

NSF Airborne Oceanography Activities

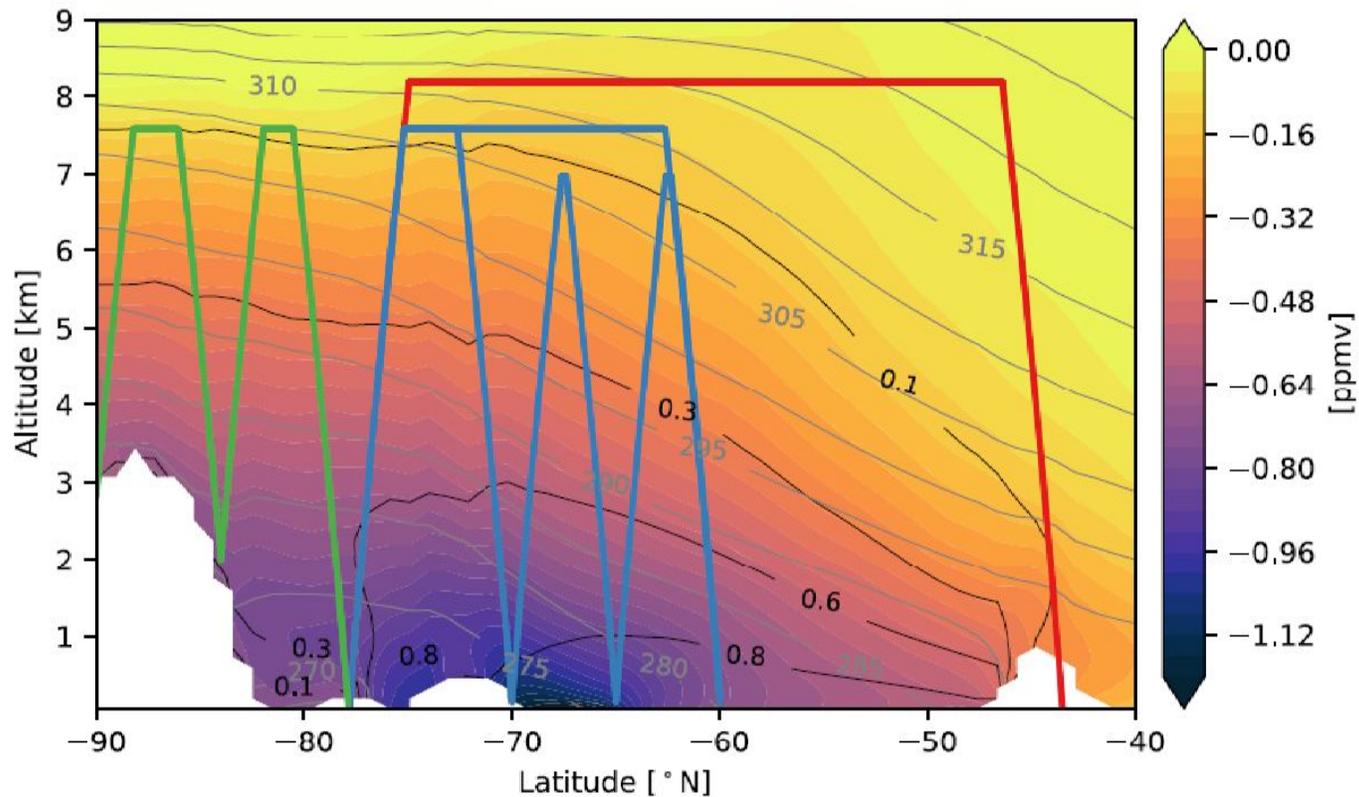


Outline

- SCARGO update
- AMELiA GV proposal
- How to request NSF aircraft

Southern Ocean Carbon Gas Observatory (SCARGO)

Modeled summertime CO₂ anomalies

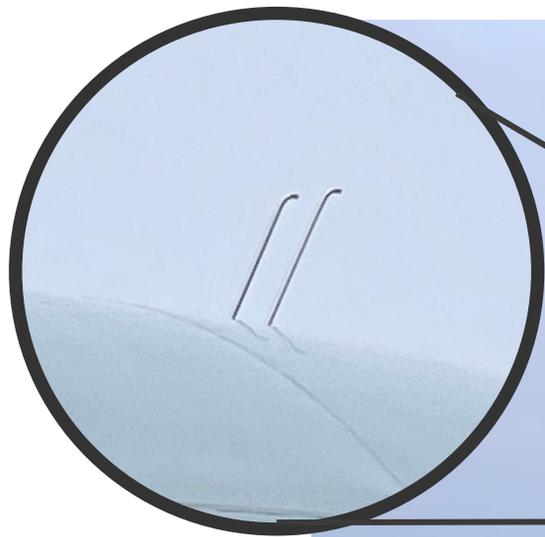


- NSF Polar Programs funded project
- “Roll-on / roll-off” rack and inlet
- Measuring CO₂, CH₄, CO, and H₂O
- NYANG LC-130s operating between Christchurch, McMurdo Station, and the South Pole, Nov-Feb
- Primary goal to quantify large-scale air-sea CO₂ exchange



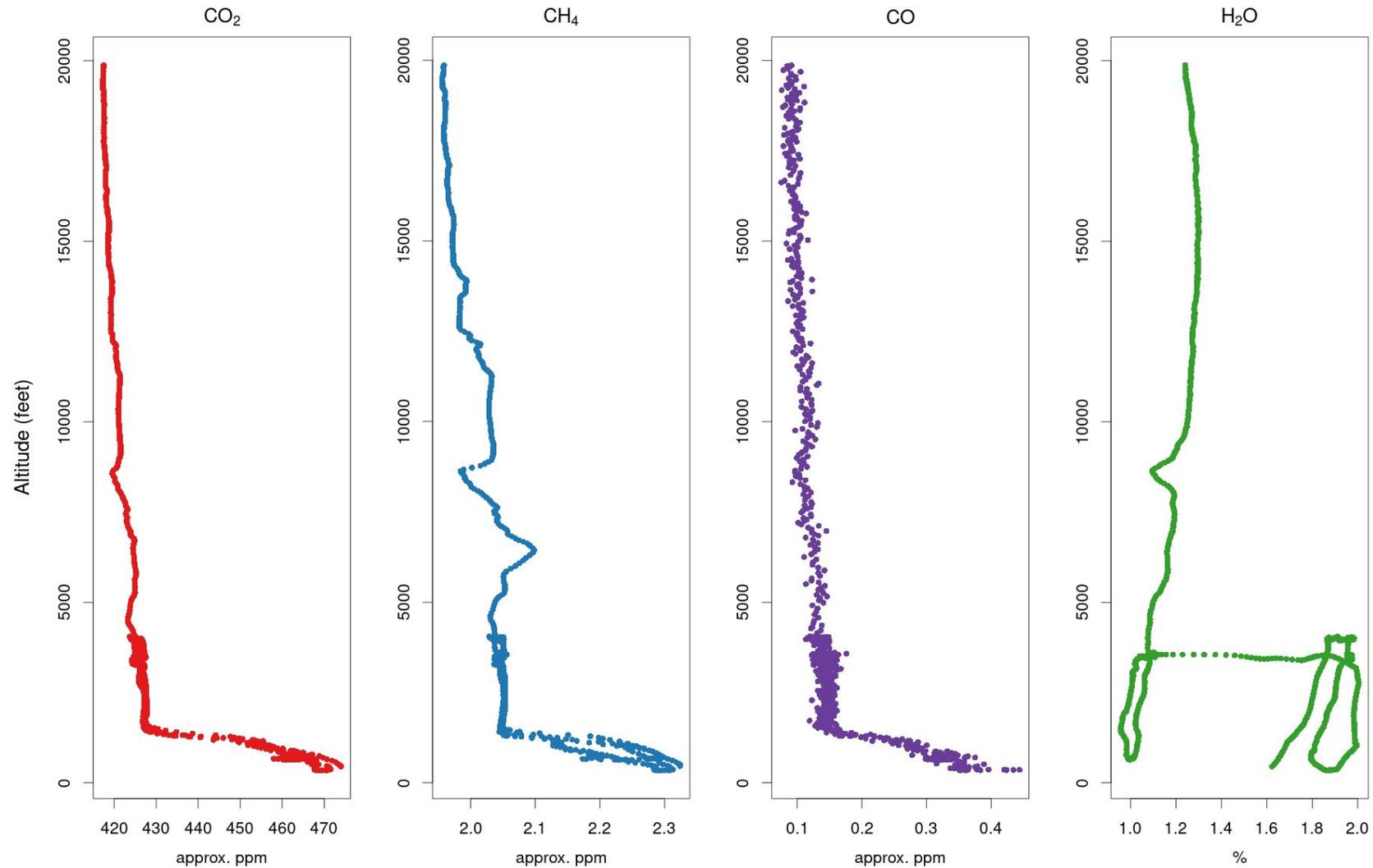
SCARGO integration and test flights completed in March, 2022





SCARGO test flight vertical profiles

SCARGO Flight: 220311a SCH 16:04:30-16:50:00 UTC Lat/Lon = 42.9/-73.8



SCARGO Plans

- Initial “test” season, Nov. 2022 – Feb. 2023
- Four field staff deploying from U.S. plus local NIWA support in Christchurch
- No dedicated flights
- Limited profiling
- Significant uncertainty in number of USAP supported flights



AMELIA

Airborne Mapping the Elements of Life in the Atmosphere



Interdisciplinary Science Team:

NCAR: Britton Stephens (lead PI), Matt Long (co-PI), Adriana Bailey, Dan Amrhein

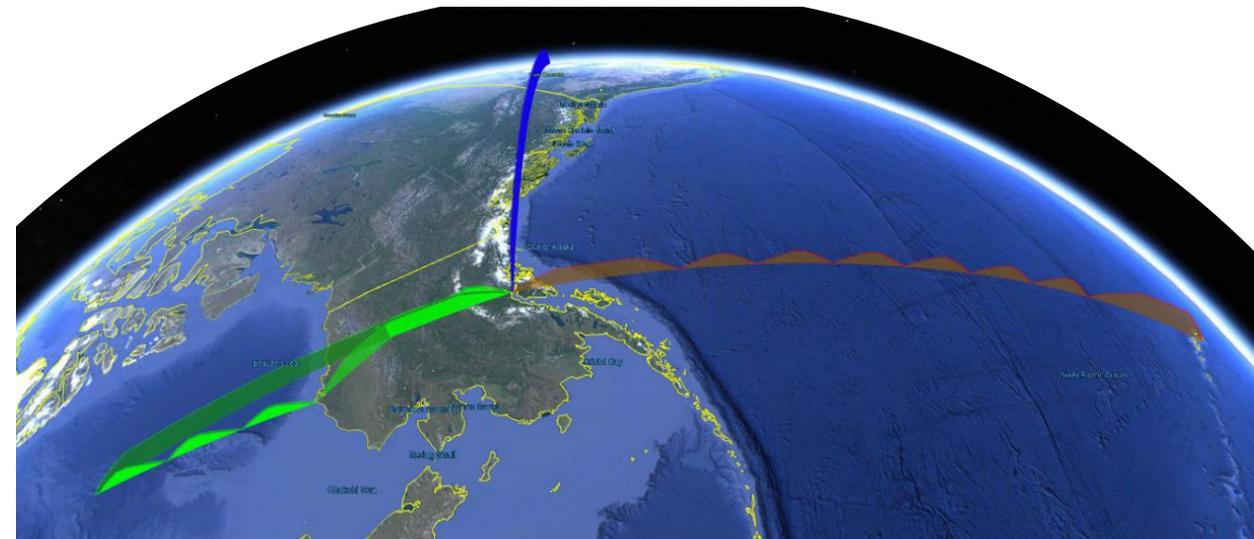
University of Colorado / NOAA: Kathryn McKain, Colm Sweeney

Scripps Institution of Oceanography: Ralph Keeling, Eric Morgan

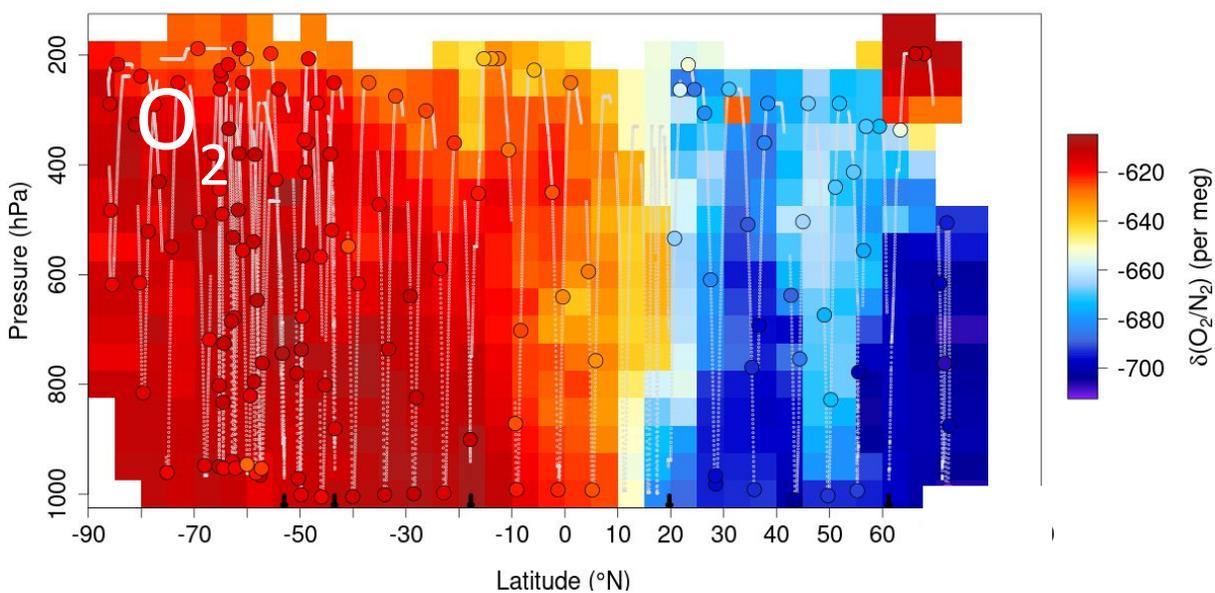
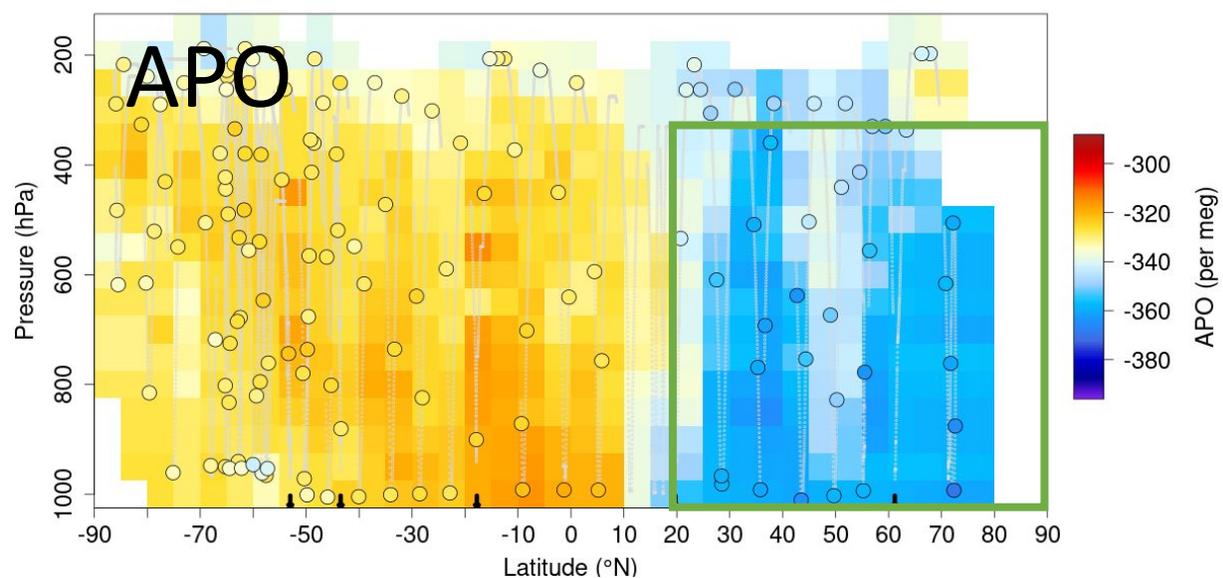
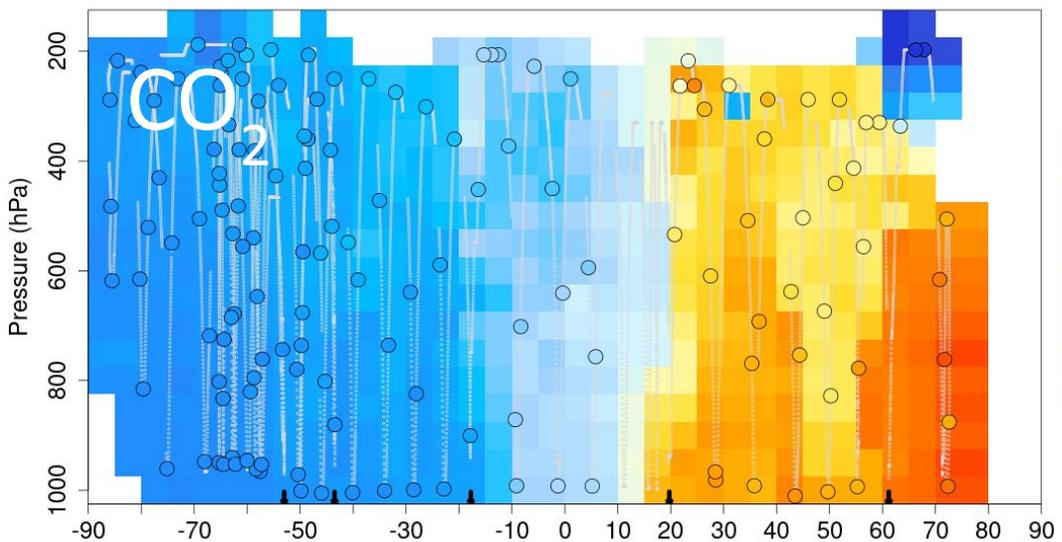
University of Washington: Abby Swann

University of California, Berkeley: Rob Rhew

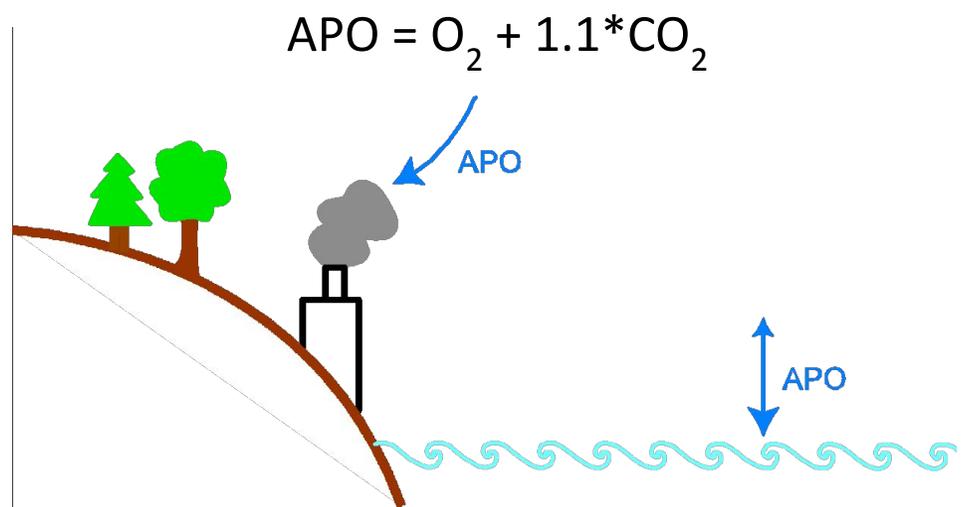
- A new concept for small-scale tomographic GV deployments repeated two times per year for four years
- A well-tested payload for measuring atmospheric CO_2 , O_2 , CH_4 , H_2O , their isotope ratios, VOCs, and related tracers



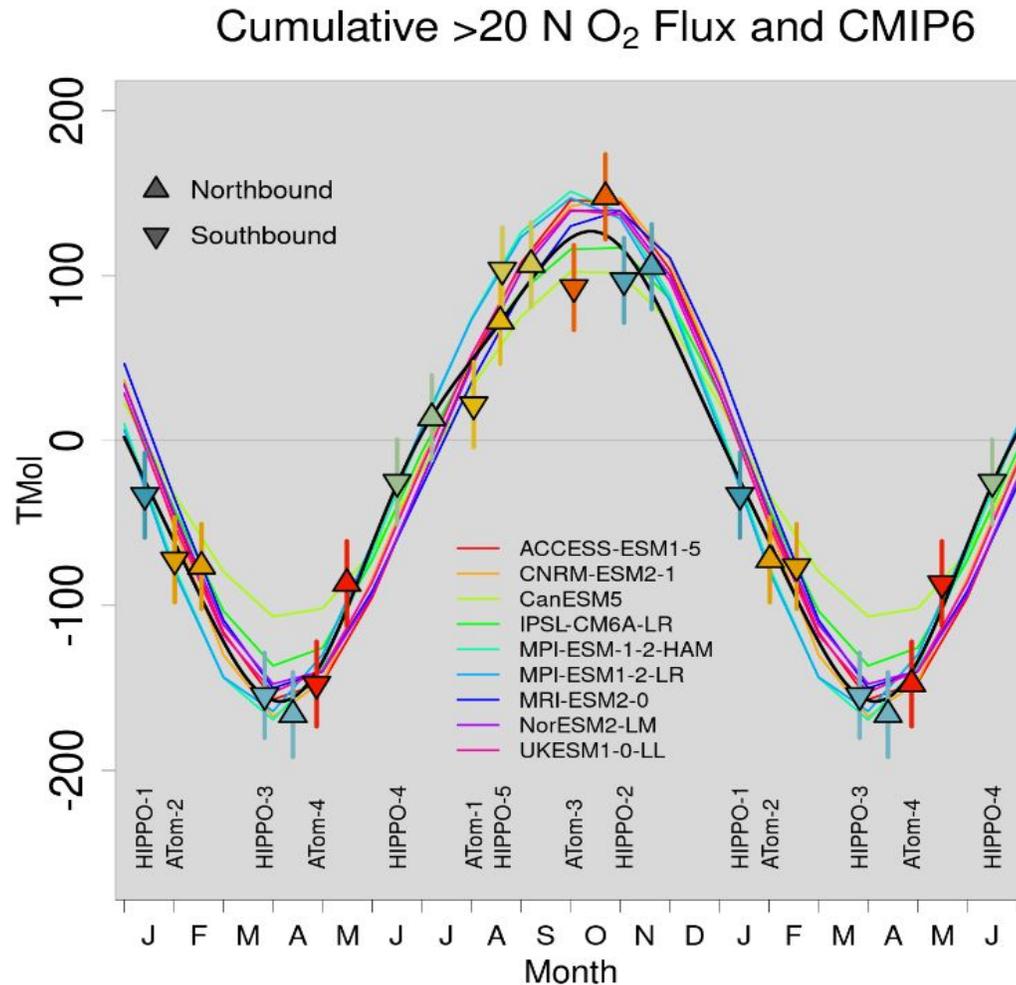
ATom-4 Southbound (27 Apr – 9 May, 2018)



Atmospheric Potential Oxygen



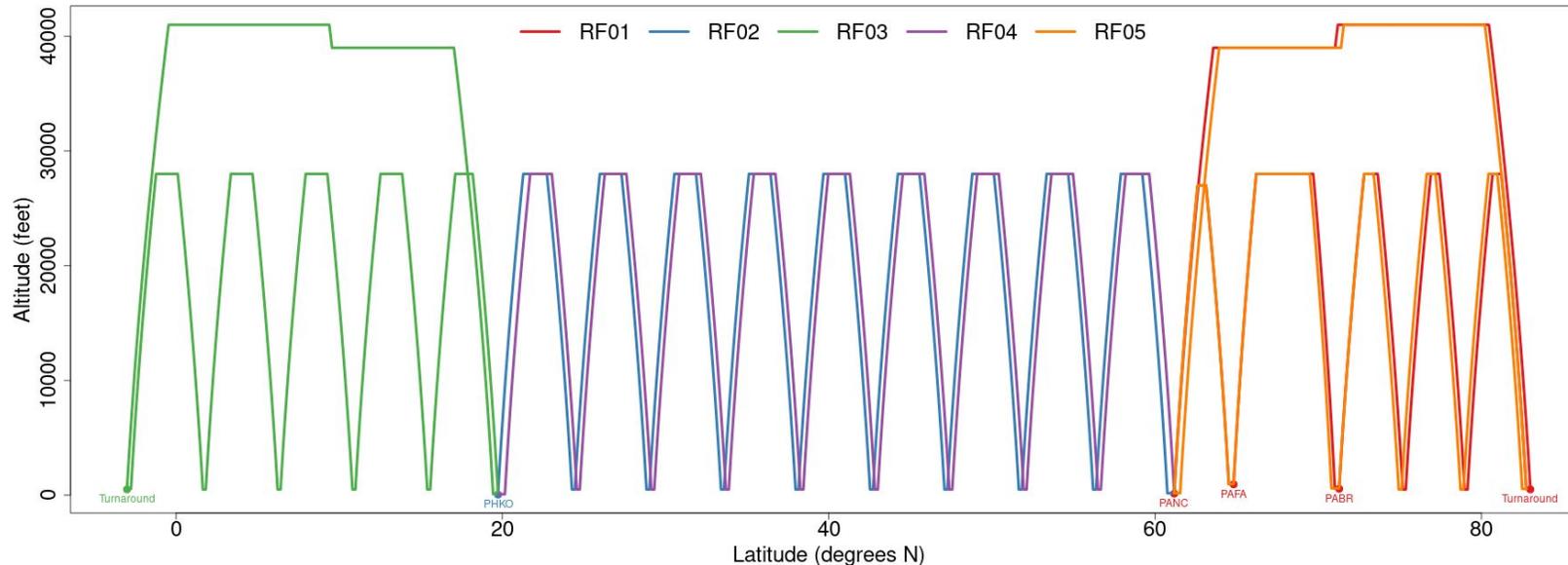
HIPPO and ATom derived northern extratropical air-sea O₂ exchange



- Observed seasonal net outgassing = 283 Tmol O₂
- Modeled = 210 - 305 Tmol O₂

AMELiA Proposal

- NSF/NCAR GV sampling over 100 species
- Continuous profiling between 500 feet AGL and 28,000 feet, from the North Pole to Equator
- Two deployments per year 2024-2027
- NSF Growing Convergence Research, declined 2021
- NSF Atmospheric Chemistry, pending 2022



A02

Lower Atmosphere Observing Facilities (LAOF) Program

Requestable Facilities (NCAR & U. of Wyoming)

Research Aircraft

NSF/NCAR C-130

NSF/NCAR HIAPER Gulfstream V (GV)

University of Wyoming King Air

Airborne Instrumentation

NCAR Airborne Vertical Atmospheric Profiling System (AVAPS)

NCAR HIAPER Cloud Radar (HCR)

NCAR GV-High Spectral Resolution Lidar (HSRL)

UWYO Cloud Radar (WCR)

UWYO Cloud Lidar (WCL)

Ground-based Systems

NCAR Integrated Surface Flux Facilities (ISFS)

NCAR Integrated Sounding System (ISS)

NCAR S-band Dual Polarization Doppler Radar (S-Pol)

NCAR MicroPulse DIAL (MPD)

Requestable Support Services

Project management

Data management

Data archival

Field Catalog & Catalog Maps

Operations Center

Design & fabrication

Forecasting & nowcasting



LAOF Request Process

NSF's Facility and Instrumentation Request Process (FIRP) [NSF 21-611]

- Three NSF FIRP Tracks with different documentation requirements and submission deadlines
 - Track 1 | Education & Outreach Requests
 - Track 2 | Single Facility Requests
 - Track 3 | Field Campaigns
- NSF FIRP Track 1 & 2 proposals have rolling submission deadlines, Track 3 proposals can be submitted twice annually on 15 January and 15 July, depending on complexity and campaign start date. [<https://www.nsf.gov/pubs/2021/nsf21611/nsf21611.htm>]

Lower Atmosphere Observing Facilities (LAOF) Requests

- LAOF requests are submitted to EOL's **PRESTO** system in advance of the FIRP proposal, based on FIRP Track submission deadlines. Track 3 facility request submission deadlines are **1 December** and **1 June**, six weeks before the FIRP proposal submission.
- The LAOF request & ROM cost estimate are required PI-submitted documents for the FIRP proposal.
- Visit www.eol.ucar.edu/requestfacilities for LAOF request documentation requirements and submission deadlines.



LAOF
LOWER ATMOSPHERE
OBSERVING FACILITIES



For LAOF request questions, please contact
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