WP-3D-0131 (31 Jan 2020)

Chris Fairall

1. Objective

Coordinated research flight with Ronald H. Brown. The Brown was expected to be at 13.9 N 54.43 W. WP-3D intended to fly a circle (90 km radius) at FL240 around the Brown, a normal size AXBT(FL100) pattern centered on the Brown (capturing the newly deployed SWIFT buoys arrayed in a N-S line). One isotope profile was to be worked in between. Two cloud profiles were planned; cloud physics probes were operational following a computer repair.

2. Crew

Eleven crew, five science team members: C. Fairall (flight scientist), Adriana Bailey (isotope sampling), Paquita Zuidema (Wband radar), Mason Leandro (cloud physics), Sandy Lucas (OAR/CPO observer).

3. Synoptic Situation

The cloud situation was not clearly classifiable. There is scattered sugar and isolated open cells; the HALO circle and the Brown circle contained an isolated cloud blob. The Brown was in/near a blob at takeoff. The AXBT lawnmower was within the sonde circle and passed over the cloud blob.

4. Flight Elements

Element	(°N, °W)	Flight Level (FL)	Time (UTC)	Notes
Takeoff-Ferry	GAIA	Ascent to FL240	15:30	
Circle	(13.9, 54.5)	FL240	16:25	12 sondes
Isotope profile	(13.1, 54.8)	FL240 to FL005	17:23	Ended at axbt start
AXBT	(14.7 55.0)	FL090	18:04	1.33X1 deg 20 drops 7 sondes
Cloud 1	(13.6 55.0)	FL067	19:46	0 sondes
Cloud 2	(13.6 55.0)	FL067	21:16	4 sondes
Transit		FL130	2240:	

Circles: One circle was executed at an altitude of 7.4 km with 90 km in radius. Dropped twelve sondes with roughly even spacing, turning and flying straight legs between drops. The circle enclosed a blob of cloud we later sampled with the AXBT and cloud modules.

Overflights: The circle had RHB in the center. We flew close to RHB at 1905 but did not overfly because we were dropping AXBT.

5. Instrument Status

Dropsondes: Launched on circle (12), AXBT run (7), cloud modules (4): AXBT (total of 19). All provided good data.
Cloud physics: probes were operational but were not recording images. Size spectra based on probe computations are recorded but these are considered less reliable that prost processing from images.
W-band radar: operational after 1605Z; turned off below ~1500 m during cloud modules. Very few cloud returns were detected.
WSRA surface wave radar: operational
SFMR: operational
Picarro isotope sampler: operational

6. Figures

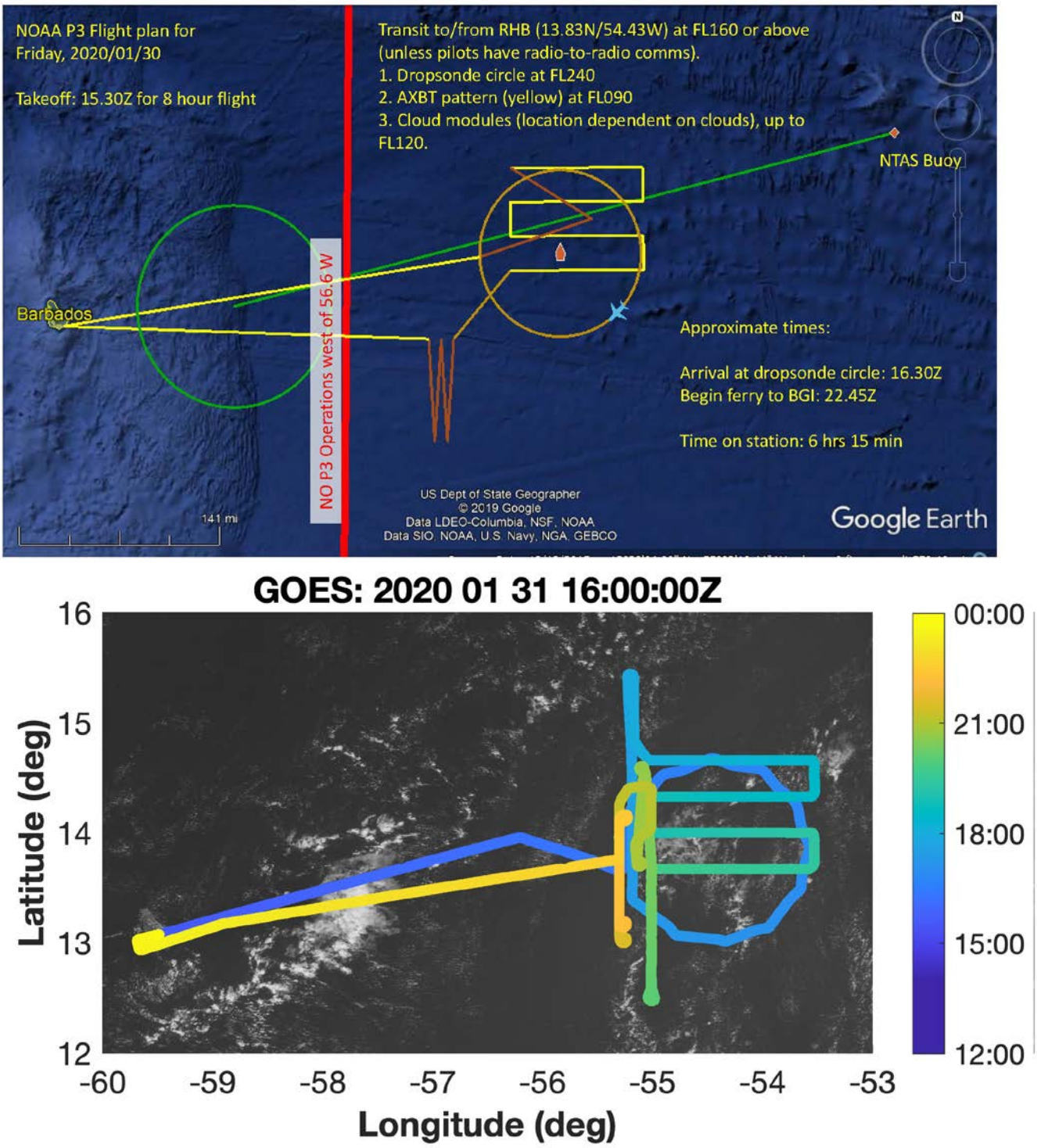

Figure 1. Plan view of flight path for WP-3D RF05.

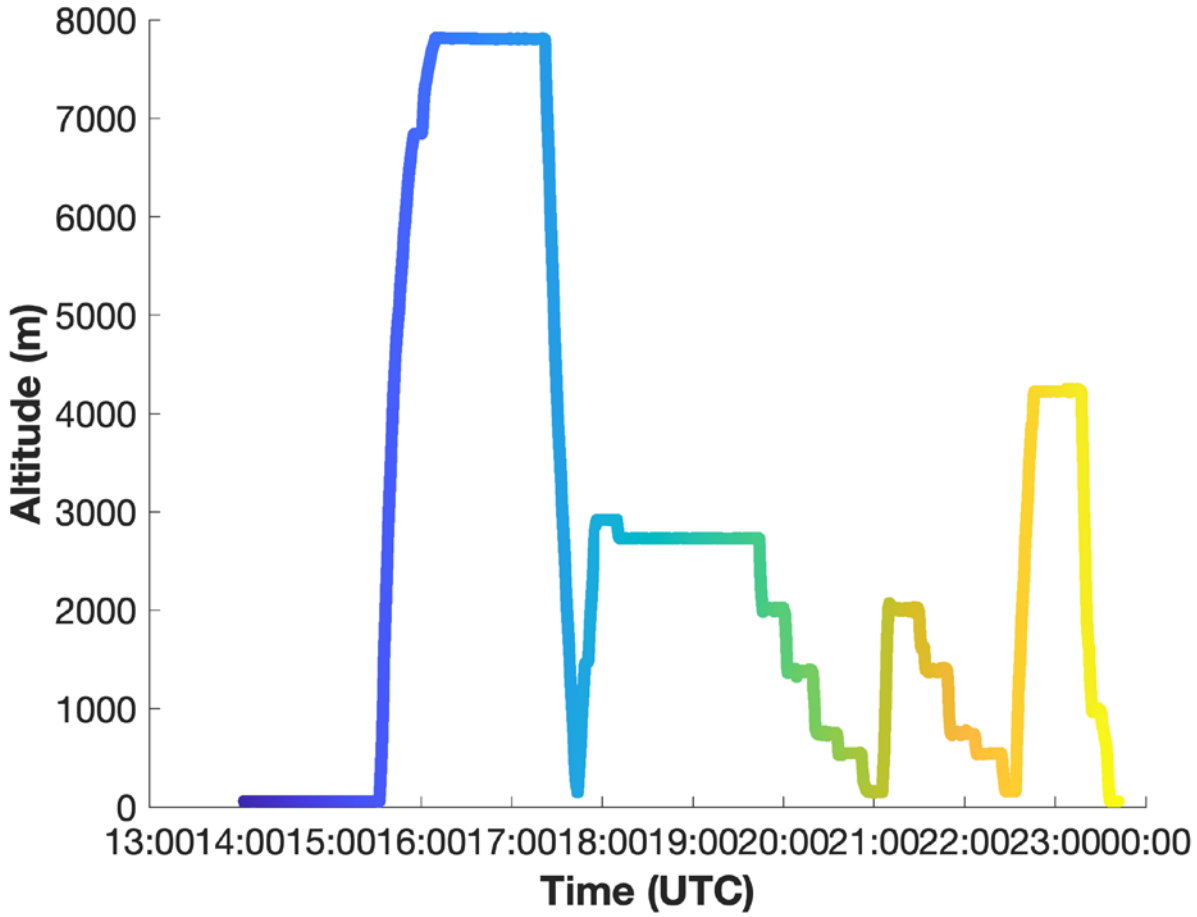

Figure 2. Profile view of flight.

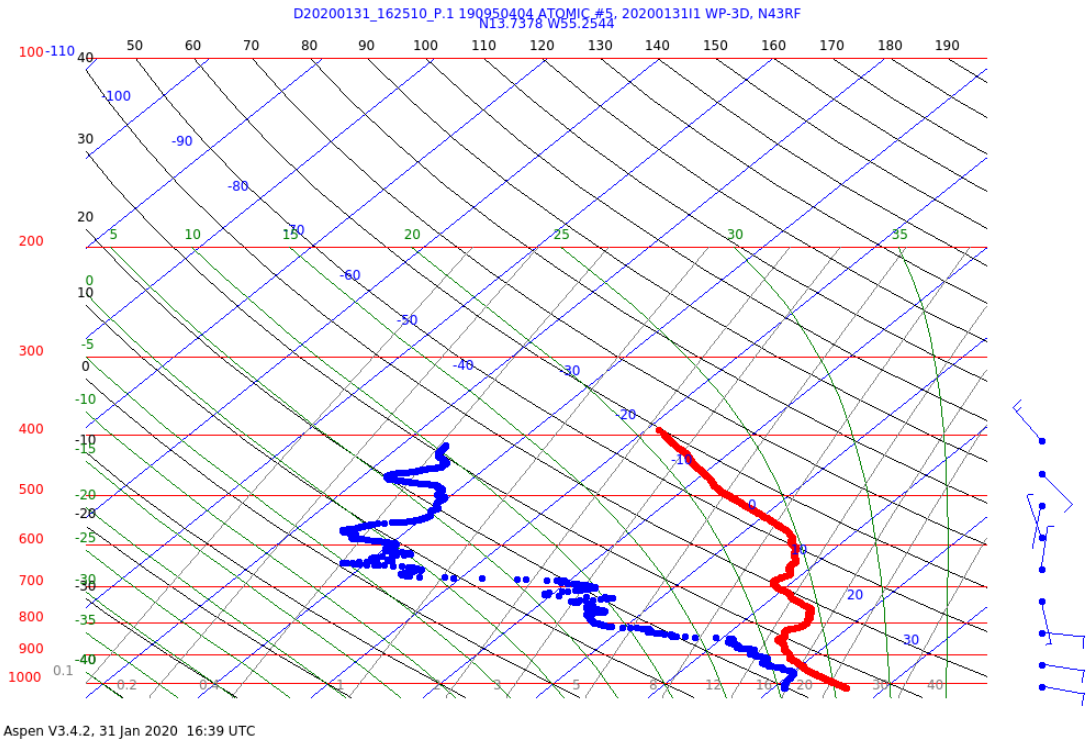

Figure 3. Dropsonde skew-T from first drop of sonde circle.

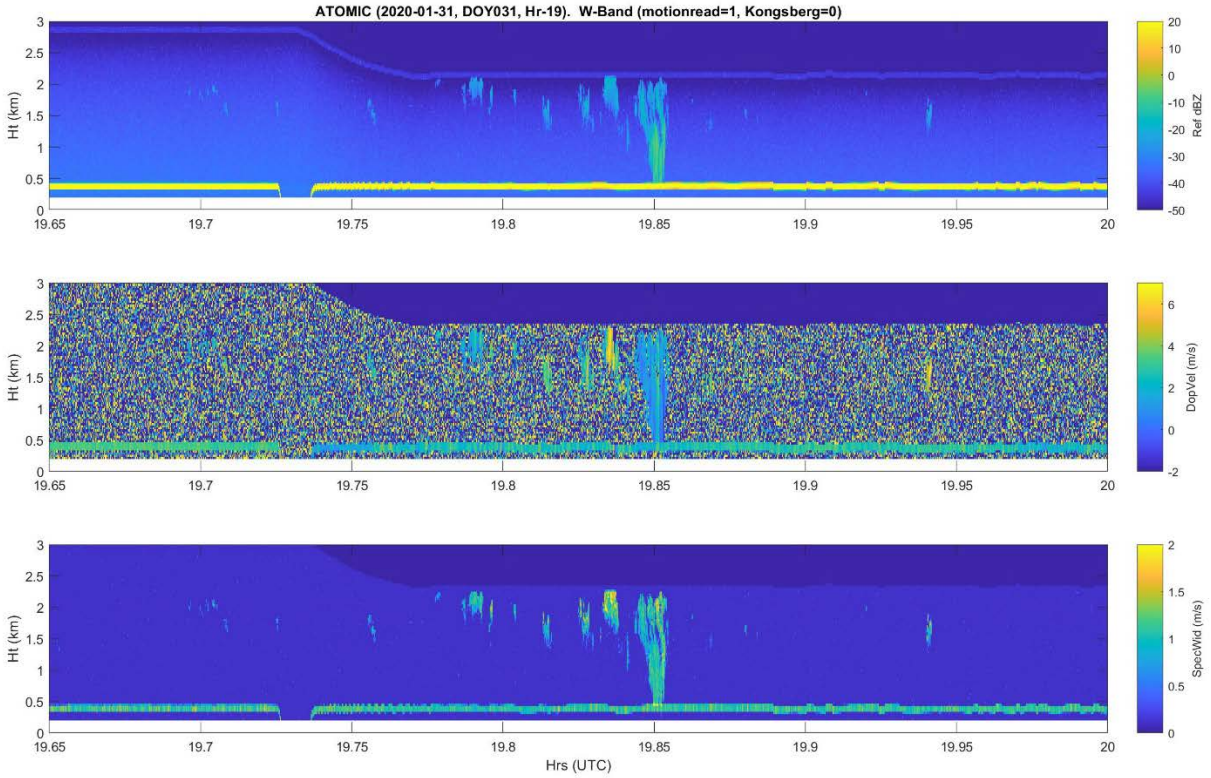

Figure 4. Section of clouds from Wband on second cloud module.

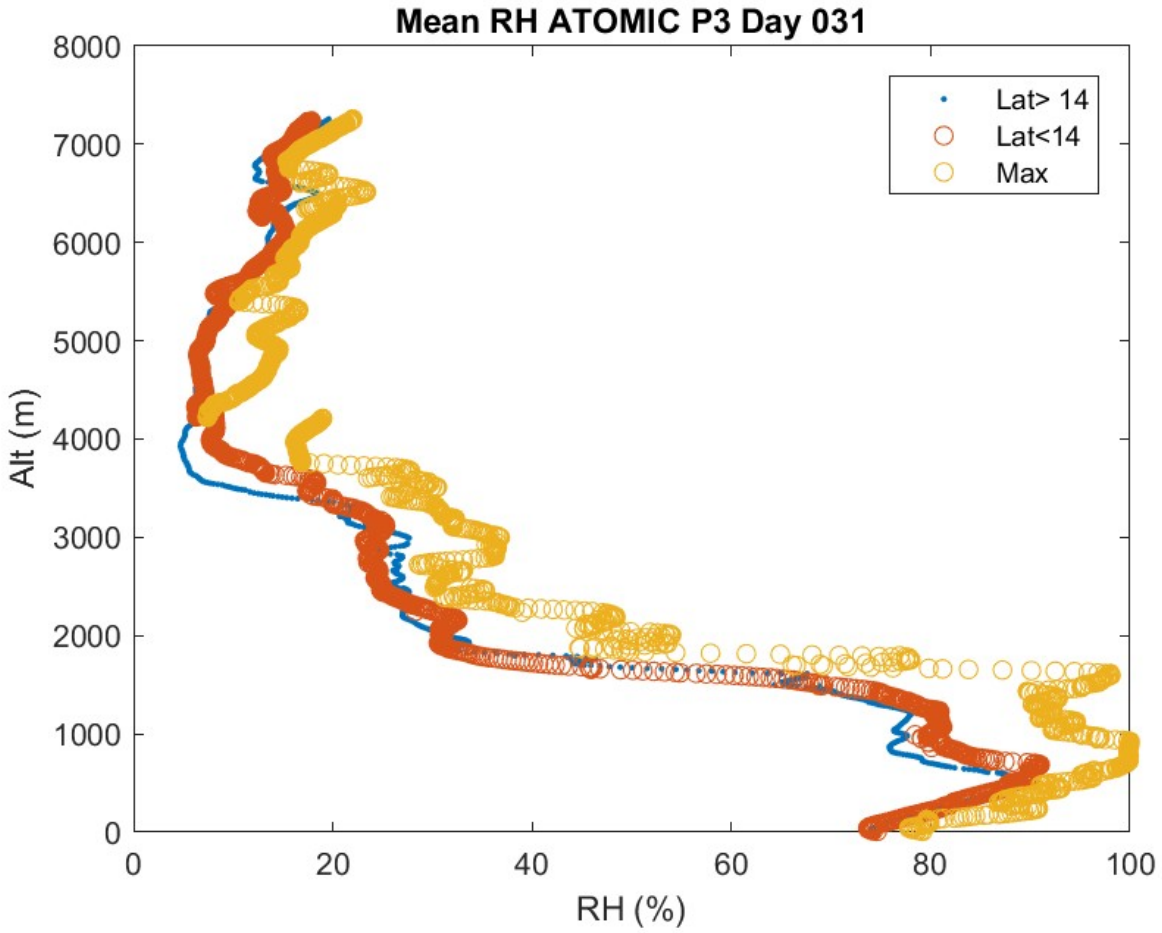

Figure 5. Profiles of dropsonde RH segregated as N (blue dots) or S (red circles) of lat=14.0. The maximum RH is shown as yellow circles. The max RH suggest thin low clouds with cloudbase about 700m and a secondary thin cloud layer with tops about 1.8 km.