Facility Update

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SCOAR Committee Meeting • 4 October 2022
Airborne Research

Center for Interdisciplinary Remotely-Piloted Aircraft Studies Twin Otter
A Multi-Year Dataset of Aerosol-Cloud Interactions

- 144 flights, ~660 flight hours
- Data: Met/Nav/Aerosol/Cloud
- Map excludes the 2021 California Smoke Mission
A Multi-Year Dataset of Aerosol-Cloud Interactions

Twomey effect
More aerosol = more but smaller droplets (at fixed liquid water)
California Smoke Mission (1 Sep – 25 Sep 2020)

- 14 flights characterizing smoke and sea salt during a very busy wildfire season
  - Numerous vertical profiles to intercompare with Navy products
Archival of Twin Otter Data

**Data Descriptor:** A multi-year data set on aerosol-cloud-precipitation-meteorology interactions for marine stratocumulus clouds

A Multi-Year Data Set on Aerosol-Cloud-Precipitation-Meteorology Interactions for Marine Stratocumulus Clouds

Version 11 ▼ Dataset posted on 08.09.2021, 19:36 authored by Armin Sorooshian, Alexander B MacDonald, Hossein Dadashzadegan, Kelvin H Bates, Matthew M Coggon, Jill S Craven, Ewan Crosbie, Eva-Lou

 USAGE METRICS ▼ 4176 views 2613 downloads 14 citations

Sorooshian et al. (2019), *BAMS*
Extensive Outreach via Student Training
Aerosol Cloud meTeorology Interactions oVer the western ATLantic Experiment

- **Science:** Build an *unprecedented dataset* to better understand aerosol-cloud-meteorology interactions, improve physical parameterizations for Earth system and weather forecasting models, assess remote sensing retrieval algorithms, and guide plans for future satellite missions.

- **Airborne element:**
  - Platforms: HU-25 Falcon + King Air
  - 150 joint airplane missions (~600 hrs per plane) over western North Atlantic Ocean
  - Based out of NASA LaRC, Hampton, VA

- **Approach:**
  - Measurements: In situ and remote sensing measurements of aerosol and cloud distributions and properties, atmospheric state
  - Modeling: Particle dispersion, chemical transport, single-column, large-eddy simulation, cloud-resolving, weather forecasting and climate modeling

- **PI:** Armin Sorooshian (U. Arizona)
- **NASA Earth Venture Sub-orbital (EVS-3) Mission**
- **$30 Million between Jan 2019 – Jan 2025**
- **Partnering Institutions:** U. Arizona, NASA LaRC, NASA GISS, NCAR, SSAI, NIA, PNNL, BNL, U. Miami, DLR (Germany)
- **Science Team > 130 people and growing**
Flight Concept

8.5 km

≤ 2 km

Ocean surface

Watch the Falcon forward camera video!
Coronavirus is wreaking havoc on scientific field work.
Payload: Falcon External Probes

- Cloud Residual Properties (CVI)
- Isokinetic Aerosol Inlet
- Trace Gases
- Cloud Droplet Probe
- AC3 Cloud Collector
- Cloud Aerosol Precipitation Spectrometer (Langley)
- Turbulent Air-Motion Measurement
- FCDP/2D-S Cloud probe (DLR)
Payload:
Falcon In-Situ Measurements

- Trace Gases (Ozone, CO, CO2, H2O)
- Aerosol Composition (PILS)
- Aerosol Composition (HR-ToF-AMS)
- Aerosol Optical Scattering, Absorption, Hygroscopicity
- Cloud Condensation Nuclei
- Aerosol Microphysics

Falcon Layout for ACCESS
Payload: King Air

- High Spectral Resolution Lidar (HSRL-2)
- Research Scanning Polarimeter (RSP)
- Dropsonde Tube Penetration
- Dropsonde (AVAPS) and RSP support Electronics
- Entry Door
- U. Wyo B-200 Launcher