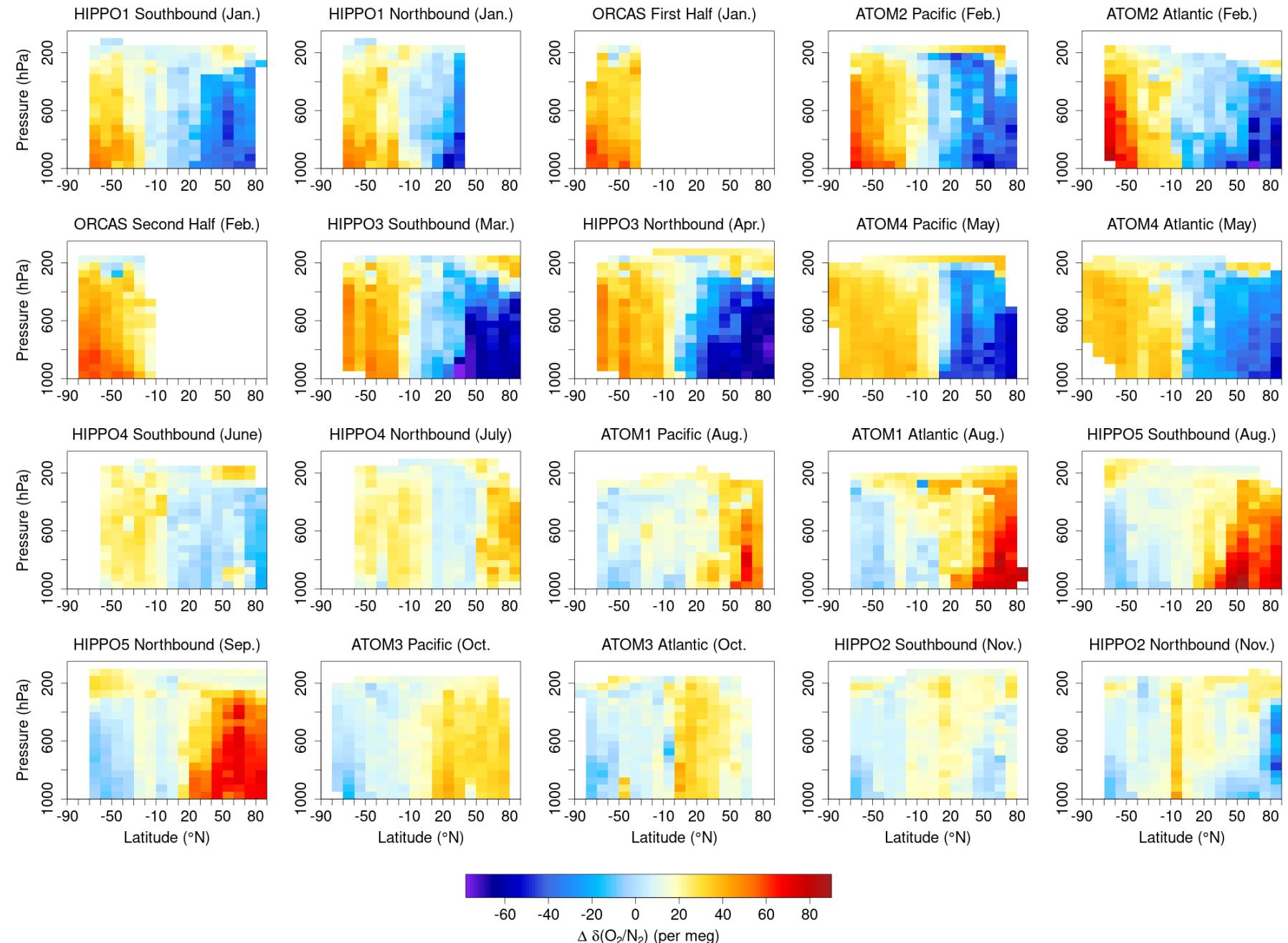
Global cross-sections over the Pacific Basin during ATom 4 (May 2018)

Example vertical profile over North Dakota, during START-08 (Aug 2008)



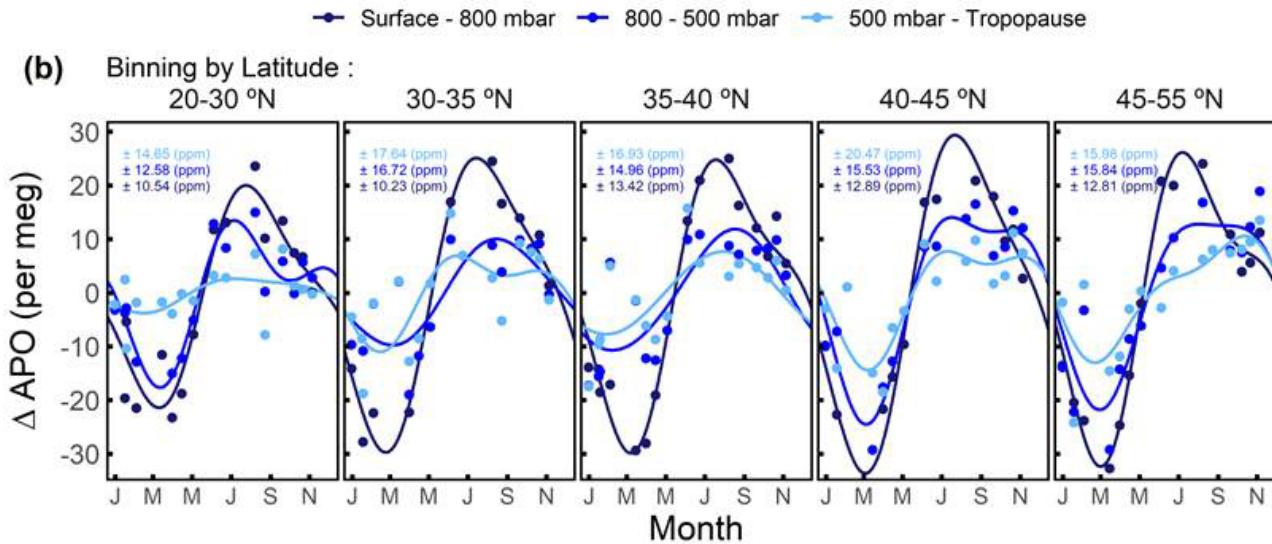
15 campaigns over 20 years, including:

- 18 global transects from HIPPO and ATom
- 1 intensive Southern Ocean campaign (ORCAS)
- Tropospheric and stratospheric sampling over North America (COBRA, ACME-07, START-08)
- > 780 hours of in situ measurements
- > 4000 flask samples

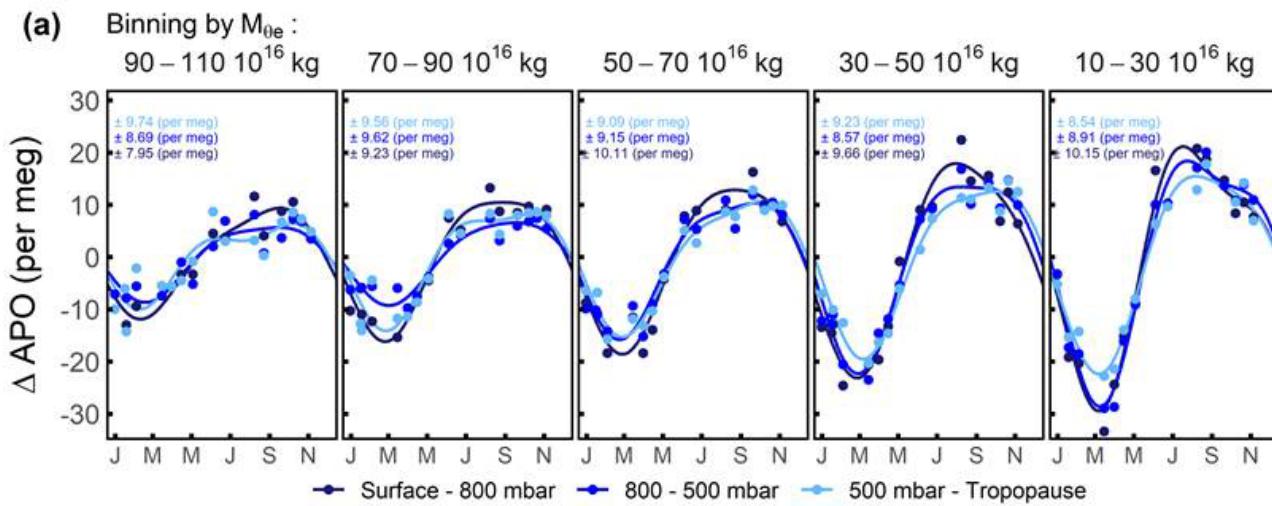


All data publicly available

Seasonal Cycles of APO in the Northern Hemisphere from Airborne Measurements



Binning using latitude & pressure



Binning using a mass-weighted isentropic coordinate, $M_{\theta e}$

Submitted to AC&P:
A mass-weighted atmospheric isentropic coordinate
for mapping chemical tracers and computing
inventories

Yuming Jin¹, Ralph F. Keeling¹, Eric J. Morgan¹, Eric Ray²,
Nicholas C. Parazoo³, Britton B. Stephens⁴

News:

- 2017: 2% change in interferometer span
- New GOLLUM tanks are prepped, currently analyzing for final numbers
- Funded for installation of in situ measurement system at Barrow, next year

Published:

24 Feb 2020

[Gravitational separation of Ar/N₂ and age of air in the lowermost stratosphere in airborne observations and a chemical transport model](#)

Review status

A revised version of this preprint was accepted for the journal ACP.

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In preparation:

Time Series of $\delta(\text{O}_2/\text{N}_2)$ and CO₂ from the Scripps O₂ Program Surface Flask Network, with Associated Estimates of Global Ocean Heat Uptake and Decadal Carbon Sinks, 1990–2019

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¹Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA, USA

²Department of Geosciences and Princeton Environmental Institute, Princeton University, Princeton, NJ, USA

Other updates from SIO

Essentially finalized:

Technical Report: “Span sensitivity of the Scripps interferometric oxygen analyzer”, 50 pages

Ralph F. Keeling, Stephen J. Walker, Bill Paplawsky
Scripps Institution of Oceanography
Aug, 2020

Compares 3 span checks:
(1) From theory
(2) Bleed tests with O₂:CO₂ mixtures
(3) Gravimetric standards

