Logistical Accomplishments of Atmospheric River Reconnaissance 2023

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Research And Operations Partnership

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

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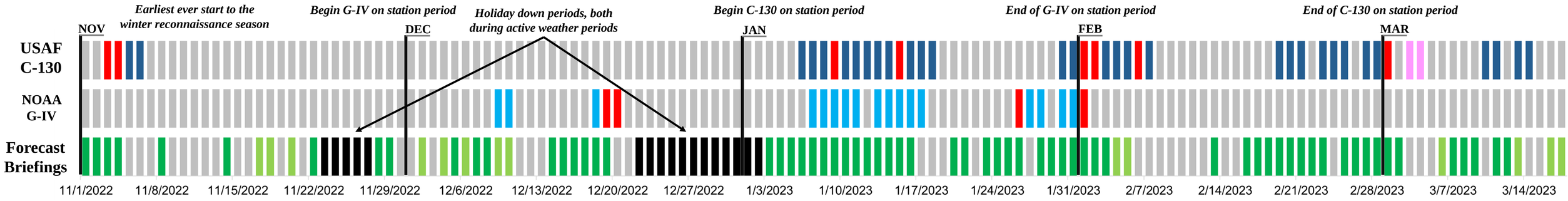
UC San Diego

Forecast Briefing | **Small Group Discussion** | **No Forecast Meeting** | **Holidays**

2022-2023 Season

C-130 Flight | **G-IV Flight** | **Mission Scrubbed** | **Gulf/Atlantic Flight** | **No Flight**



AR Recon Season Summary

The 2023 cool season was extraordinary in terms of atmospheric river activity along the US West Coast, with more than 30 atmospheric rivers making landfall in California alone between October 2022 and March 2023. As part of the National Winter Season Operations Plan, CW3E led the collaborative Atmospheric River Reconnaissance field campaign to sample these storms in conjunction with the National Weather Service, NOAA Office of Marine and Aviation Operations, US Air Force Reserve Command 53rd Weather Reconnaissance Squadron, and other research partners. Teams of forecasters, flight planners, researchers, and aircrews collaborated i**n 79 forecast discussions to plan 49 missions which provided 1,380 additional observations**

Logistical Considerations

Each AR Recon season, the team adapts to a variety of known logistical considerations to successfully plan and execute missions including:

- *Aircraft and crew availability (on station vs resources permitting period)*
- *Maintenance and crew rest considerations during consecutive flights*
- *Maintaining safe operations under COVID-19 precautions*
- *Hazardous weather conditions at airports and over sampling regions*

This season also featured new and unique considerations for the team including:

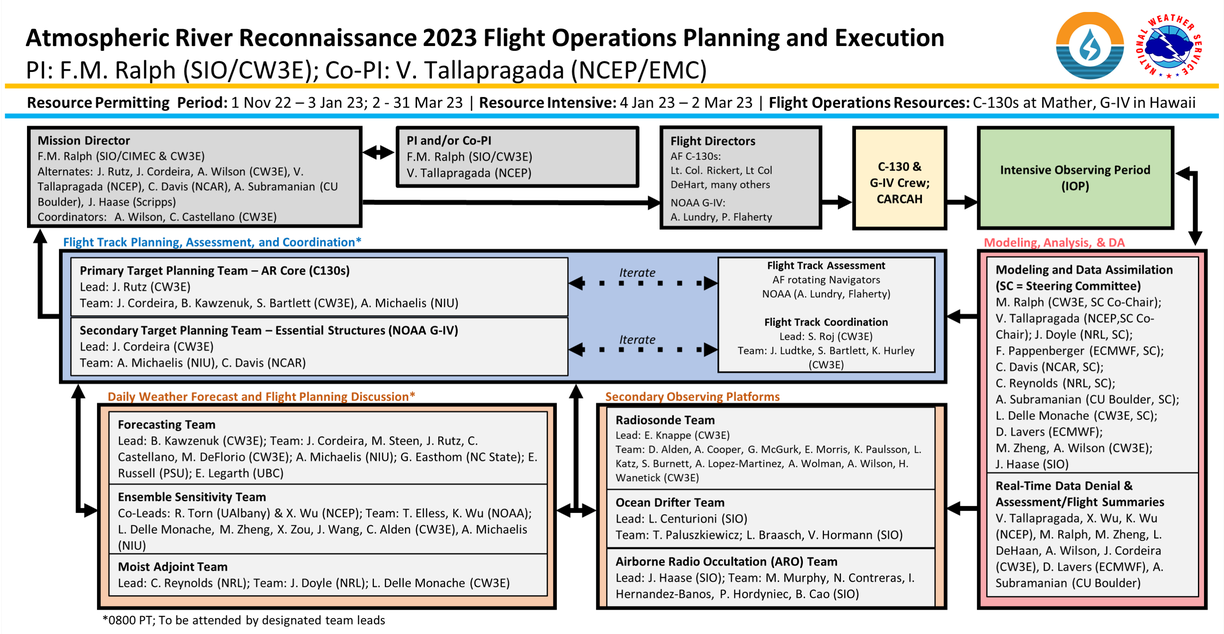
- *An earlier start to the AR Recon season than ever before (November 1st)*
- *Mid-season aircraft maintenance cycle for the G-IV*
- *Complex airspace considerations over the Gulf of Mexico/Western Atlantic basins, where AR Recon completed multiple dry runs and 2 successful sampling flights for the first time*
- *Multiple prolonged active weather periods during the recon season*

Despite these logistical hurdles, the AR Recon team was still able to provide valuable observational data for the global forecast models and future meteorological research

AR Recon team members collaborate after a forecaster briefing, Jan. 2023
Erik Jepsen/UC San Diego

AR Recon Briefing Workflow

This flight operations planning and execution flow chart demonstrates the diverse group of researchers and operational staff involved in planning and executing AR Recon missions



Forecast Discussion

- A lead forecaster posts the briefing for the days discussion and begins crafting the forecast "story", highlighting the primary weather features/areas of interest and potential impacts
- Support forecasters assist with the development of the briefing by engaging in pre-meeting discussion with the forecast lead and preparing/sourcing relevant maps and graphics

Model Sensitivity Analysis

- Multiple teams produce graphics highlighting areas of sensitivity with the forecast, highlighting the geographical areas where additional observations may improve the global forecast models

Flight Planning

- Flight coordinator prepares the Google Earth Flight tool, updates georeferenced maps/graphics
- Coordinator and flight leads develop preliminary flight tracks before the meeting, which are then refined and optimized after the primary forecast & sensitivity discussions
- Tracks are then vetted by Air Force and/or NOAA liaison to verify the feasibility of each mission

Flight Track Approval and Dissemination

- Flight tracks are approved by the AR Recon mission director, officially requested by the NOAA/NWS partners, and officially tasked by CARCAH *(Chief, Aerial Reconnaissance Coordination, All Hurricanes)*
- CARCAH then disseminates the information via the "Plan of the Day" which triggers the official mobilization of NOAA and Air Force crews for mission tasking

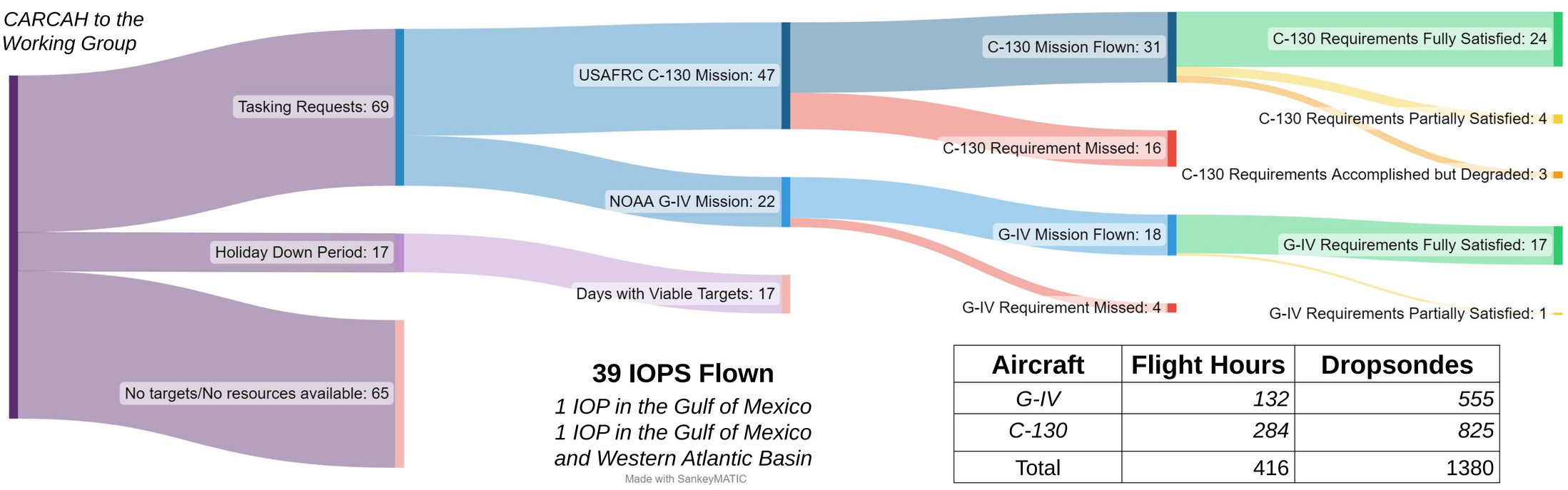
2022-2023 Season Outcomes Visualization

Data as presented by CARCAH to the 2023 Winter Season Working Group

2022-2023 Atmospheric River Reconnaissance Season

151 Days

1 November 2022
31 March 2023



39 IOPS Flown

1 IOP in the Gulf of Mexico
1 IOP in the Gulf of Mexico and Western Atlantic Basin

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Aircraft	Flight Hours	Dropsondes
G-IV	*132*	*555*
C-130	*284*	*825*
Total	416	1380