

WP-3D-00203 (3 Feb 2020)

Robert Pincus

1. Objective

The plan was to transit across the HALO circle, make a drop sonde circle centered on the Ron Brown, perform an isotope sampling leg, drop a set of AXBTs around the Swift gliders to sample sea surface temperature variability, and then do as many cloud modules as possible (as this was the first flight on which cloud probes were operable). Unfortunately one of the navigation systems aboard the aircraft failed partway through the first cloud module and the aircraft had to return to Barbados.

2. Crew

Eleven crew, five science: R. Pincus (flight scientist), D. Henze (isotope sampling), G. Feingold (W-band radar, observer), A. Wang (observer), S. Whitehall (observer).

3. Synoptic Situation

The region remained strongly influenced by Saharan dust, especially below ~2 km. The northern half of the circle was quite clear, with the RHB seemingly under a large cloud feature in the circle center, while there were scattered clouds around the southern perimeter.

4. Flight Elements

Element	(°N, °W)	Flight Level (FL)	Time (UTC)	Notes
Takeoff-Ferry	GAIA	Ascent to FL100	13:19	
Circle	(13.9, 54.5)	FL250	14:13	
Isotopes	(14, 56.75)	FLs 5, 18.5, 22, 100	17:00	
AXBTs	(13.4, 55.7)	FLs 100	15:45	
Transit			17:27	
Clouds 1	(13, 54.5)	FLs 22, 28	17:38	
Transit		FLs 100	15:45	

Circles: Location noted is center of a 90-km radius circle centered on the nominal position of the RHB. Dust was notable. The northern half of the perimeter was remarkably clear with a large cloud feature near the center.

Isotope sampling: West of the circle in mostly clear air, traveling first NW, then directly south to the SW corner of the AXBT grid to begin sampling.

AXBT deployment: Sampling every 1/3 of a degree running north 1 1/3 degrees and east 1 degree (five by four AXBTs) from the SW corner. The SWIFT buoys deployed by the Ron Brown were all contained within this pattern.

Cloud sampling 1: Sampling along 13N between 54.5 and 53.5W at flight levels 5, 22 (just below cloud base), 28 (mid-cloud) and 70 (above cloud). The mission was aborted after the second leg was complete.

5. Instrument Status

Radiosondes: Launched only during cloud modules. All provided good data.

Cloud physics: probes appeared operational though low values were reported by the CDP.

W-band radar: operational; turned off below ~1500 m during cloud modules

WSRA surface wave radar: operational

SFMR: operational

Picarro isotope sampler: operational

6. Figures

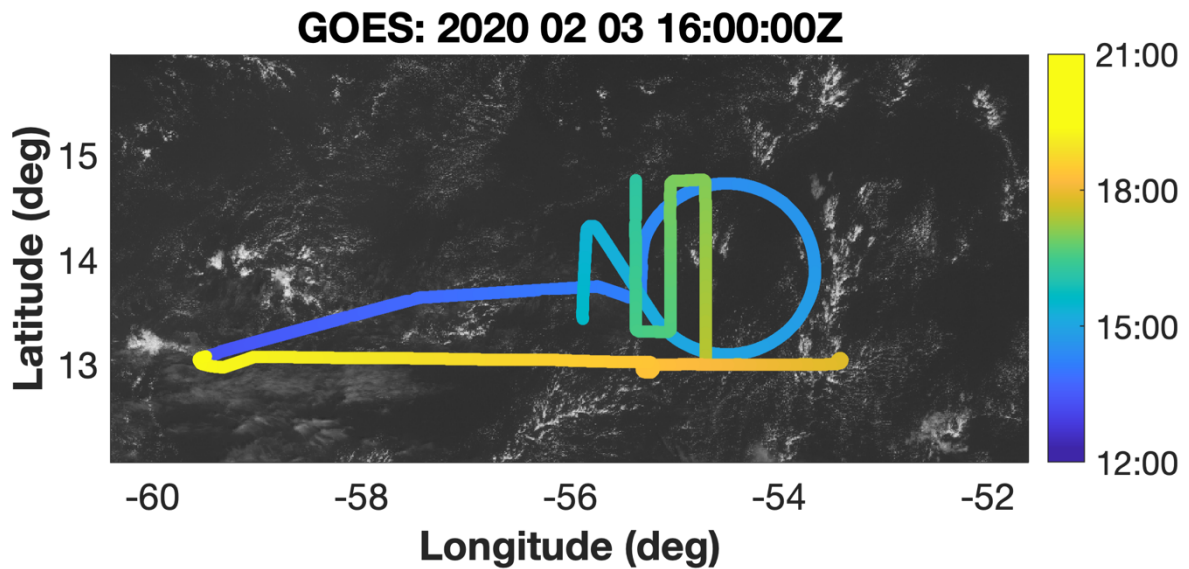


Figure 1. Plan view of flight path for WP-3D RF06. The track is superimposed on a satellite image from GOES-14 Channel 2 (red wavelengths in the visible) at 16:00Z. The first two legs of the AXBT pattern are not visible.

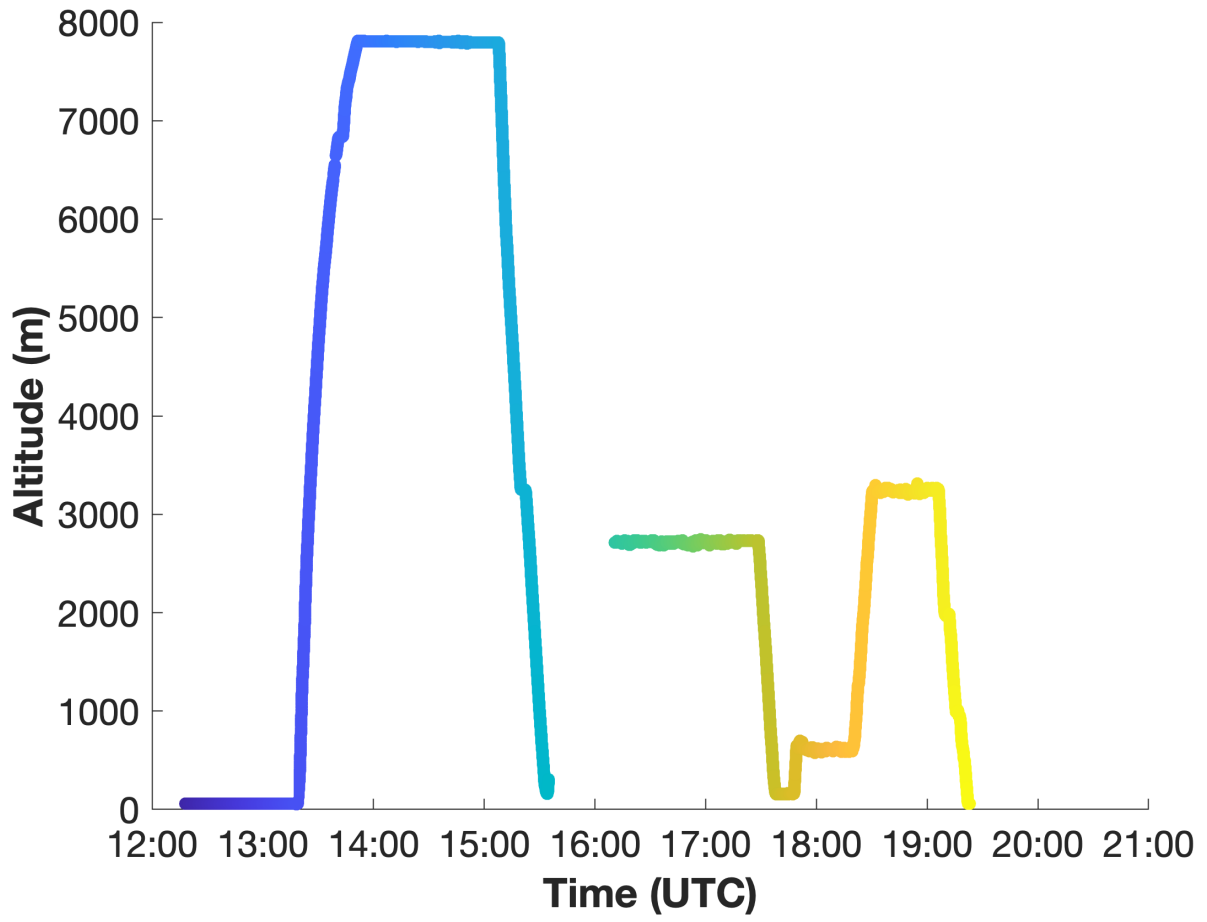


Figure 2. Profile view of flight plan.

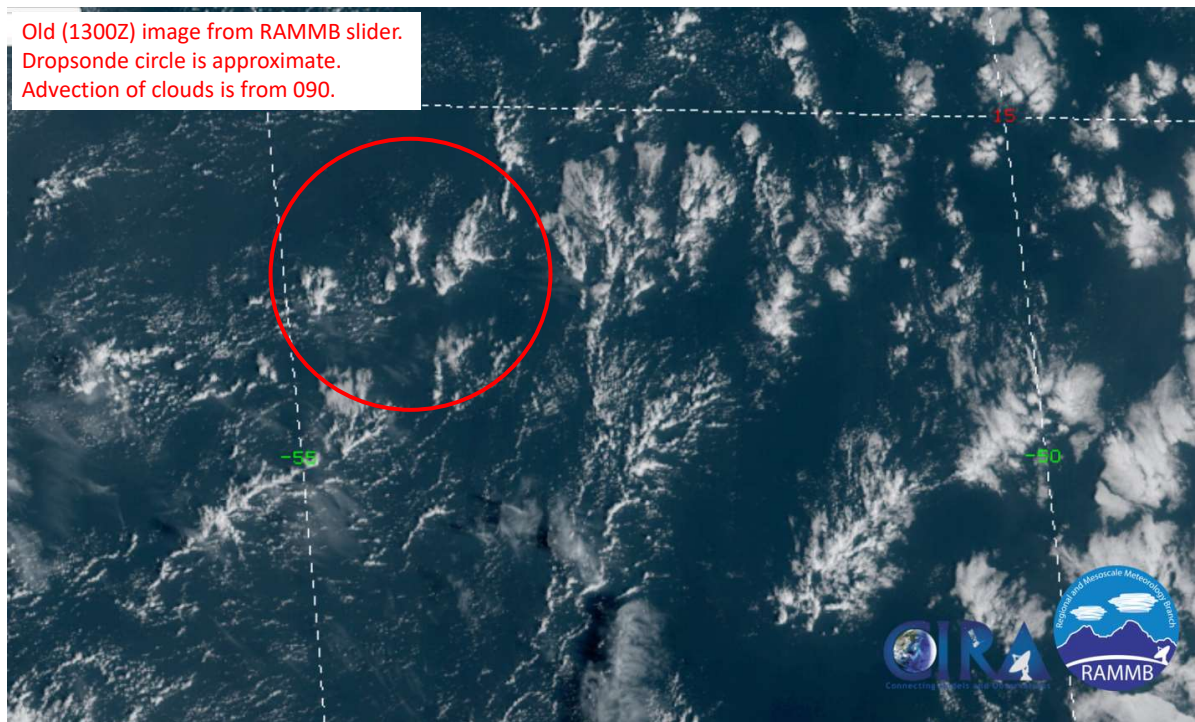


Figure 3. Satellite image from near take-off time. Emphasizes the richer variety of clouds visible in multi-color imagery. There were also more clouds in the morning than in the early afternoon.

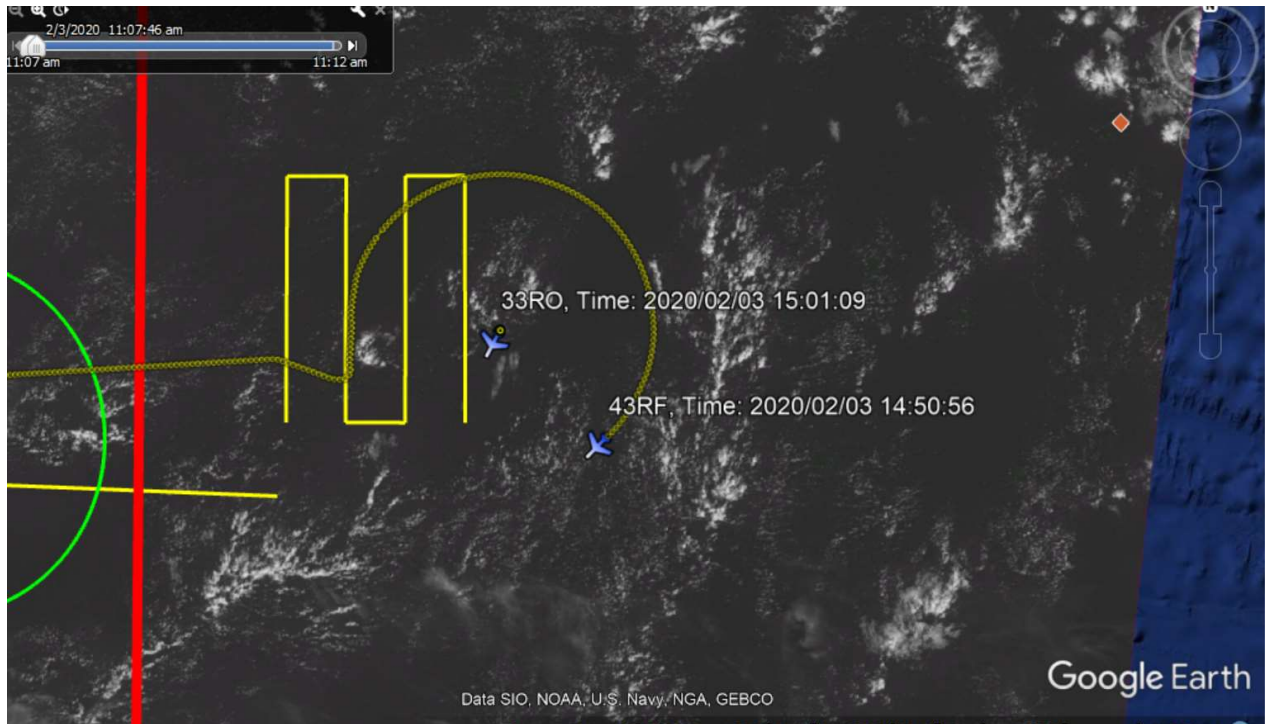


Figure 4. Visible satellite image acquired during dropsonde circle. The image (from band 2 of GOES ABI) does not show as many clouds as are seen in the field. Nonetheless the contrast between N and S is striking and consistent with observations from the aircraft.



Figure 5. Very small clouds observed on eastern leg of the dropsonde circle.

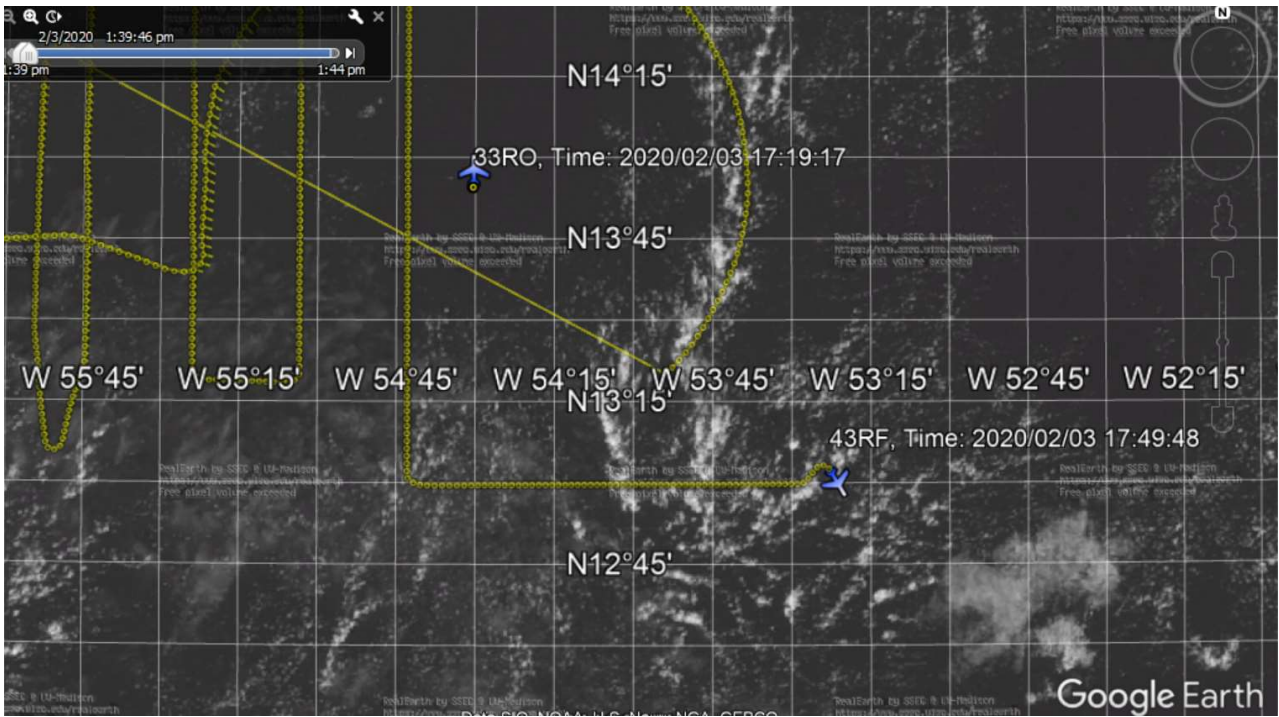


Figure 6. Clouds intended for sampling during cloud module 1. Only legs below cloud base were flown before the flight was aborted.