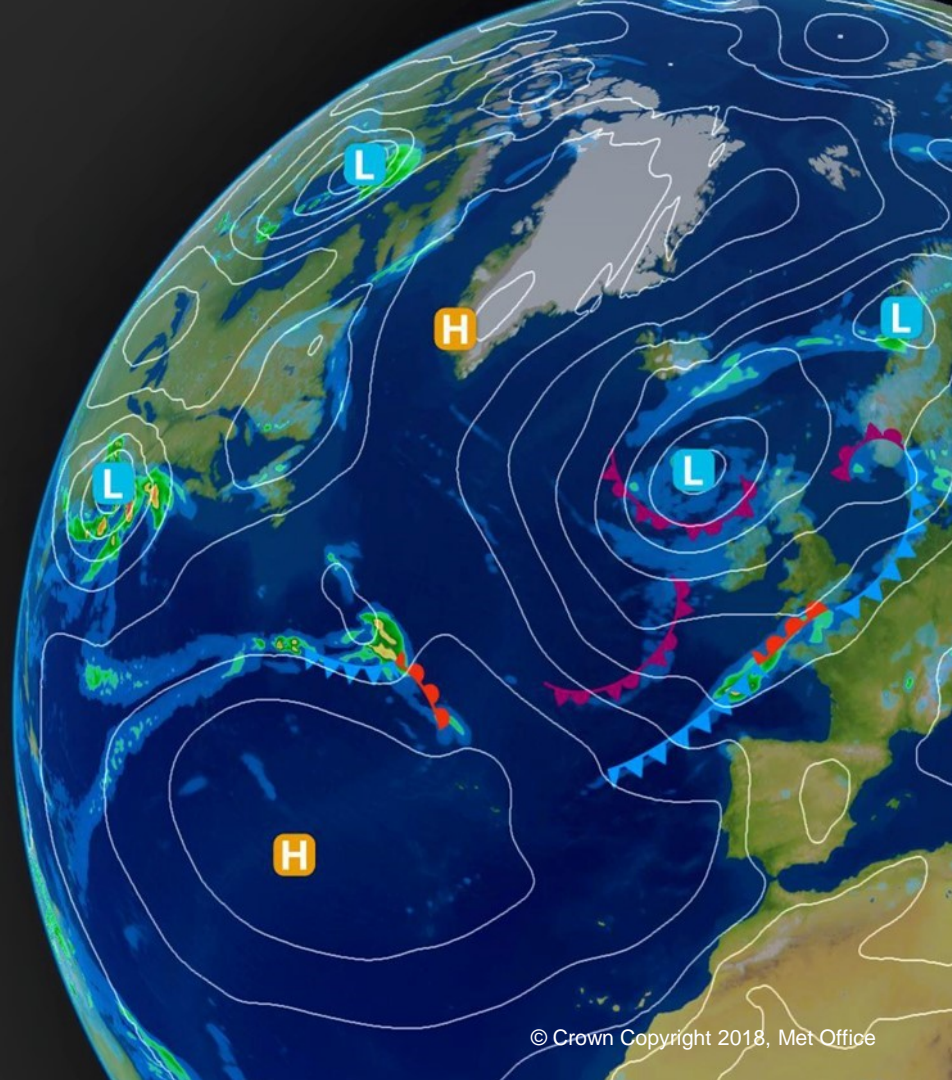


Studying AMV Errors With The NWP SAF Monitoring Web Site

Francis Warrick, James Cotton



NWP SAF AMV Monitoring

nwpsaf.eu -> Monitoring -> Winds
Quality Evaluation -> AMVs

- AMV usage by NWP centre
- Monthly monitoring plots versus Met Office and ECMWF models
- Analysis reports every two years
- One-off investigations



AMV Monthly Monitoring

Select a year, month, and satellite. **Please allow a few seconds for the table to load.**

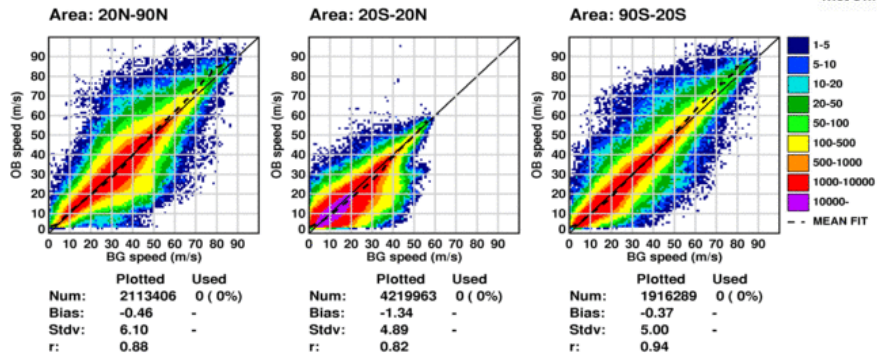
Key: HL: High-Level (above 400 hPa), ML: Mid-Level (400-700 hPa), LL: Low-Level (below 700 hPa).

Year: 2018 Month: February Satellite Type/Source: Geostationary Satellite: GOES-15

Channel	Provider	Density	Map	Zonal	Vector
ir38		ML LL	LL	Zonal	LL
		LL	LL	Zonal	LL
ir		HL ML LL	HL ML LL	Zonal	HL ML LL
		HL LL	HL ML LL	Zonal	HL ML LL
vis		ML LL	LL	Zonal	LL
		LL	LL	Zonal	LL
wv		HL ML	HL	Zonal	HL
		HL	HL	Zonal	HL

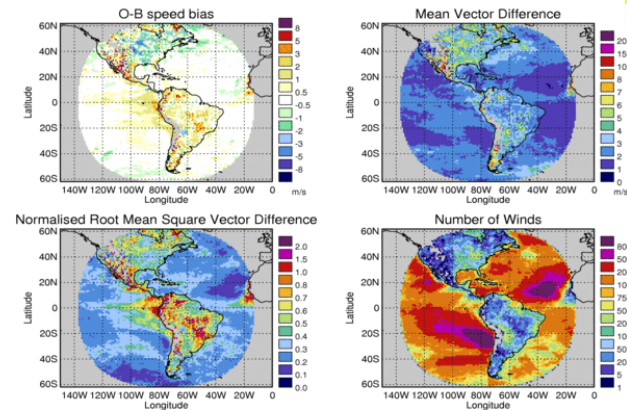
Speed Histograms

GOES-16 IR, March 2018, Above 400 hPa



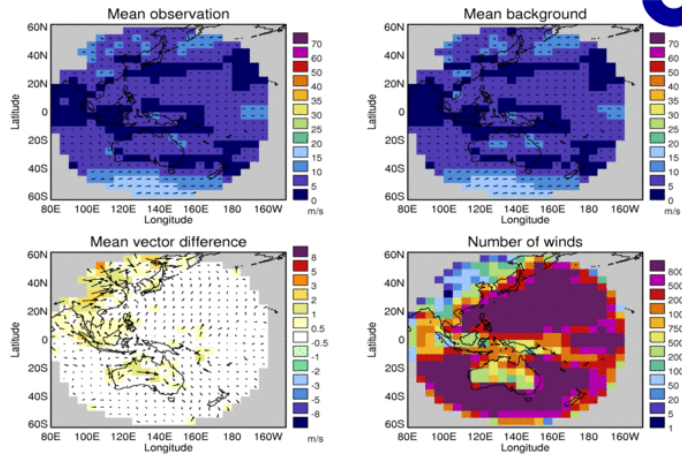
Maps

Met Office: GOES-16 VIS II, March 2018



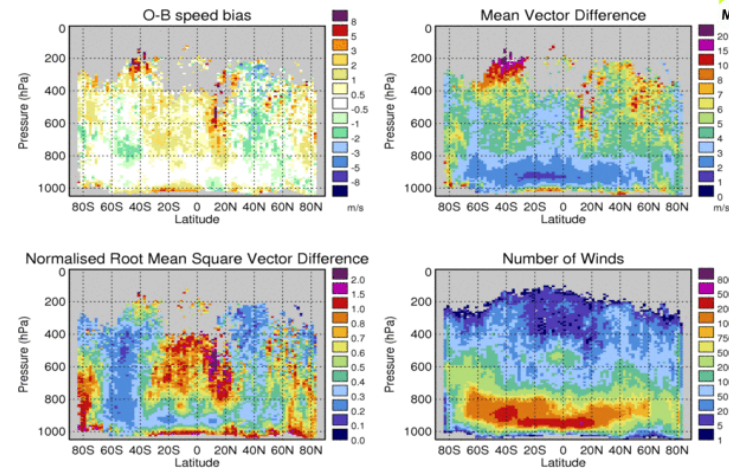
Maps with Wind Vectors

ECMWF:HIMAWARI8_IR II March 2018



Zonal Plots

Met Office: MISR StereoMV VIS 0.6, March 2018

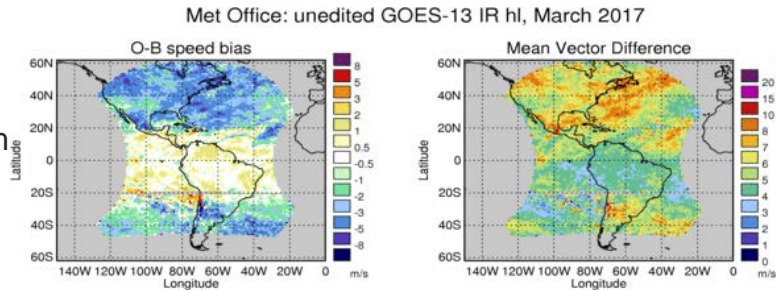


Jet Region Negative Speed Bias

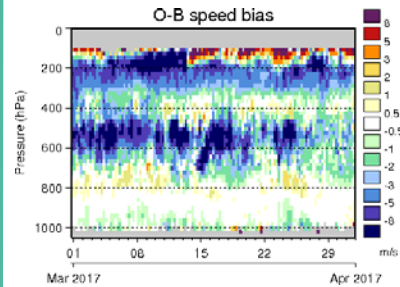
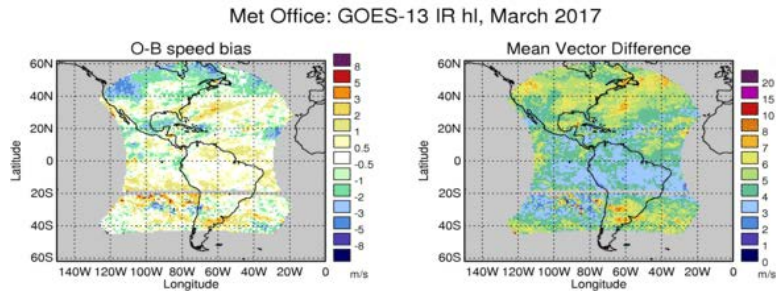
High-Level (heights above 400 hPa)

Feature 2.10

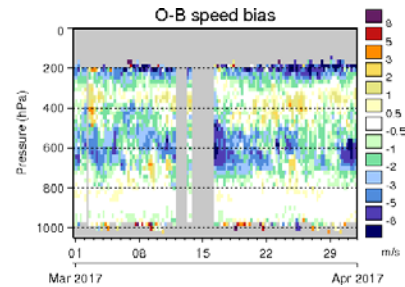
Heritage Algorithm
(Un-edited)



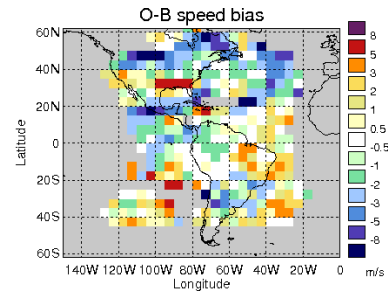
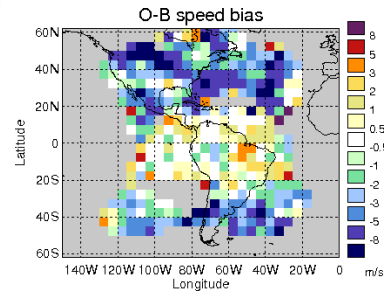
Nested Tracking



Heritage Algorithm
(Un-edited)



Nested Tracking



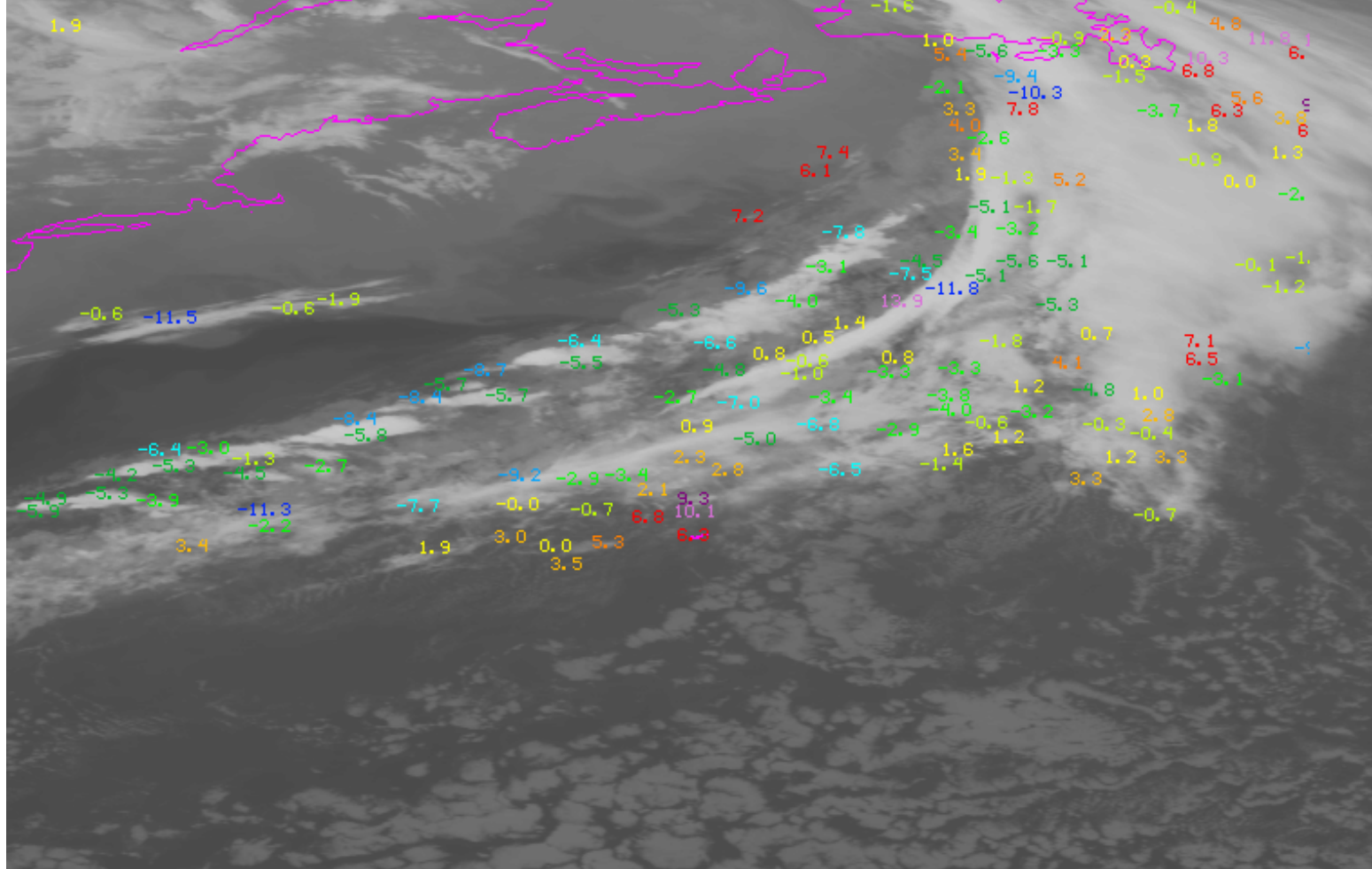
O-B Speed Differences

Nested Tracking

9th March 2017

0545 UTC

GOES-13 IR

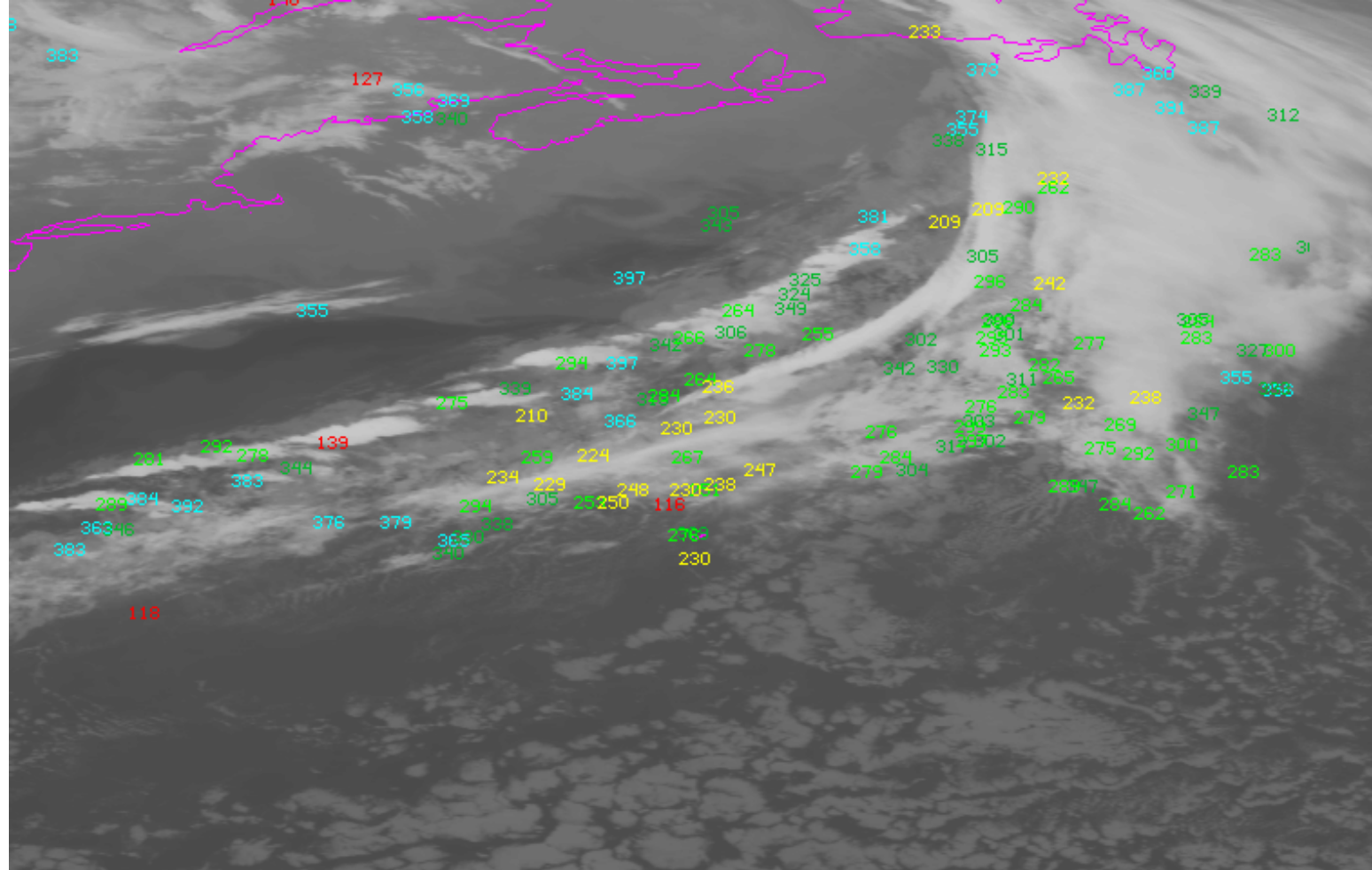


Heritage Algorithm
(Un-edited)

9th March 2017

0545 UTC

GOES-13 IR

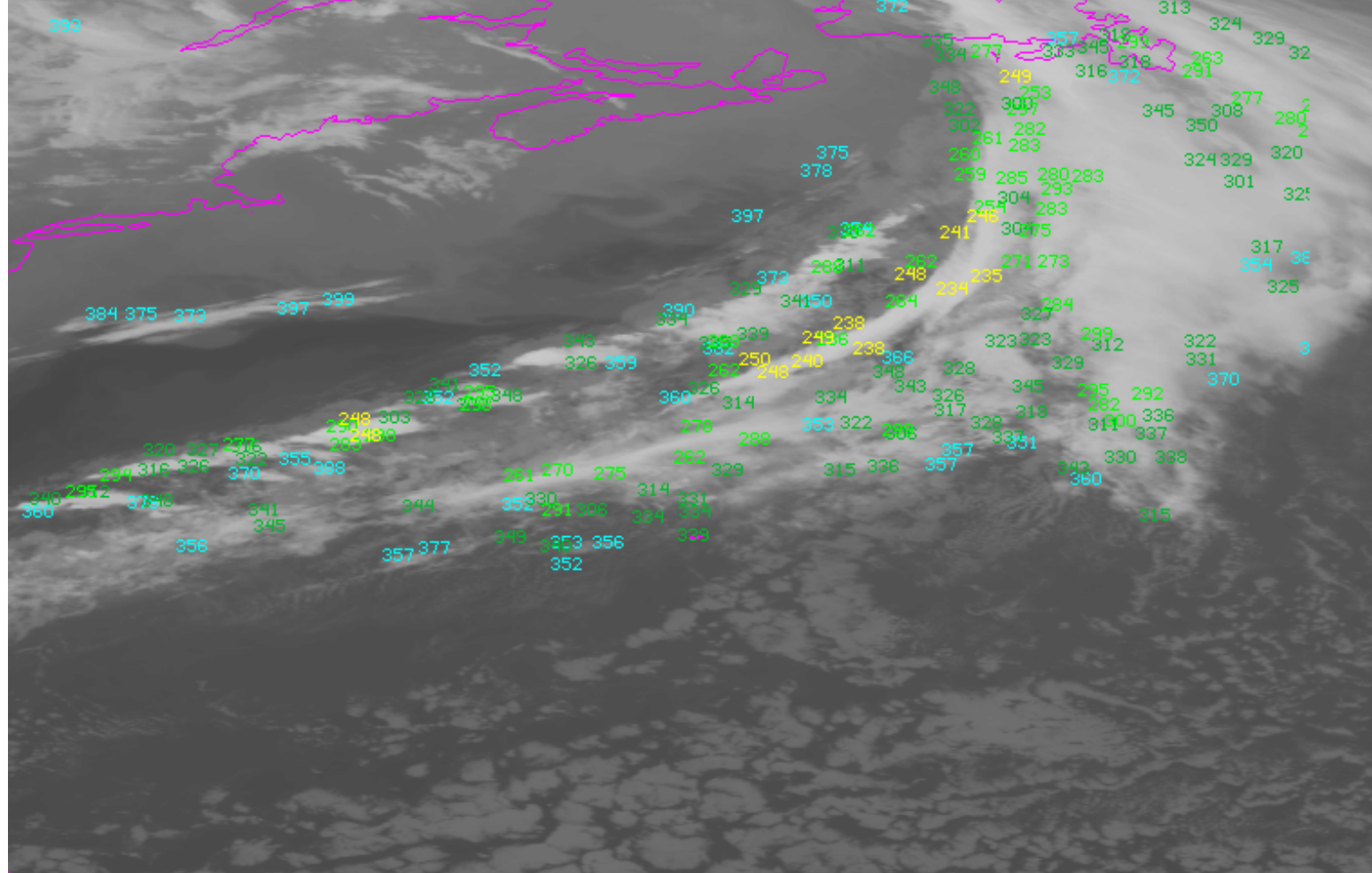


Nested Tracking

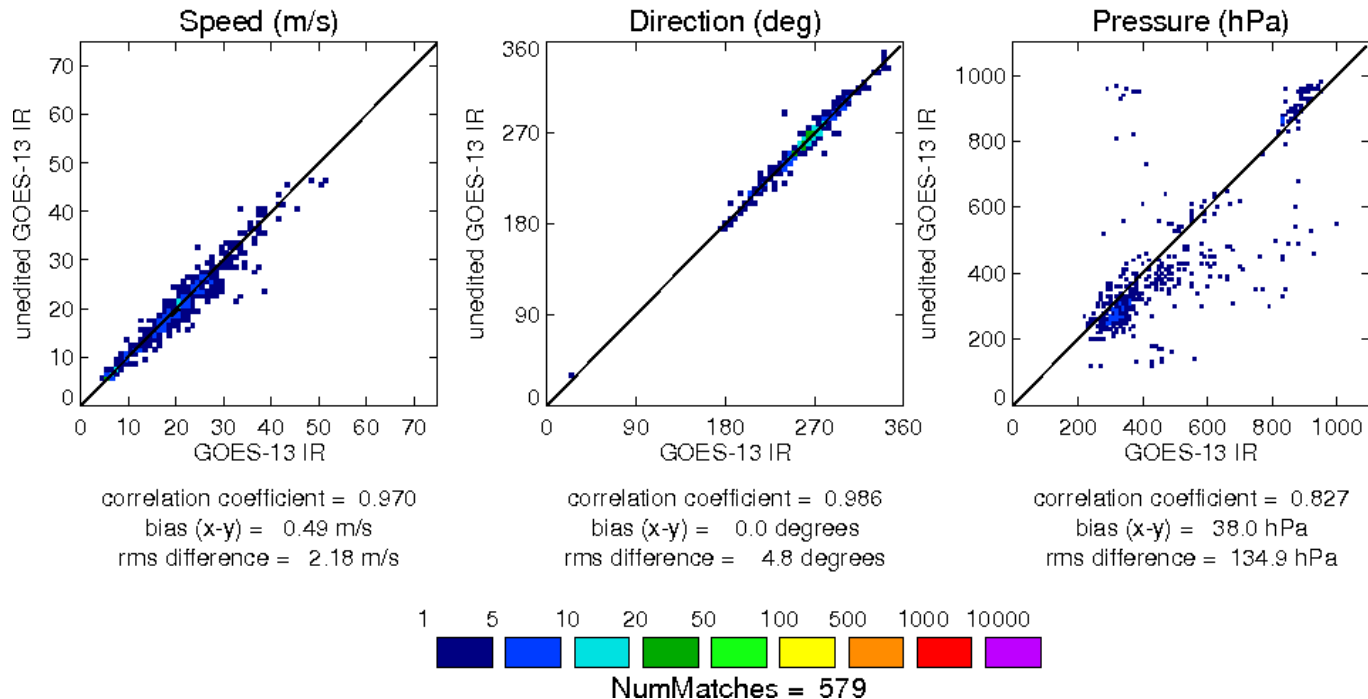
9th March 2017

0545 UTC

GOES-13 IR



Collocation Plots , March 2017



Co-located within 10km, 10 minutes.

9th March 2017 06Z cycle

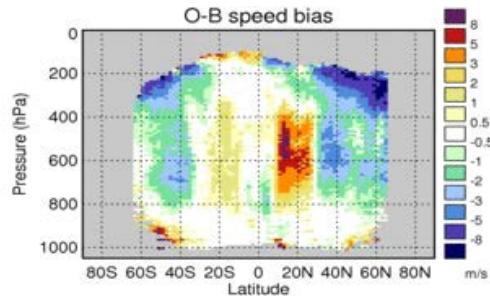
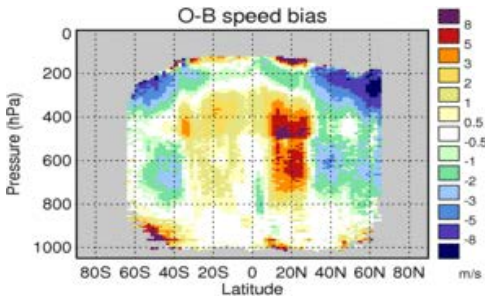
Positive Speed Bias in Tropics

High-Level (heights above 400 hPa)

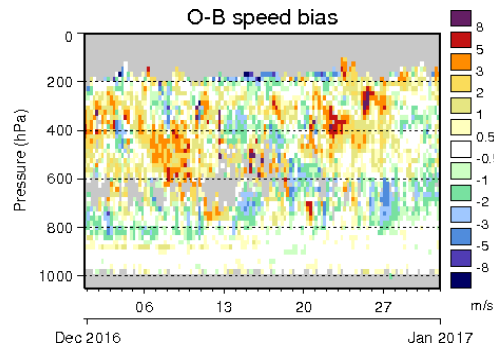
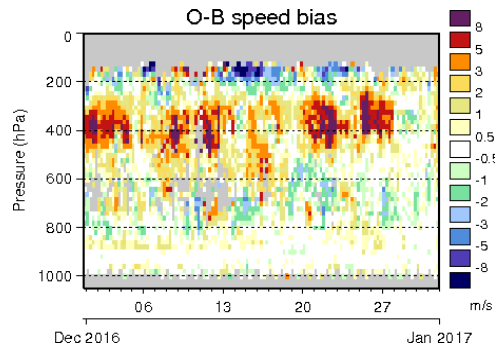
Feature 2.13

Operational Heights (CLA)

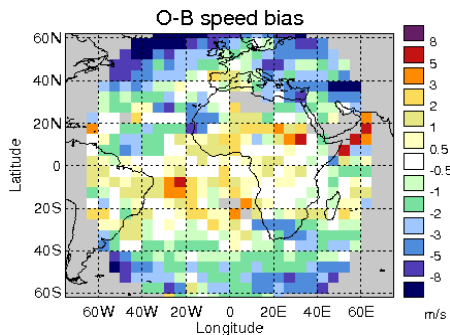
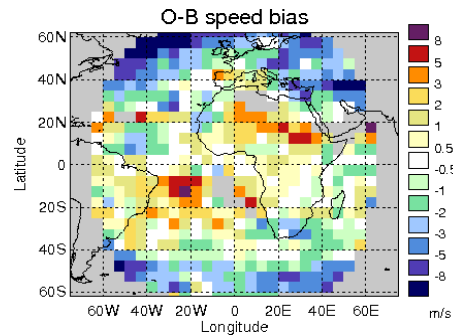
OCA



Infra-red 10.8 micron
December 2016



← Data over South Atlantic

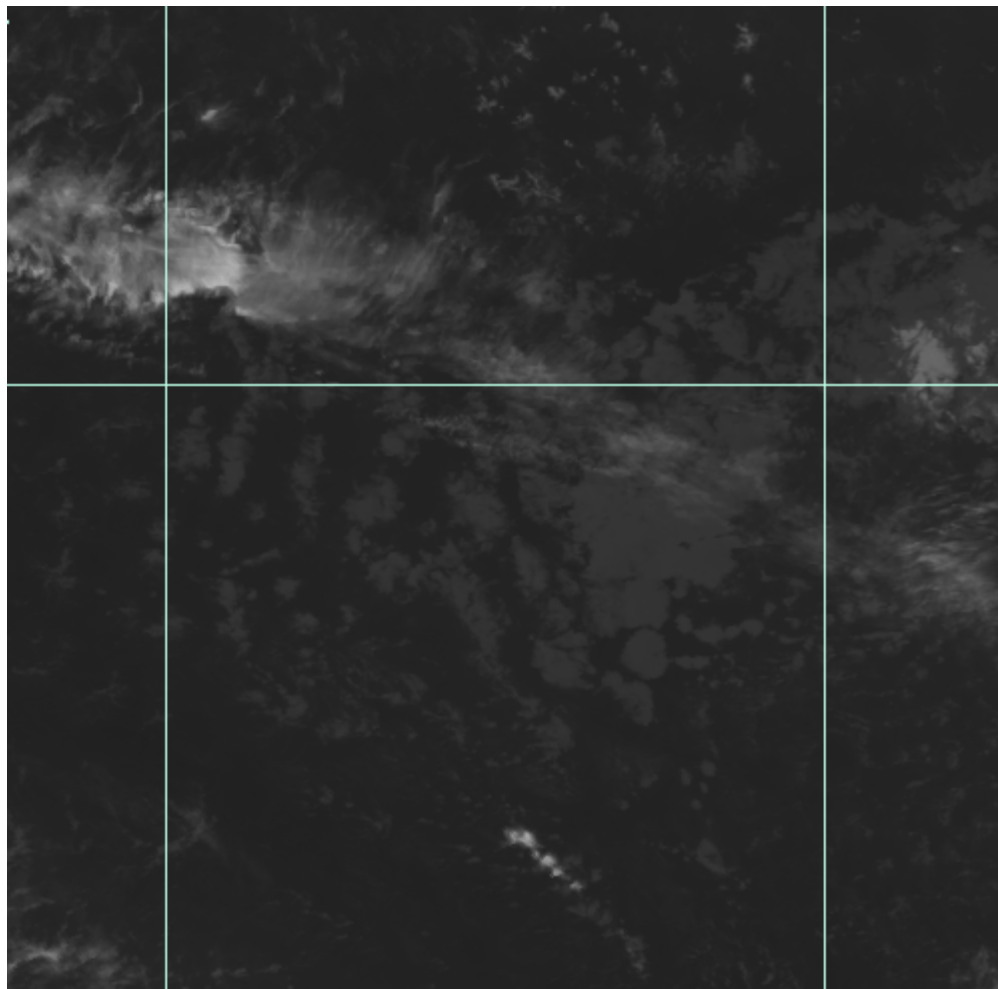


← Heights above 400 hPa
24th-27th December

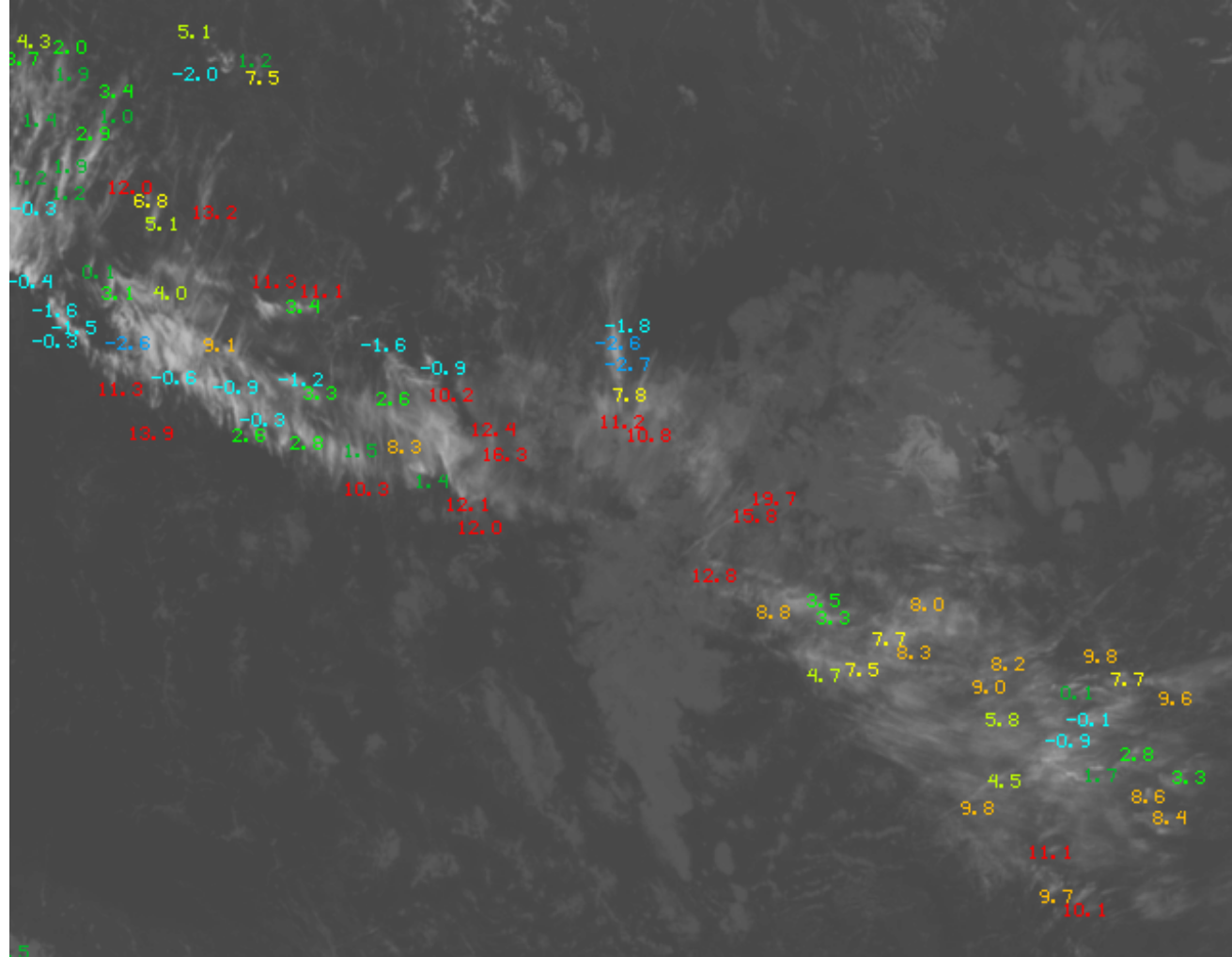
Meteosat-10 IR 10.8

26th December 2016

1500-2100 UTC (18Z
cycle)



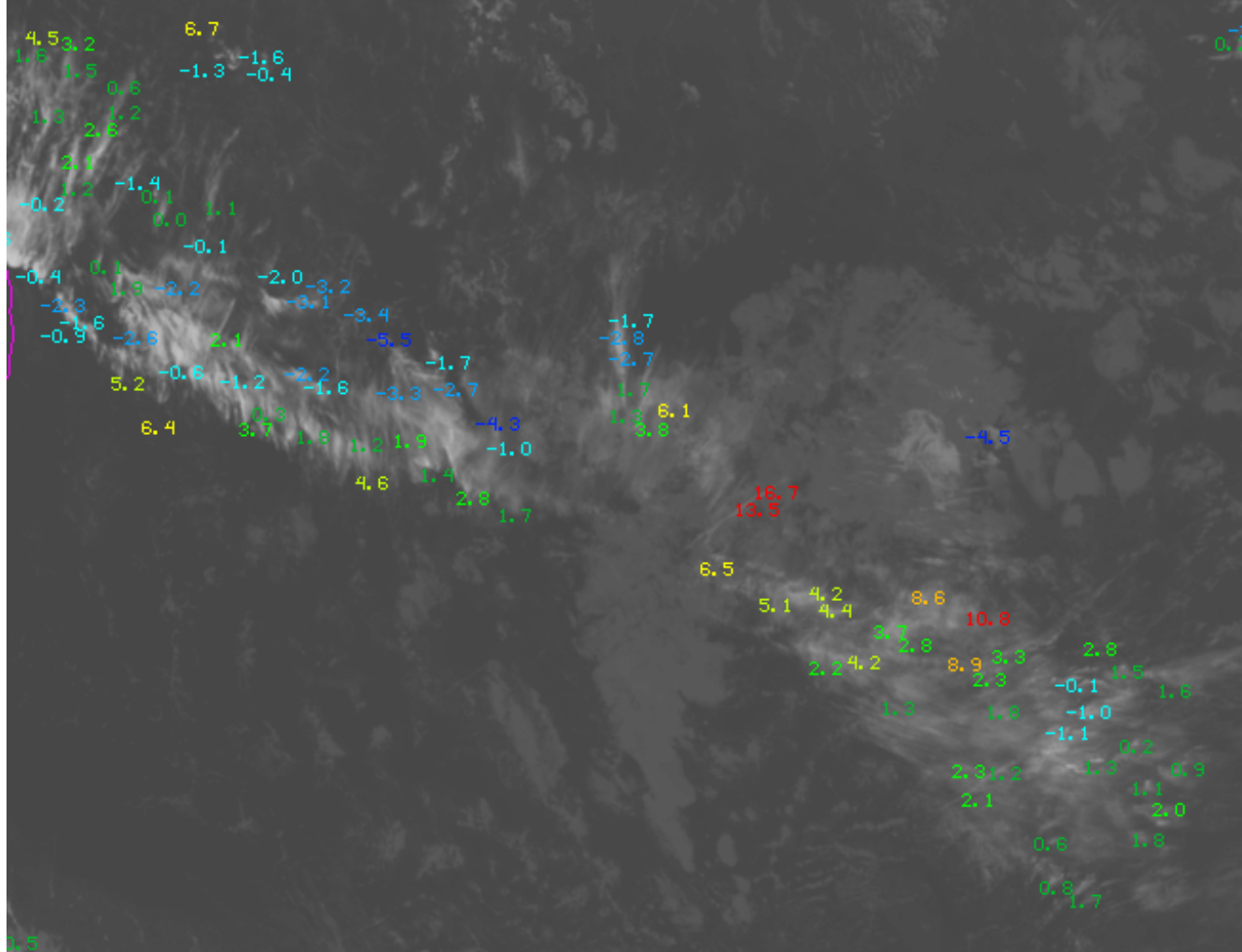
Operational Heights (CLA)



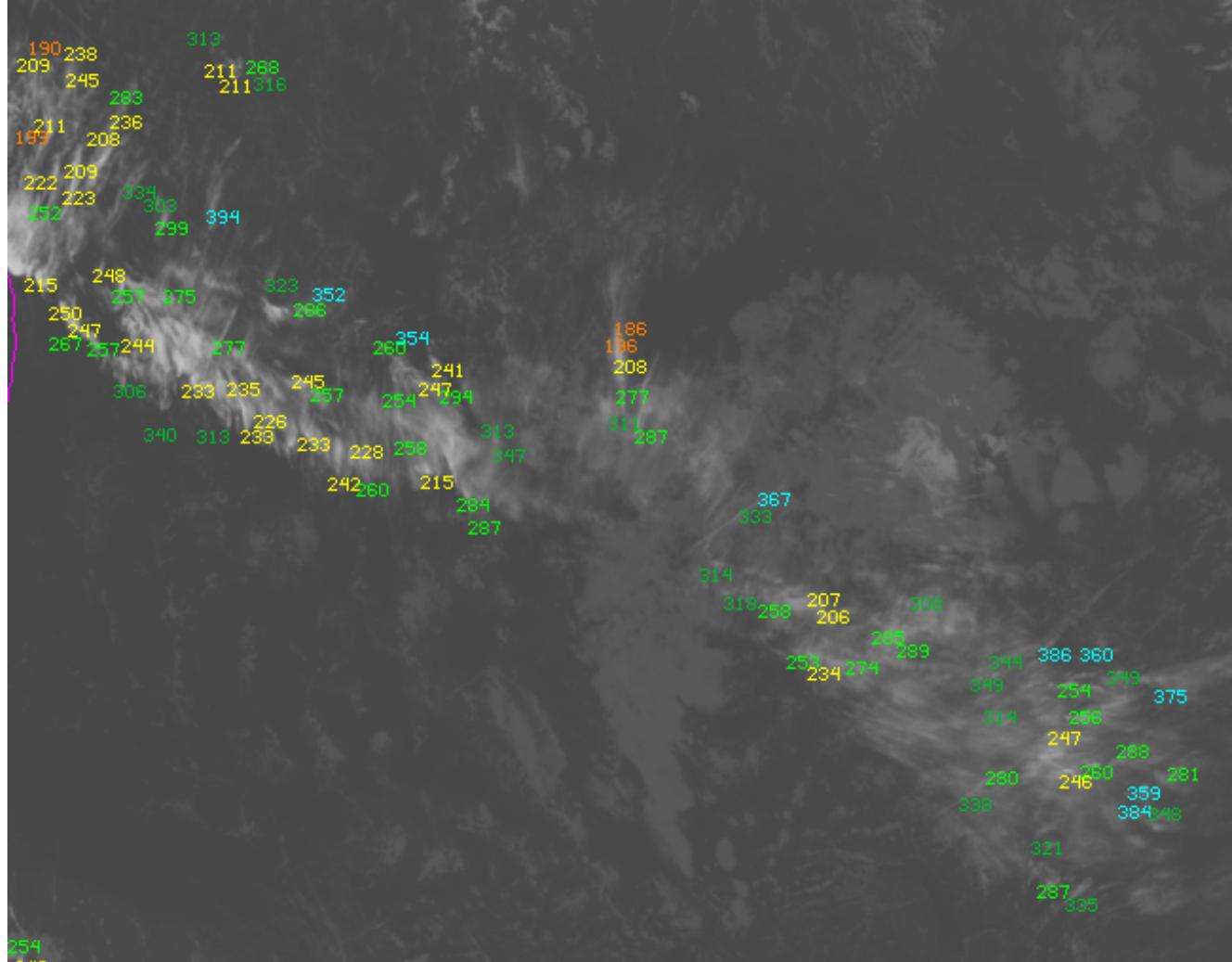
OCA

Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016



Operational Heights (CLA)



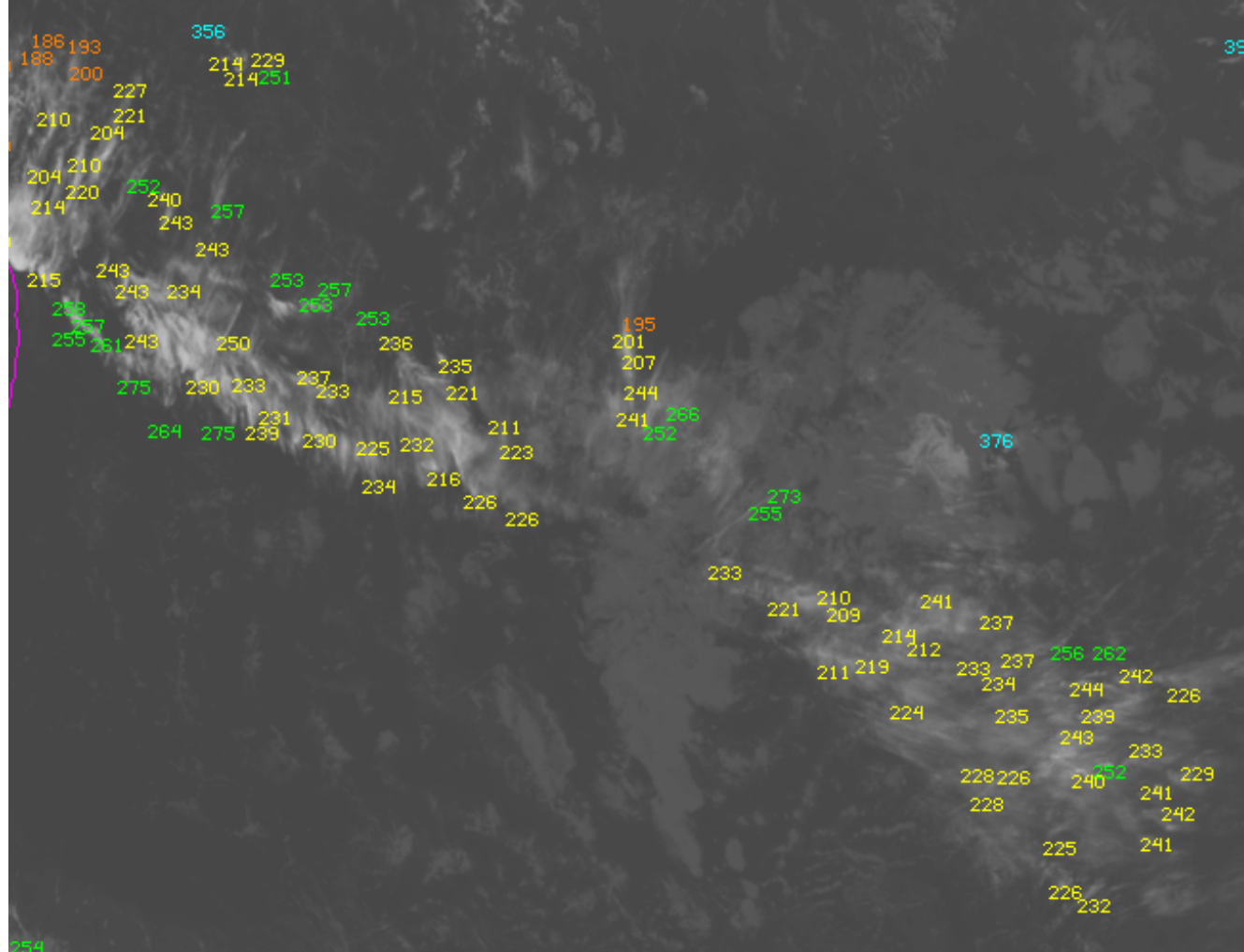
Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016

OCA

Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016



Operational Heights (CLA)

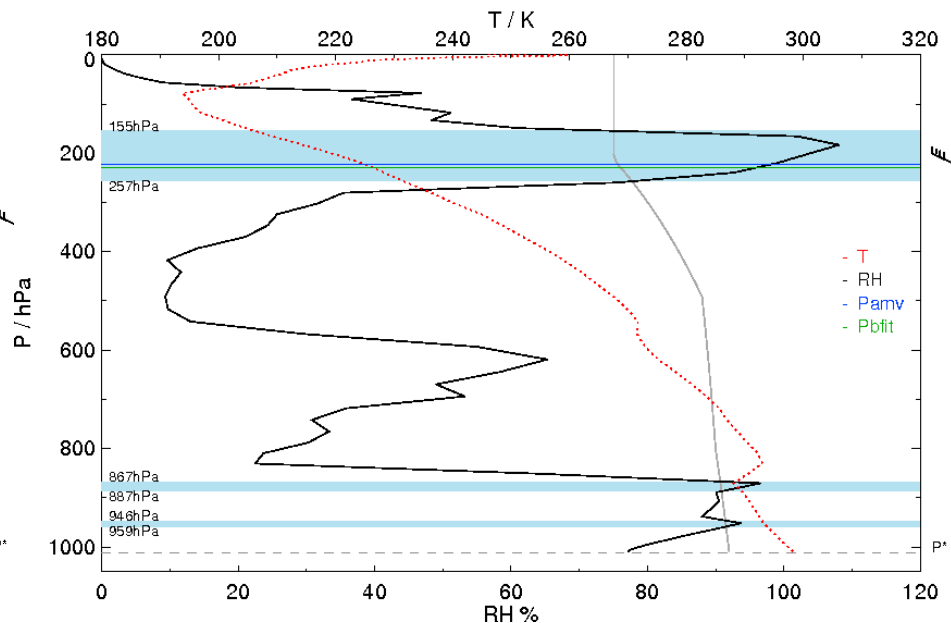
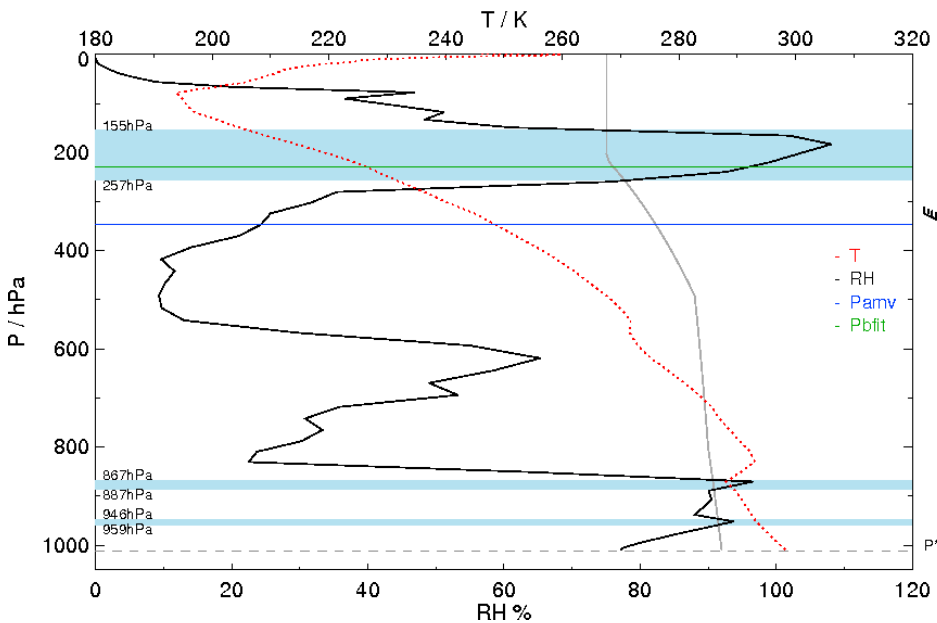
OCA

Sat 57 IR10.8 20161206 1830 UTC

lat=-9.4 lon=-26.0 surf 0 press=347 hPa bfit=228 hPa (T) ep=75 hPa flag 43 qi1=75 qi2=93
p*=1012 hPa orog=0 m bgRH=24% spd=20.2 m/s bias=16.3 m/s iob 178965

Sat 7057 IR10.8 20161206 1830 UTC

lat=-9.4 lon=-26.0 surf 0 press=223 hPa bfit=228 hPa (T) ep=63 hPa flag 3 qi1=75 qi2=93
p*=1012 hPa orog=0 m bgRH=98% spd=20.2 m/s bias=-1.0 m/s iob 143413



MSG Positive Bias over North Africa

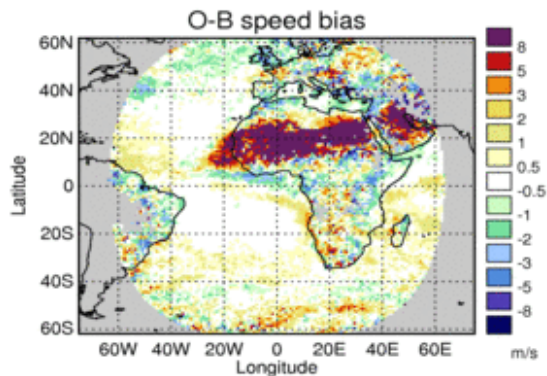
Low-Level (heights below 700 hPa)

Feature 2.6

Below 700 hPa



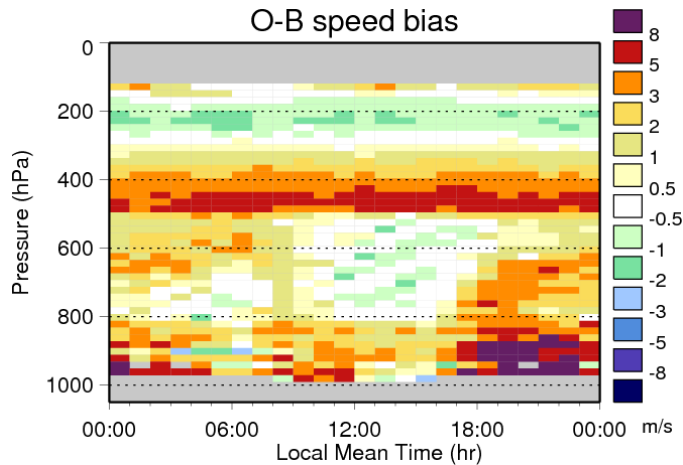
Meteosat-10 IR 10.8 December 2016



- Seen in MSG visible and infra-red over desert

- Worse in winter (position of jet)

- Linked with cirrus & semi-transparent cloud

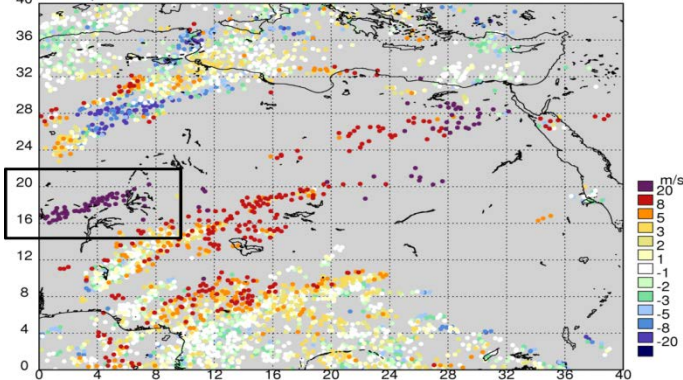


Meteosat-10 IR 10.8

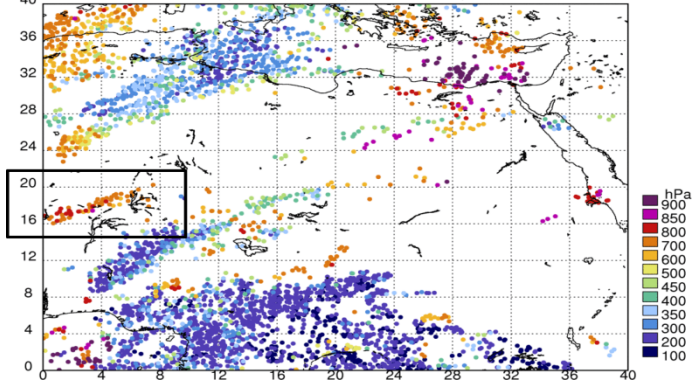
Sahara

December 2016

O-B Speed Difference, Meteosat-10, 18UTC RUN, 6 December 2016

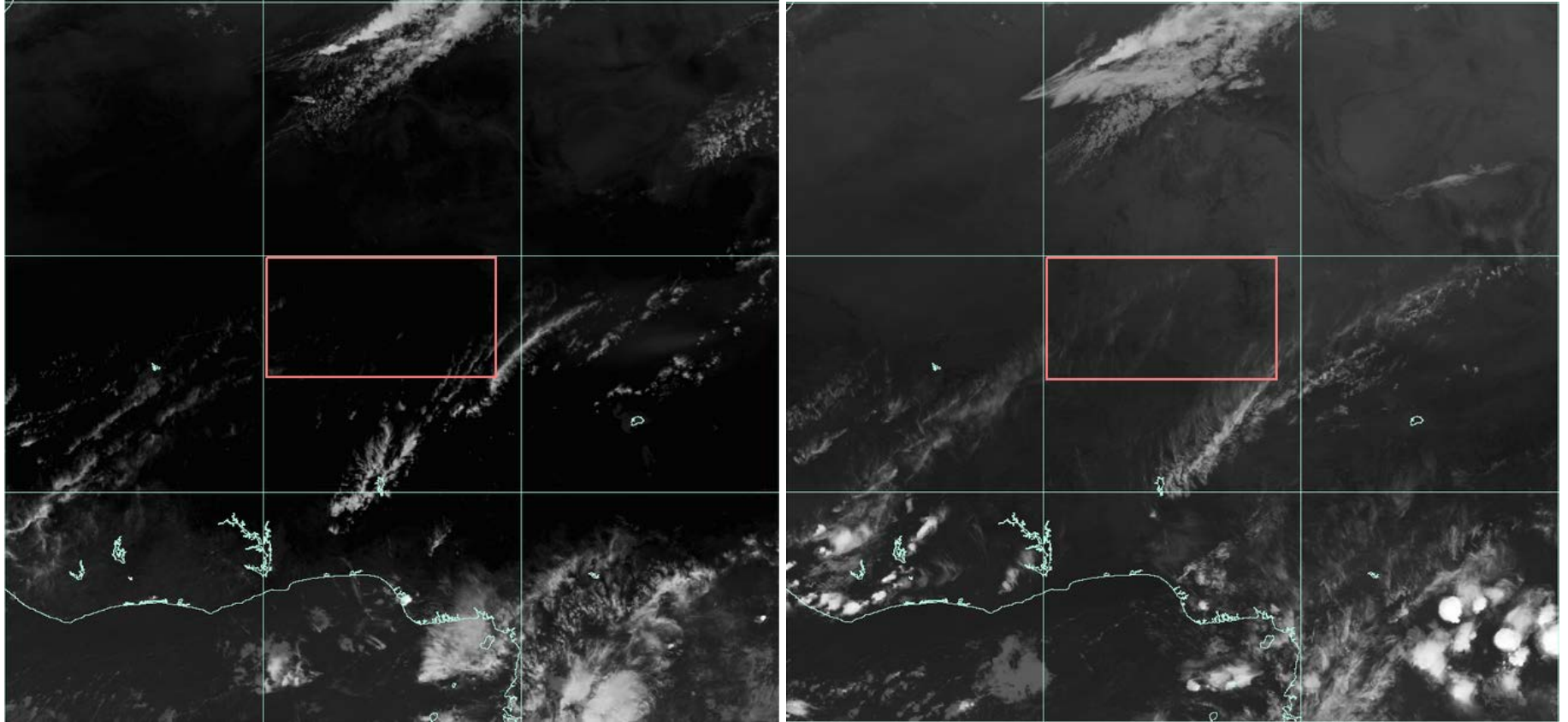


Observation Pressure, Meteosat-10, 18UTC RUN, 6 December 2016



Why is this feature only present in the 18Z cycle, and not the 00, 06 and 12Z cycles?

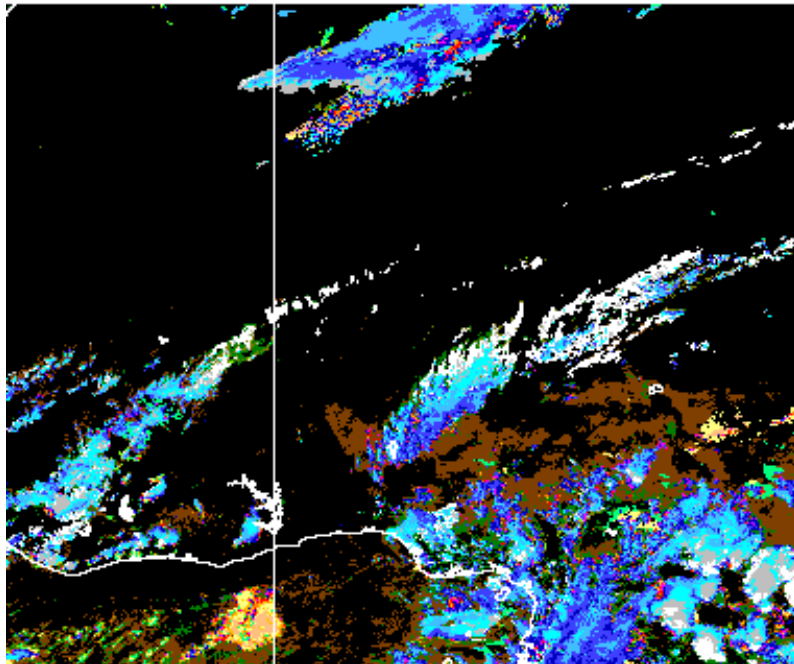
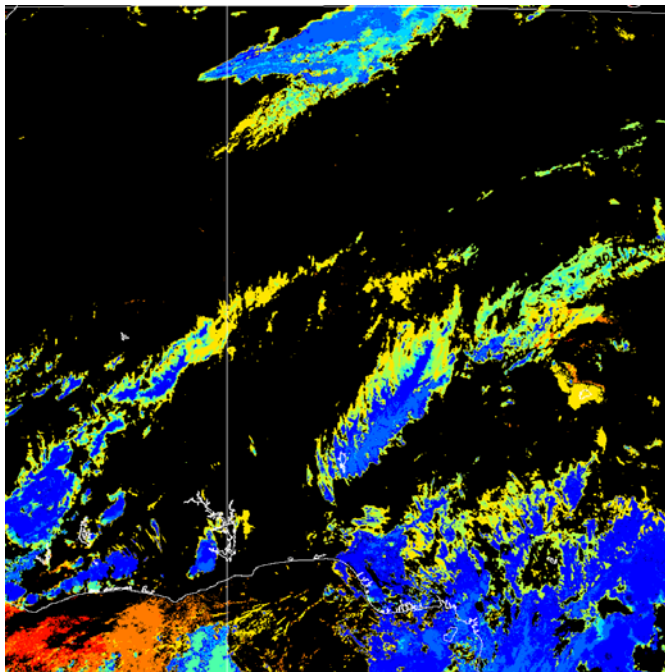
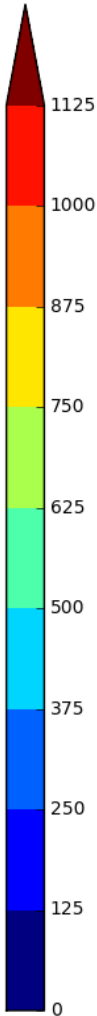
Faint cloud is moving north-east ward



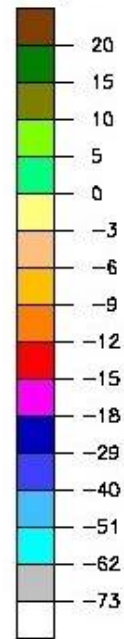
Cloud Top
Pressure (hPa)

OCA

Met Office Cloud Product



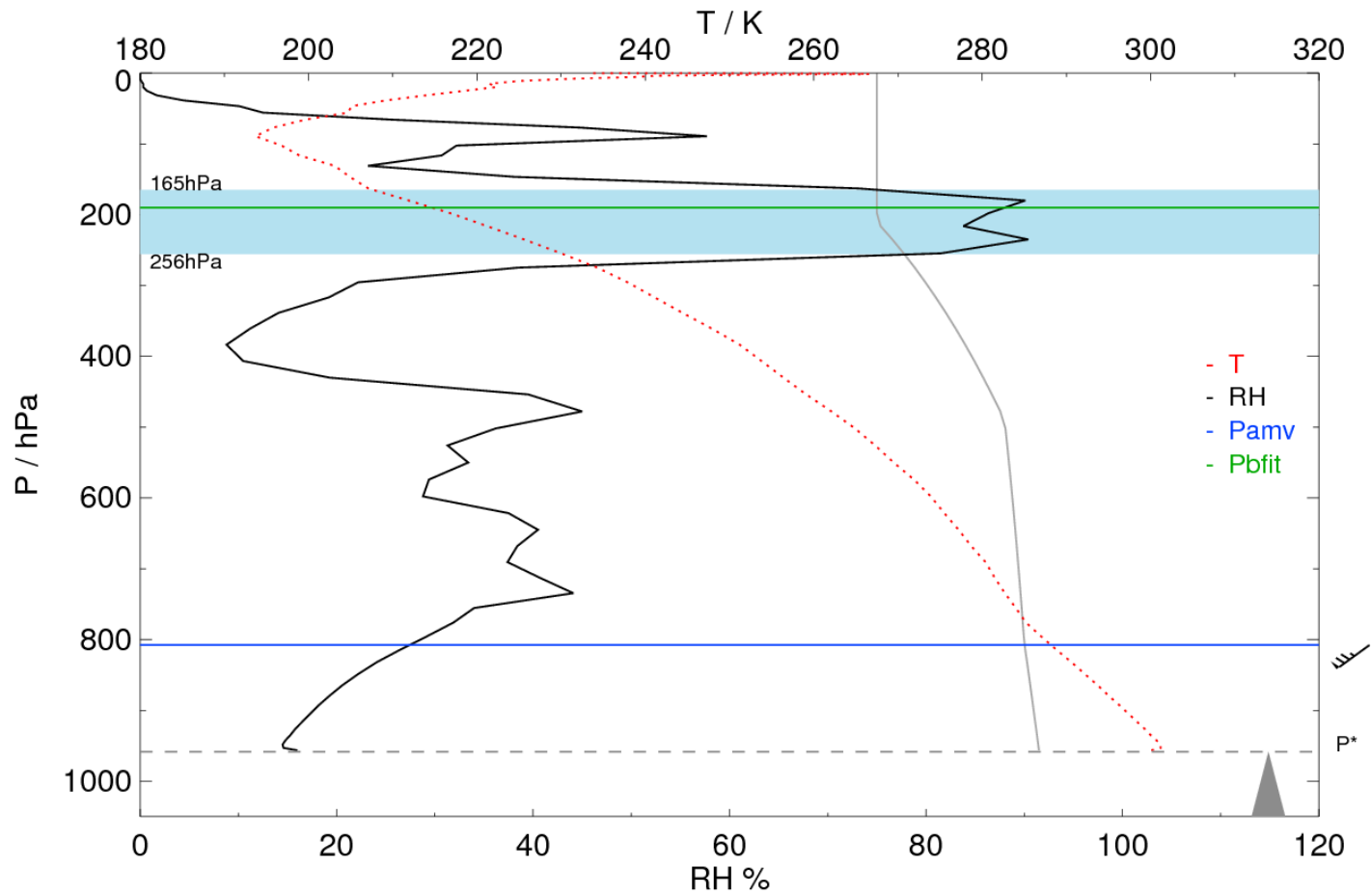
Temperature °C



Sat 57 IR10.8 20161206 1730 UTC

lat 17.3 lon 2.4 surf 3 press=808 hPa bfit=190 hPa (T) ep=133 hPa flag 43 qi1=79 qi2=99

p*=959 hPa orog=485 m bgRH=27% spd=38.6 m/s bias=37.5 m/s iob 140227

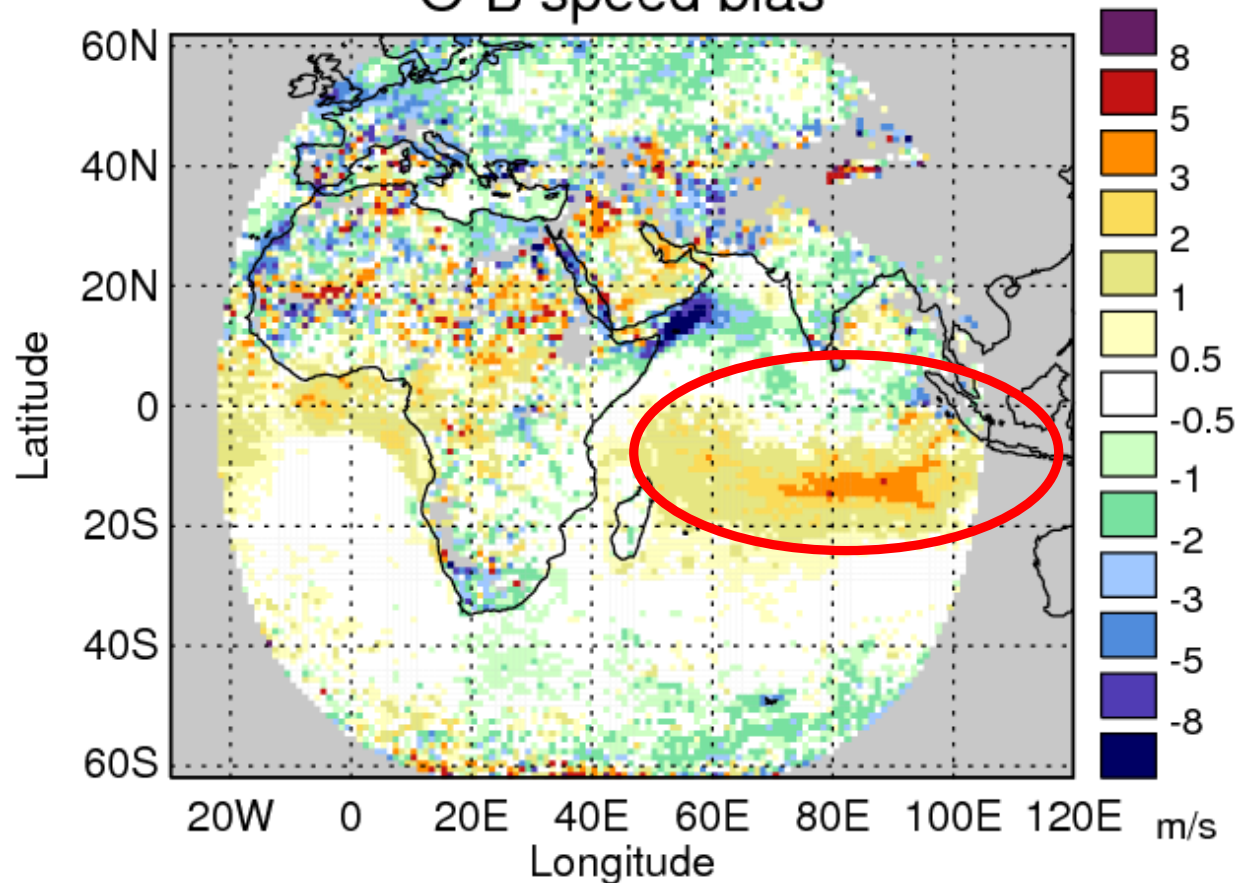


Meteosat-8 (IODC) Positive Speed Difference in the Tropics

Low-Level (heights below 700 hPa)

Feature 8.1

O-B speed bias

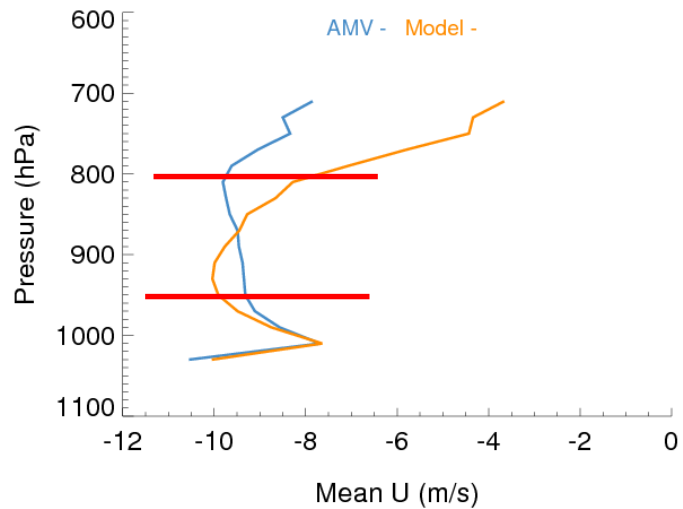


Feature Background:

Peaks June-August

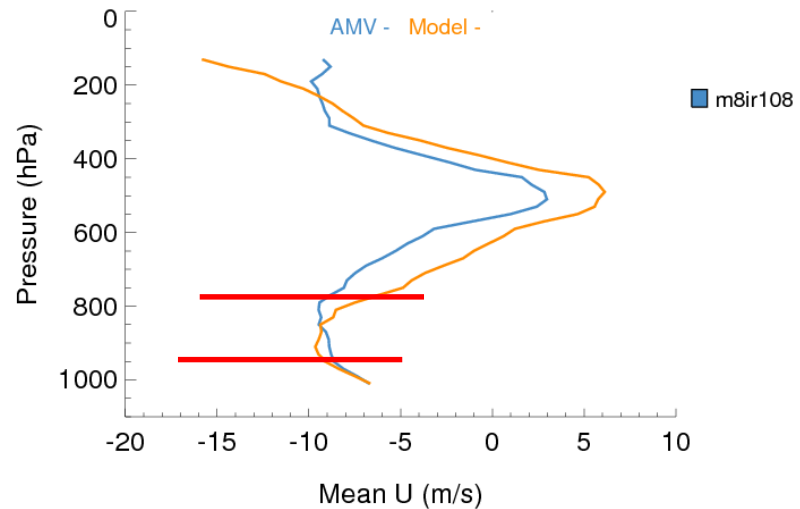
AMV minus best-fit pressure averages -100 hPa, suggesting AMVs assigned too high

AMV profile versus model

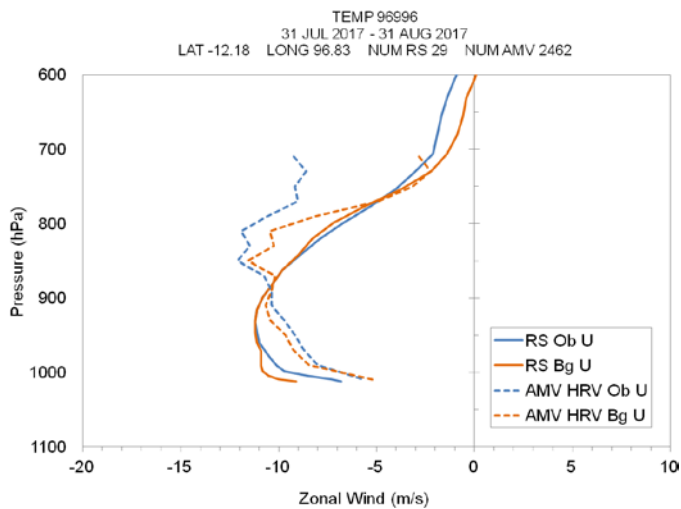
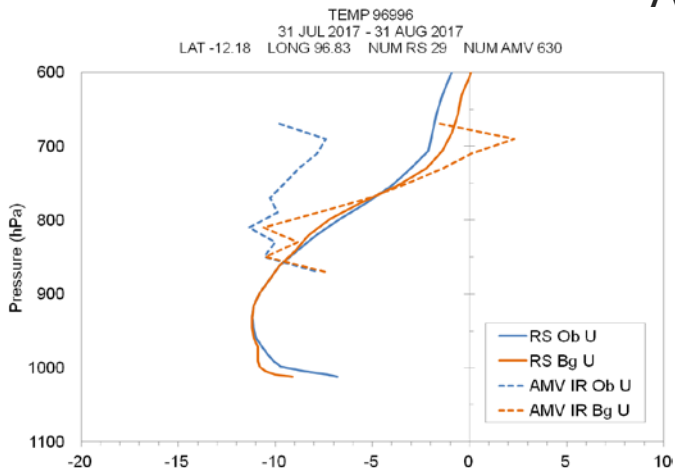


Lack wind shear
~800-950 hPa

(also seen versus
ECMWF model)



Cocos Islands



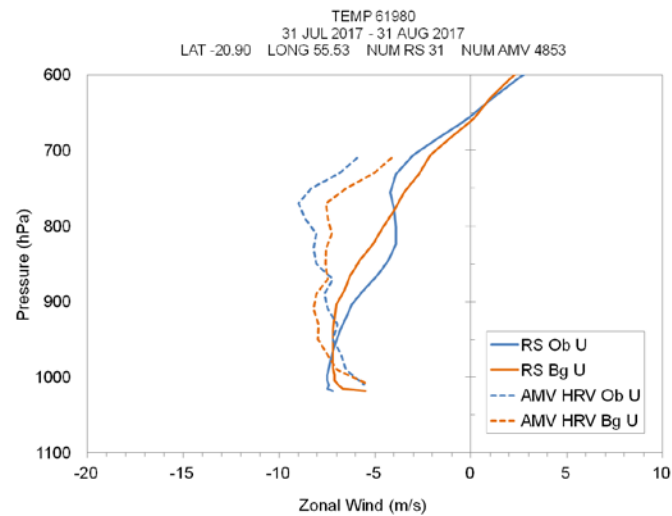
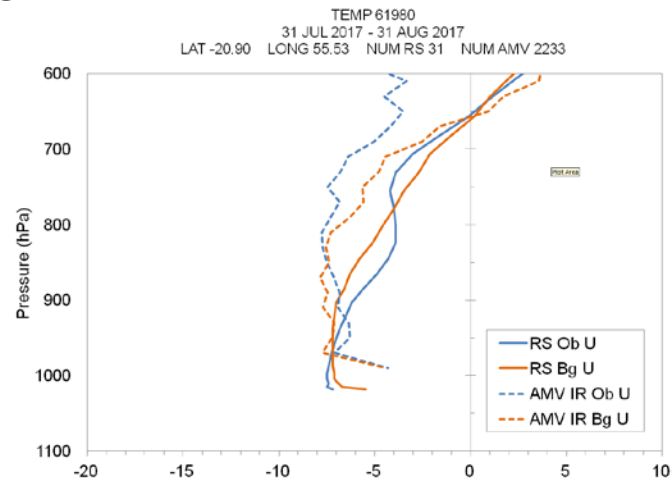
AMV profile versus sondes

Only 2 sites available in region of interest...

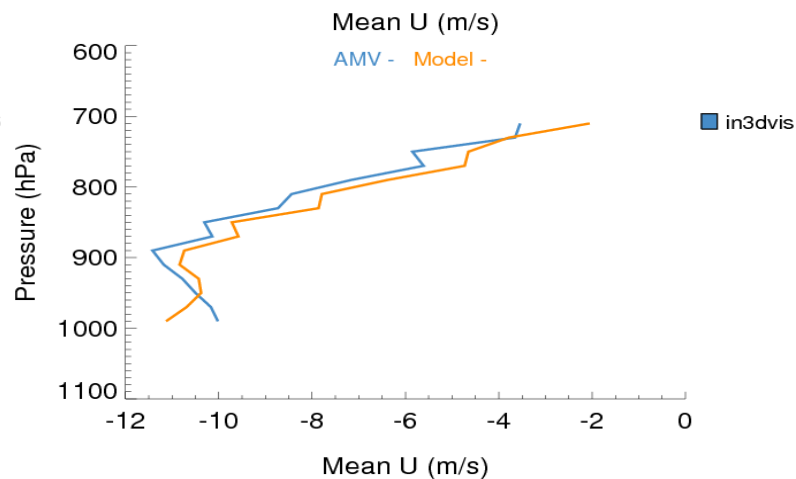
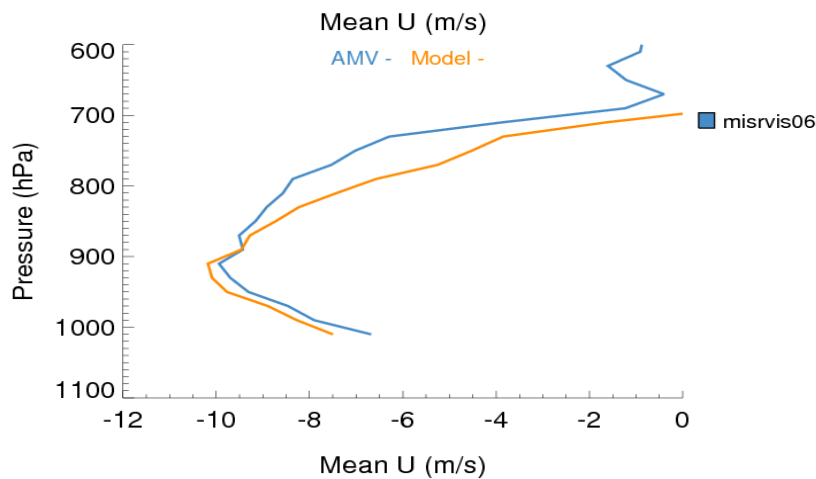
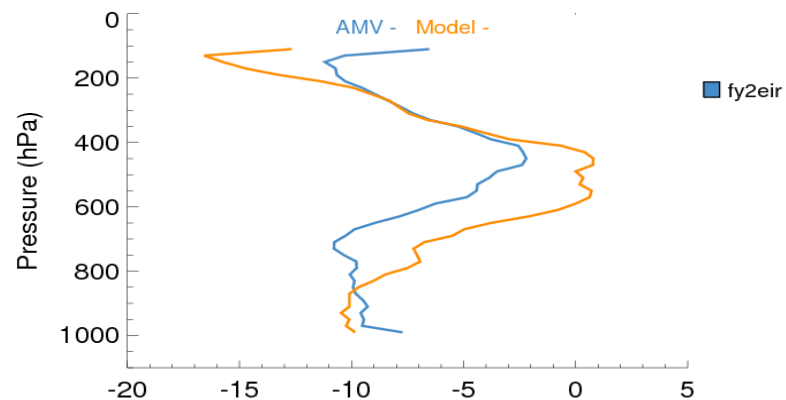
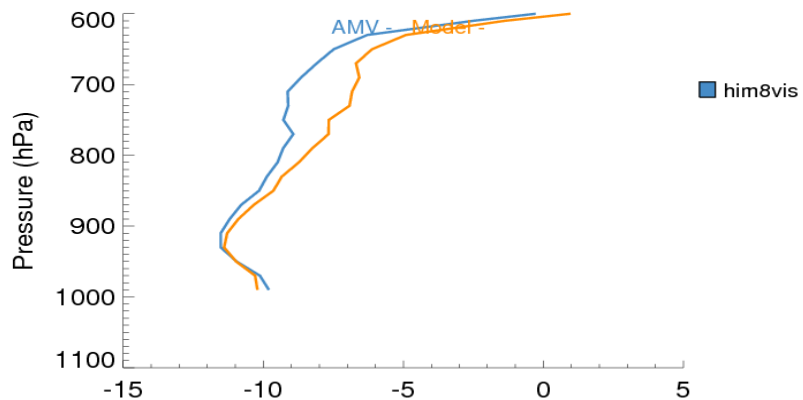
Saint Denis:
background profiles do not match

Cocos Islands:
lack of AMV wind shear 700-850 hPa

Saint Denis, Reunion



Other AMVs versus Met Office model



Any questions?