

ARM SGP CFH Operations Status

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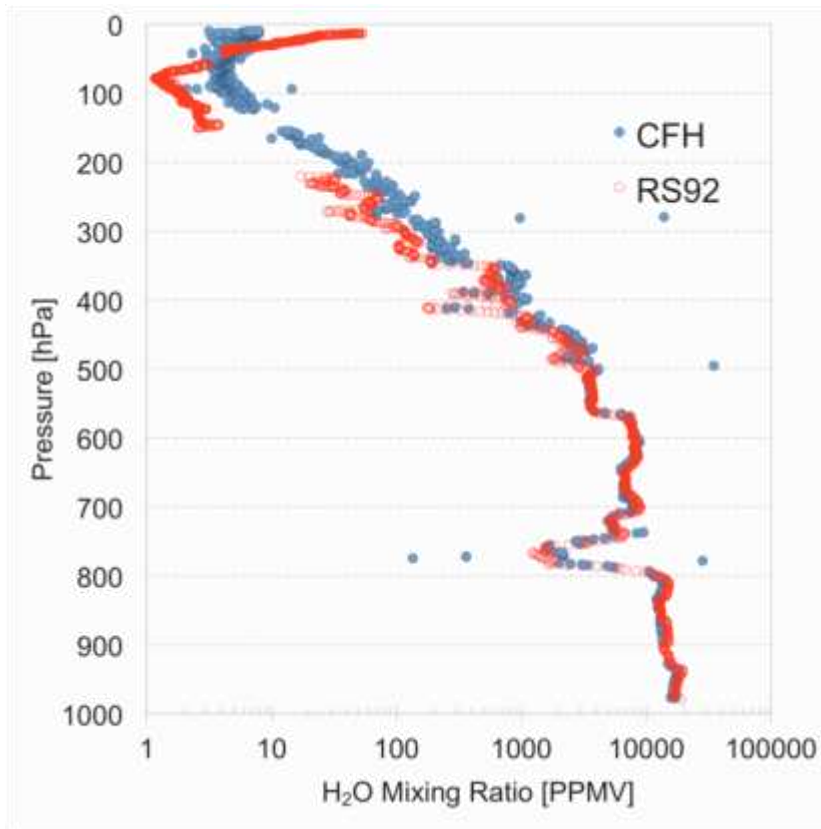
Lori Borg, University of Wisconsin–Madison



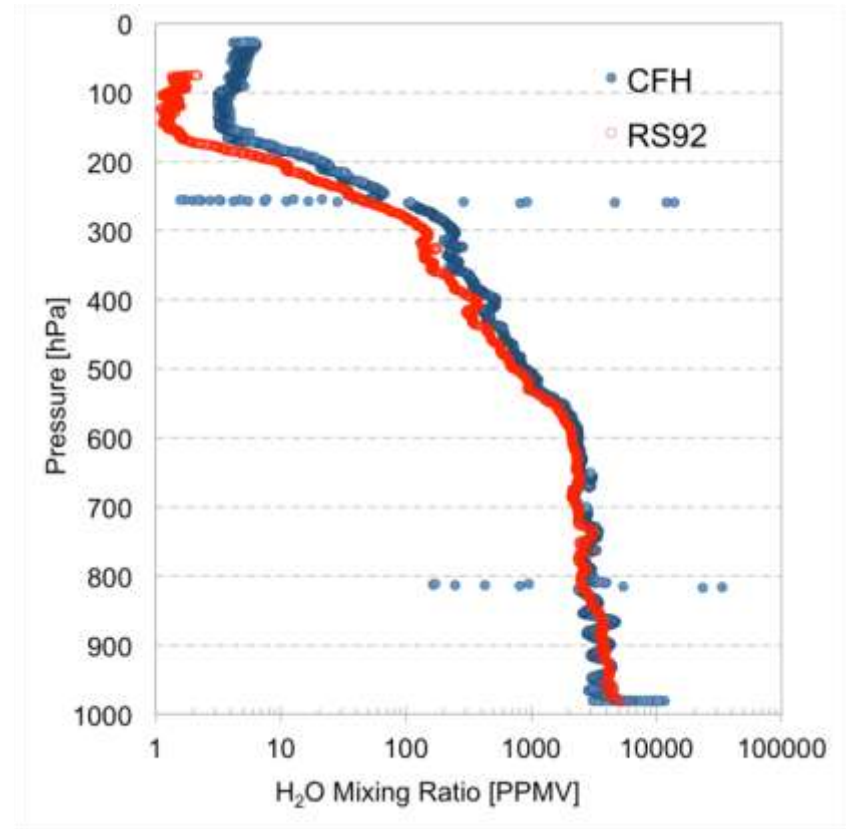
ARM CFH Mission

- **P**rovide launches of balloon-borne cryogenic frost-point hygrometer as a humidity baseline measurement.
- **H**oward Diamond, through NOAA funds CFH launch hardware.
- **A**RM provides mentorship oversight and ‘manpower’ for the efforts associated with the CFH sonde preparation and launches.
- **I**mprove and evaluate the procedures for CFH launches at the SGP facility.
- **E**valuate CFH launch logistics for use at other ARM launch sites (i.e. Barrow, Alaska) in the future.

Profiles



2015-09-15: CFH (blue) versus RS92 (red)



2017-01-30: CFH (blue) versus RS92 (red)

- ✓ Twenty water vapor mixing-ratio profiles from combined instrument measurements.
- ✓ Burst altitudes exceed 10 hPa for 50% of the launches.
- ✓ Launch times in the mornings, except 10/27/15 – NPP overpass

Launch package updates

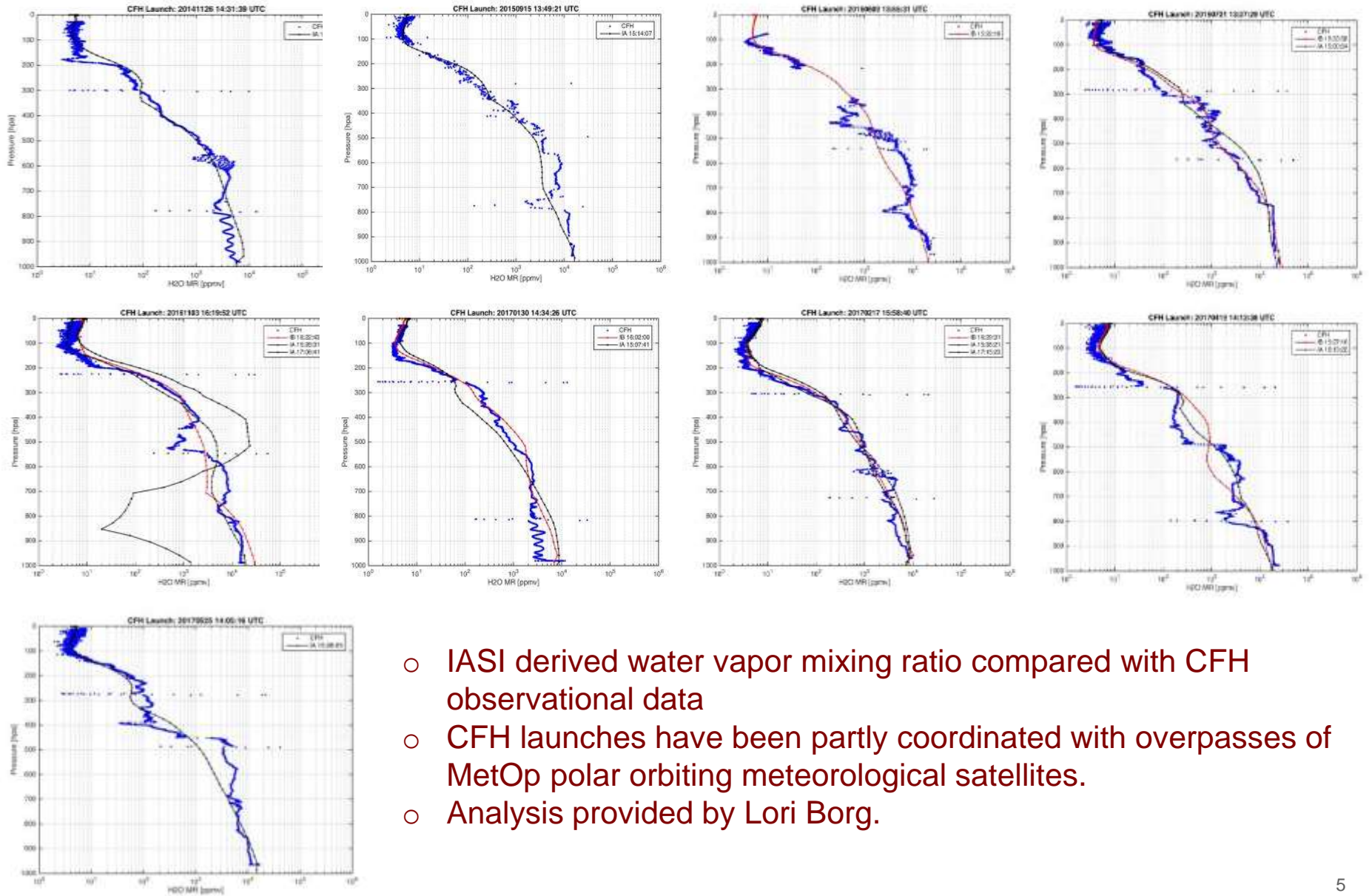
- CFH
- InterMet IMet1 RSB
- Vaisala RS92 radiosonde, ground check with Vaisala GC25 prior to each launch
- Vaisala launch systems were updated to MW41 at SGP in April. Donna Holdridge and Jenni Kyrouac performed RS41 radiosonde test launch.

Date	Burst Altitude (km)	Burst Pressure (hPa)	Launch Time (UTC)
20140911	32.807	7.87	13:23:15
20141126	24.323	27.27	14:31:39
20150212	30.611	10.02	14:14:49
20150326	33.588	6.43	13:09:30
20150429	31.519	9.08	13:06:07
20150511	31.677	8.97	13:27:01
20150715	30.567	11.4	13:47:45
20150915	32.926	7.86	13:49:21
20151027	33.497	6.79	19:17:42
20160212	28.883	13.46	14:33:02
20160322	28.386	14.42	13:35:15
20160609	28.251	15.66	13:55:31
20160721	32.516	8.46	13:27:29
20160928	30.808	10.63	12:42:12
20161103	32.908	7.46	16:19:52
20170130	24.189	27.57	14:34:26
20170217	26.932	17.91	15:58:40
20170419	33.376	7.01	14:12:38
20170525	32.217	8.63	14:05:16



Photo courtesy: Donna Holdridge

Spaceborne H₂O Profiles



- IASI derived water vapor mixing ratio compared with CFH observational data
- CFH launches have been partly coordinated with overpasses of MetOp polar orbiting meteorological satellites.
- Analysis provided by Lori Borg.

ARM Data Ingest

- Quick Data and DQ checks performed

ARM Data Quality Explorer » Metrics

Home Plot Browser DQ Zoom DS View DQPR Search Bookmark Invalid Requests Add Request Modify Requests Legend

Tables Loaded: 1 of 1

sgpcfhC1.b1 v1.0 : 04.19.2017 - 141238											
Assessment Toggling	Pressure from the radiosonde pressure sensor (hPa)										
	978-900	900-800	800-700	700-600	600-500	500-400	400-300	300-200	200-100	100-50	50-0
altitude	~										
cfh_battery_voltage	~										
cfh_frost_point_temperature	~										
data_frame_number	~										
detector_signal	~										
detector_temperature	~										
h2o_mixing_ratio	~										
imet_temp_l	~										
imet_temp_p	~										
imet_temp_u	~										
lat	~										
lon	~										
potential_temperature	~										
relative_humidity	~										
rs_battery_voltage	~										
rs_frost_point_temperature	~										
saturation_mixing_ratio	~										
saturation_vapor_pressure	~										
temperature	~										
temperature_raw	~										
wind_direction	~										
wind_speed	~										

- Diagnostic Plots +
- DQA Report
- NCVweb Plot
- CM Logs

ARM Data Ingest

- Quick Data and DQ checks performed

ARM Data Quality Explorer » Field Metrics

[Home](#) [Plot Browser](#) [DQ Zoom](#) [DS View](#) [DQPR Search](#) [Legend](#)

cfh_frost_point_temperature

sgpcfhC1.b1 : 04.19.2017 - 141238

	Pressure from the radiosonde pressure sensor (hPa)										
	978-900	900-800	800-700	700-600	600-500	500-400	400-300	300-200	200-100	100-50	50-0
Good											
Not Available											
Missing											
Bit 2											
Bit 3											
Bit 4											

Field Attributes

Ancillary variables

qc_cfh_frost_point_temperature

Comment

This is the direct mirror temperature transmitted by the CFH.

Long name

Frost point temperature measured by the CFH

Missing value

-9999.0

Units

degC

Valid max

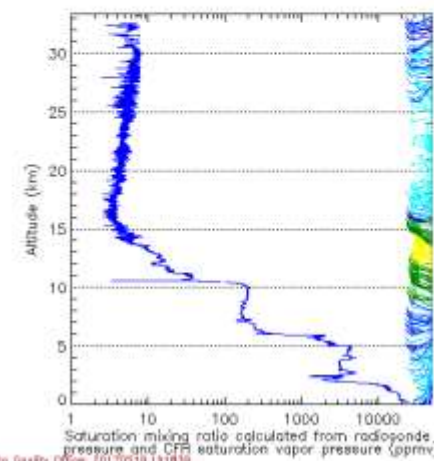
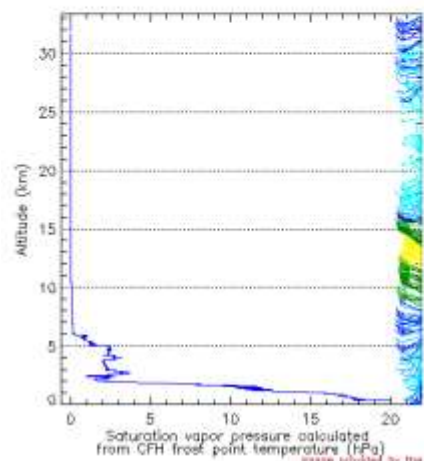
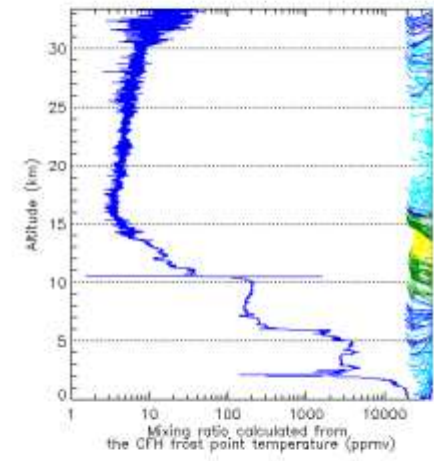
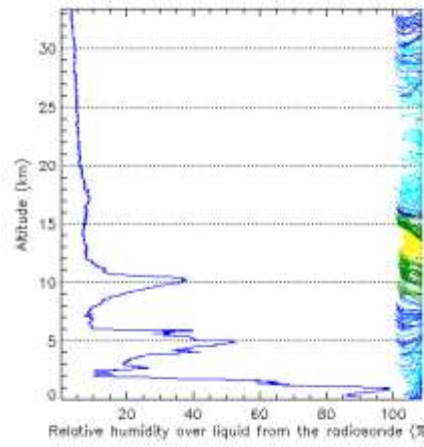
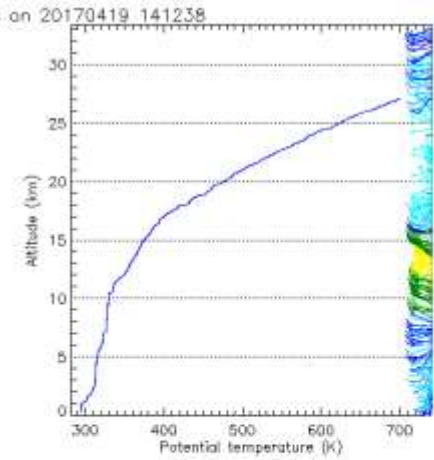
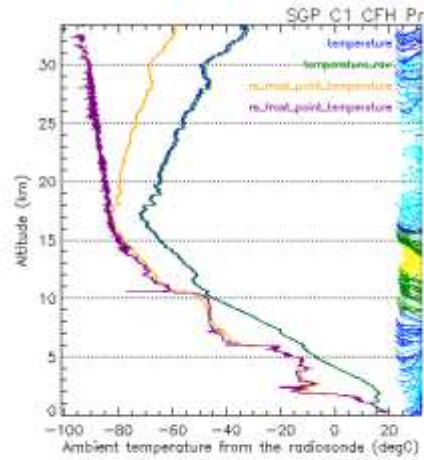
30.0

Valid min

-110.0

ARM Data Ingest Tools

- Quick Data and DQ checks performed with Diagnostic Plots



CFH Instrument Acquisition, Design

- ✓ ENSCI purchase price for CFH is now ~ \$ 3,000.-
- ✓ Design is good, but not perfect
- ✓ Facilitate retrieval of instrument



=> Metal tube exchange leads to instrument damage

To Do

- Complete Data ingest: ARM DMF ↔ GRUAN RS launch client
- Data processing
- Refine launch procedures for ARM operators
- Refurbish old CFH instruments
- Move to RS41-CFH package
- Produce ARM Baseline CFH humidity measurements
- GRUAN certification

Acknowledgements

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