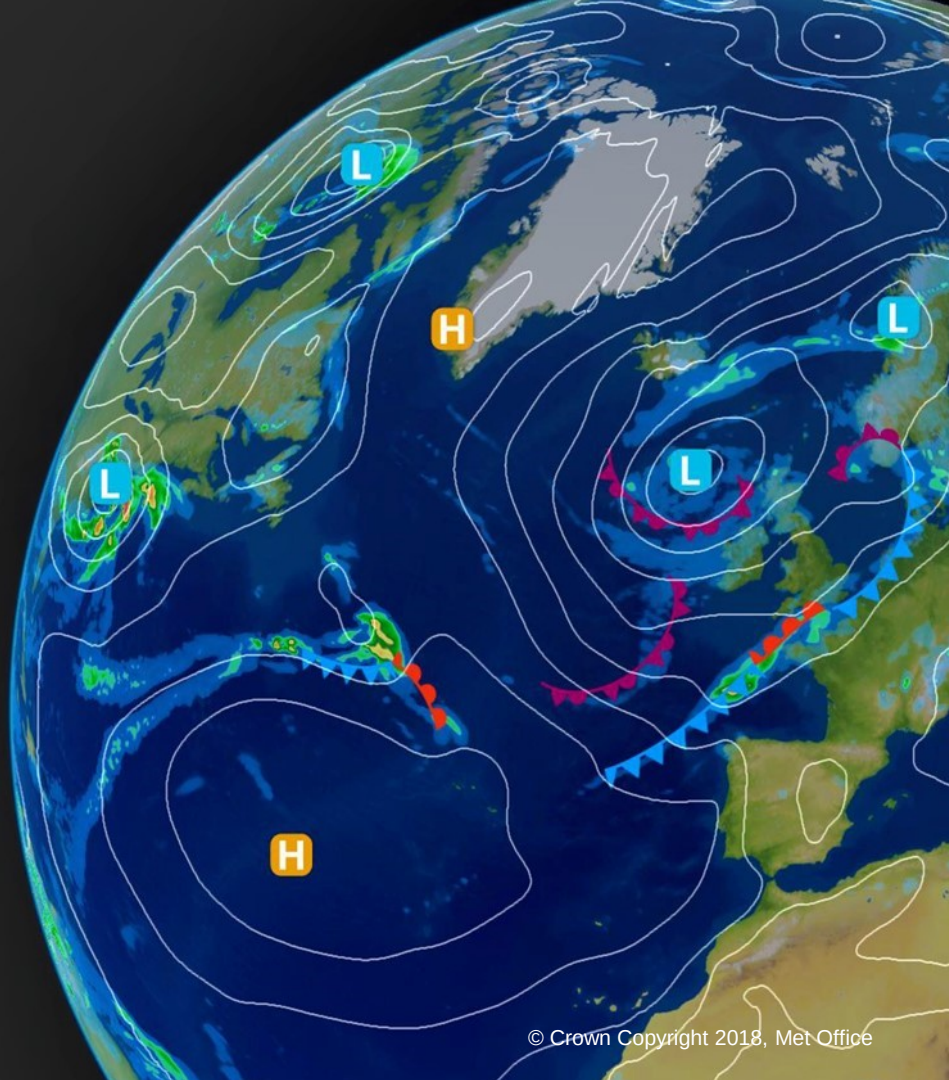
Studying AMV Errors With The NWP SAF Monitoring Web Site

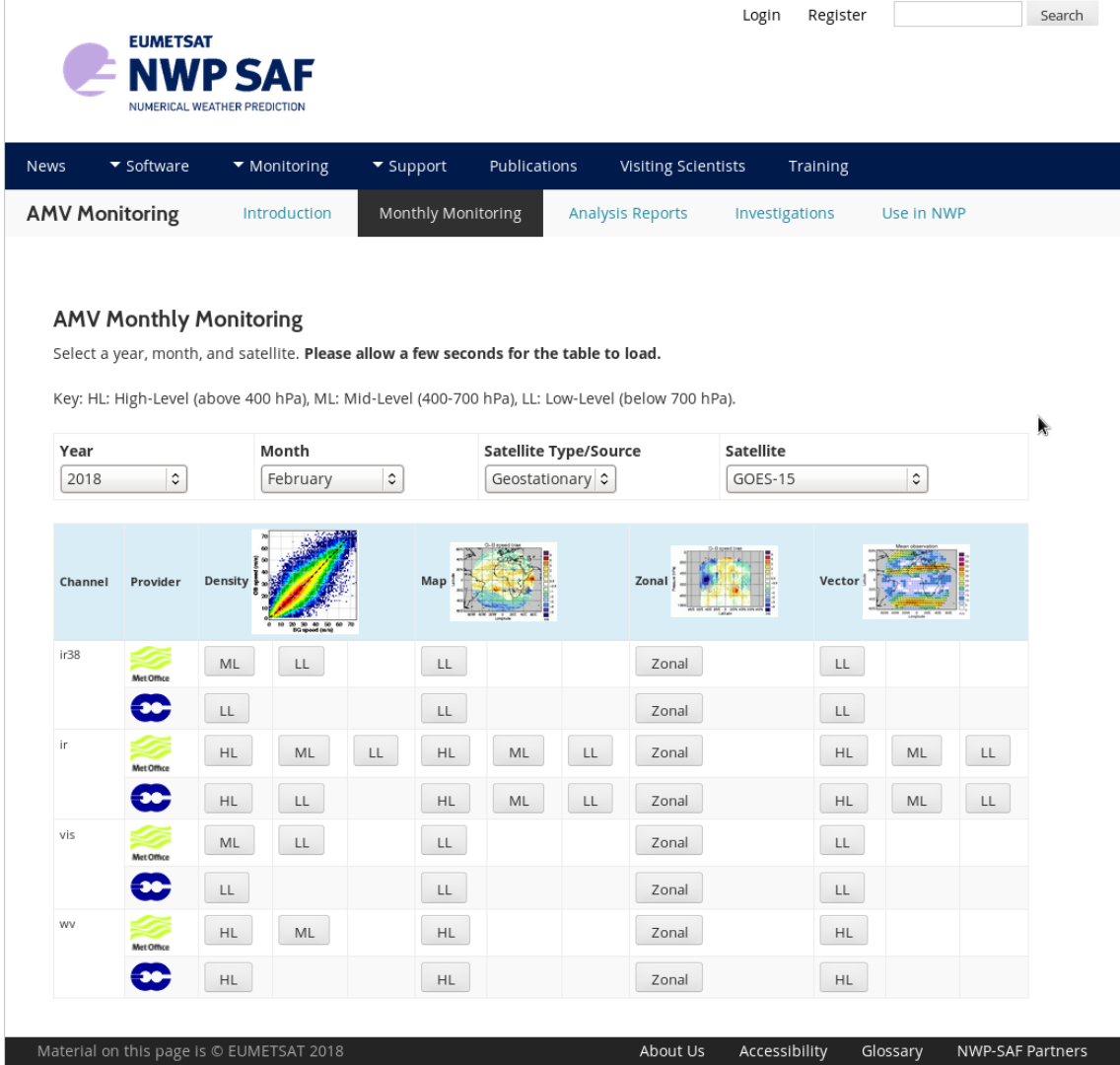
Francis Warrick, James Cotton



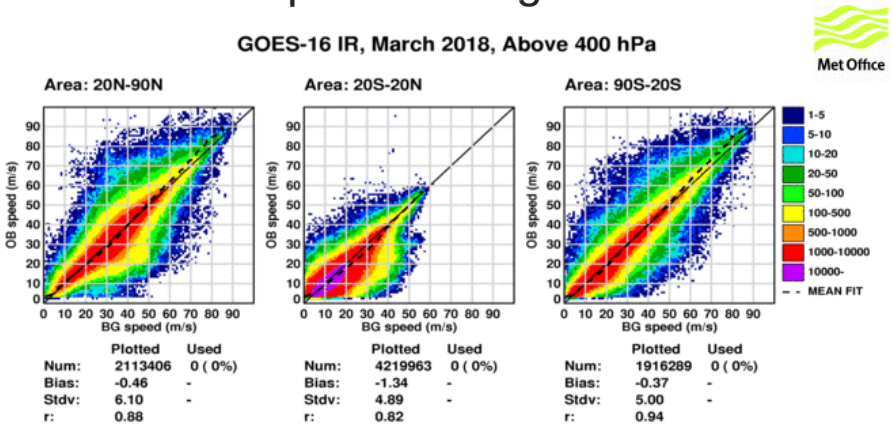
NWP SAF AMV Monitoring

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

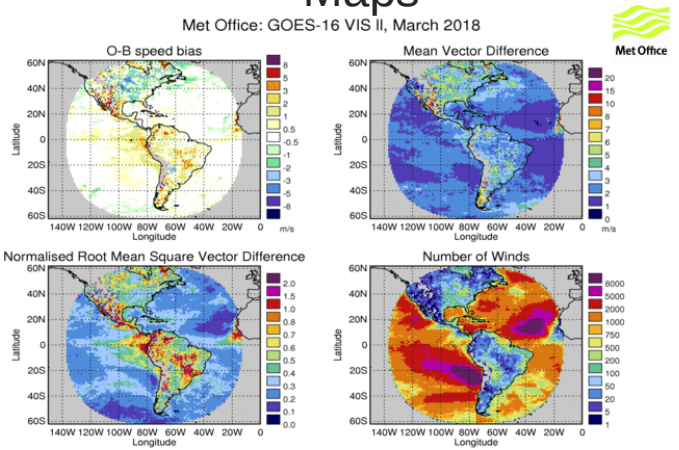
- AMV usage by NWP centre
- Monthly monitoring plots versus Met Office and ECMWF models
- Analysis reports every two years
- One-off investigations



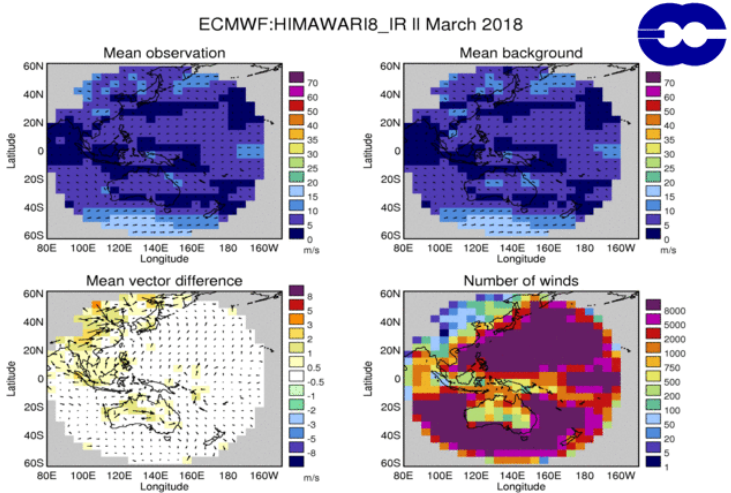
Speed Histograms



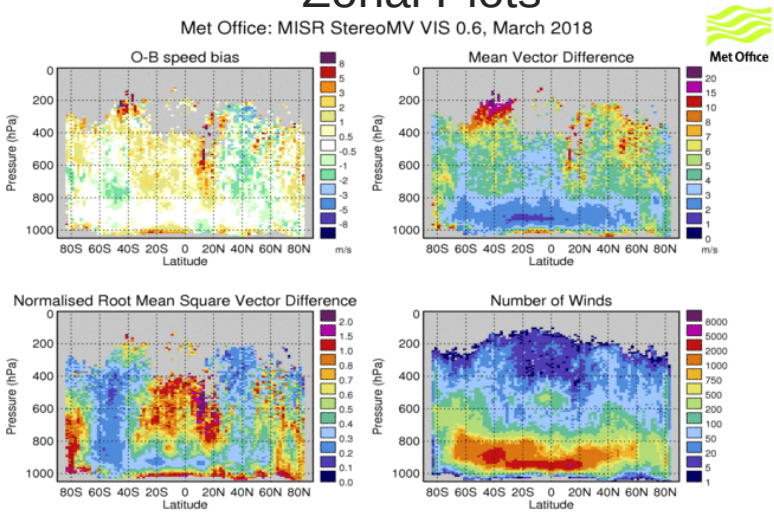
Maps



Maps with Wind Vectors



Zonal Plots

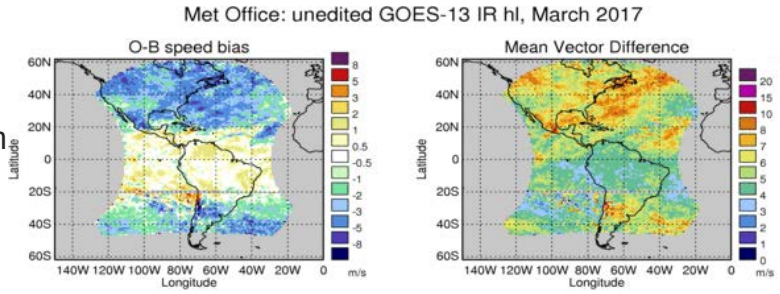


Jet Region Negative Speed Bias

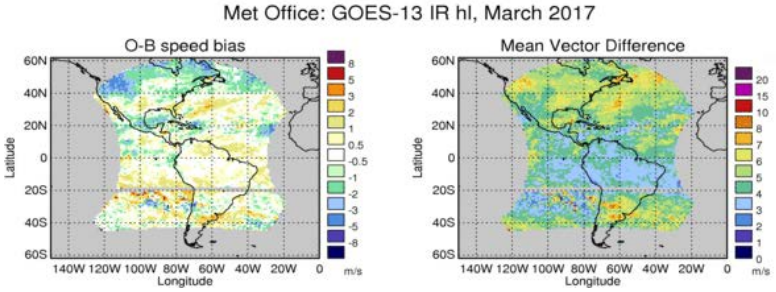
High–Level (heights above 400 hPa)

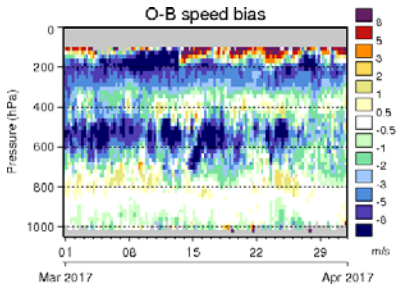
Feature 2.10

Heritage Algorithm (Un-edited)

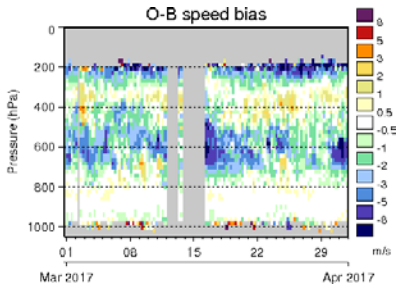


Nested Tracking

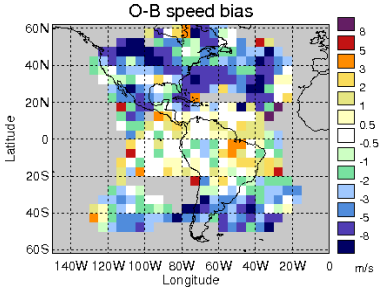


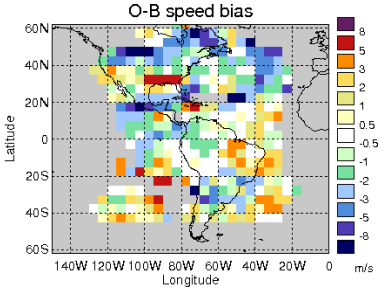


Heritage Algorithm (Un-edited)



Nested Tracking





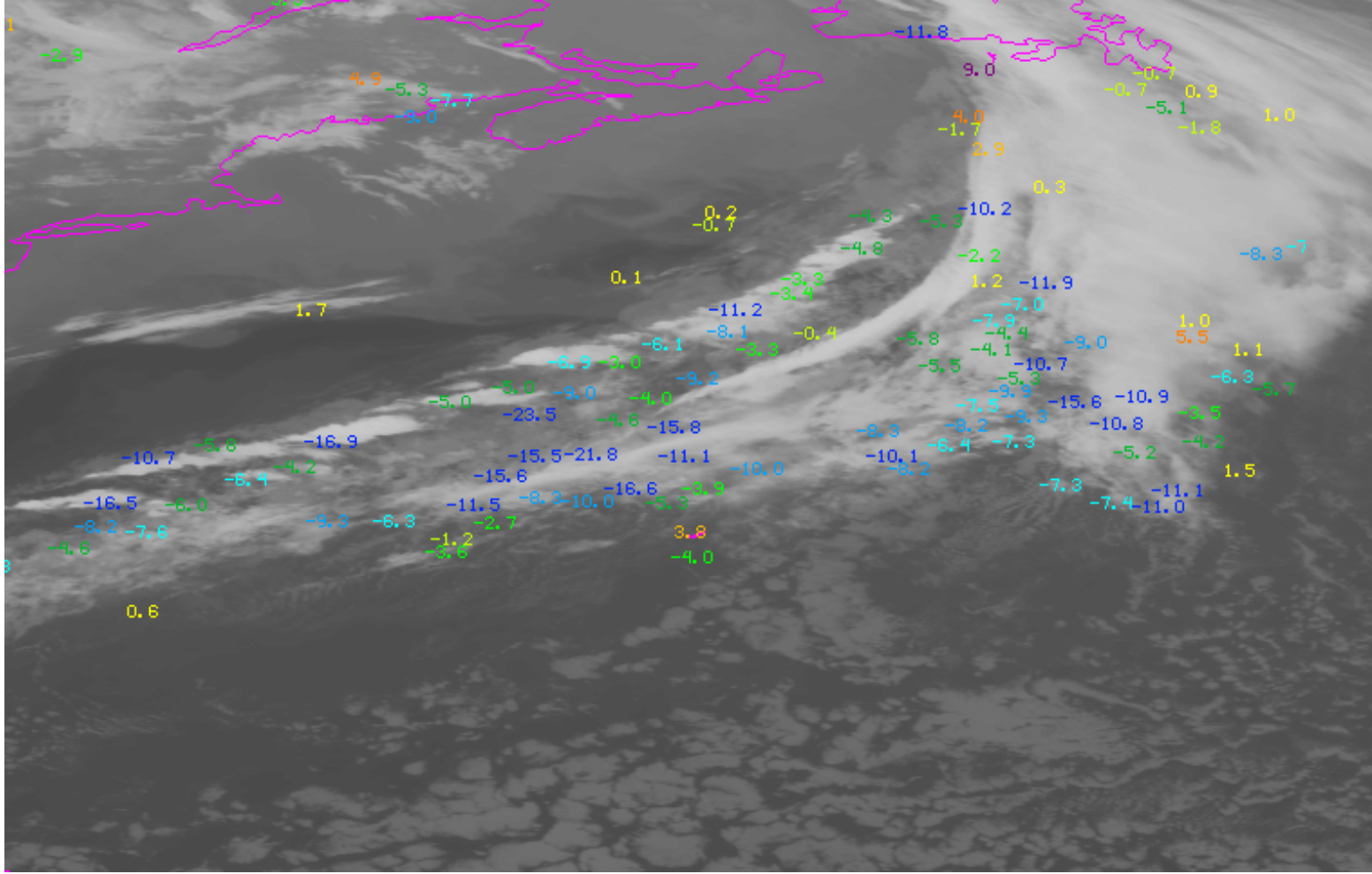
O-B Speed Differences

Heritage Algorithm
(Un-edited)

9th March 2017

0545 UTC

GOES-13 IR



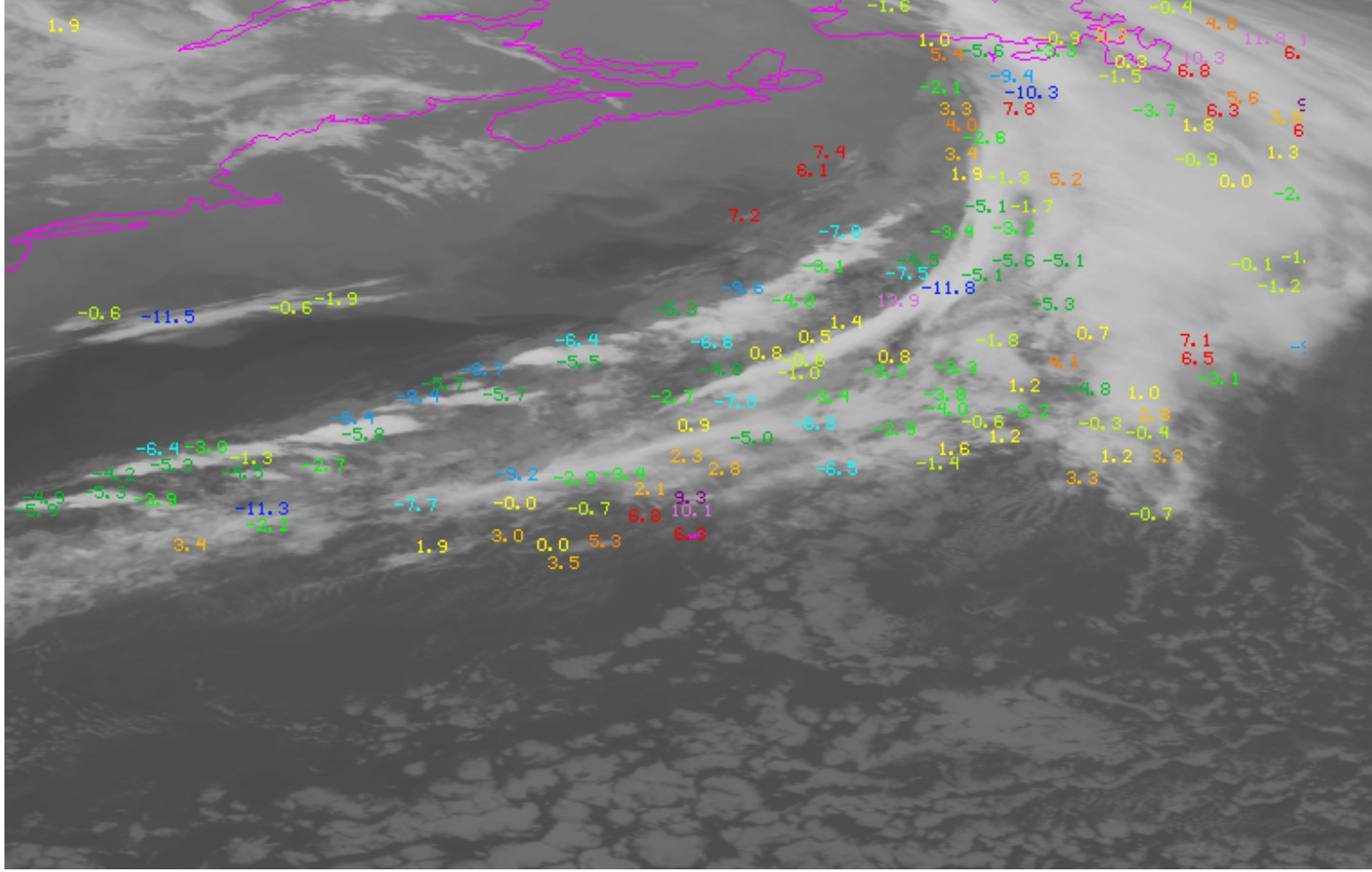
O-B Speed Differences

Nested Tracking

9th March 2017

0545 UTC

GOES-13 IR

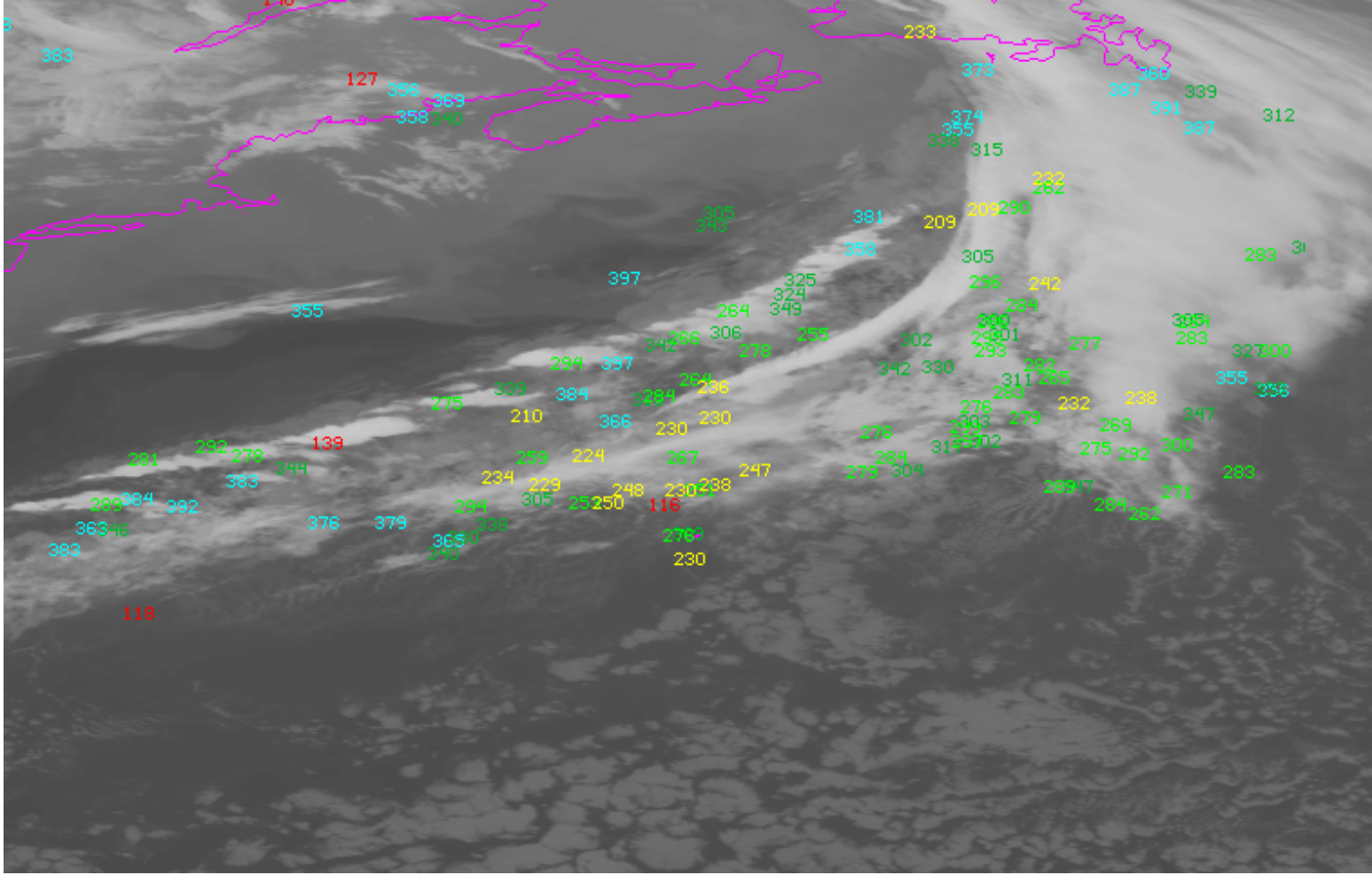


Heritage Algorithm
(Un-edited)

9th March 2017

0545 UTC

GOES-13 IR

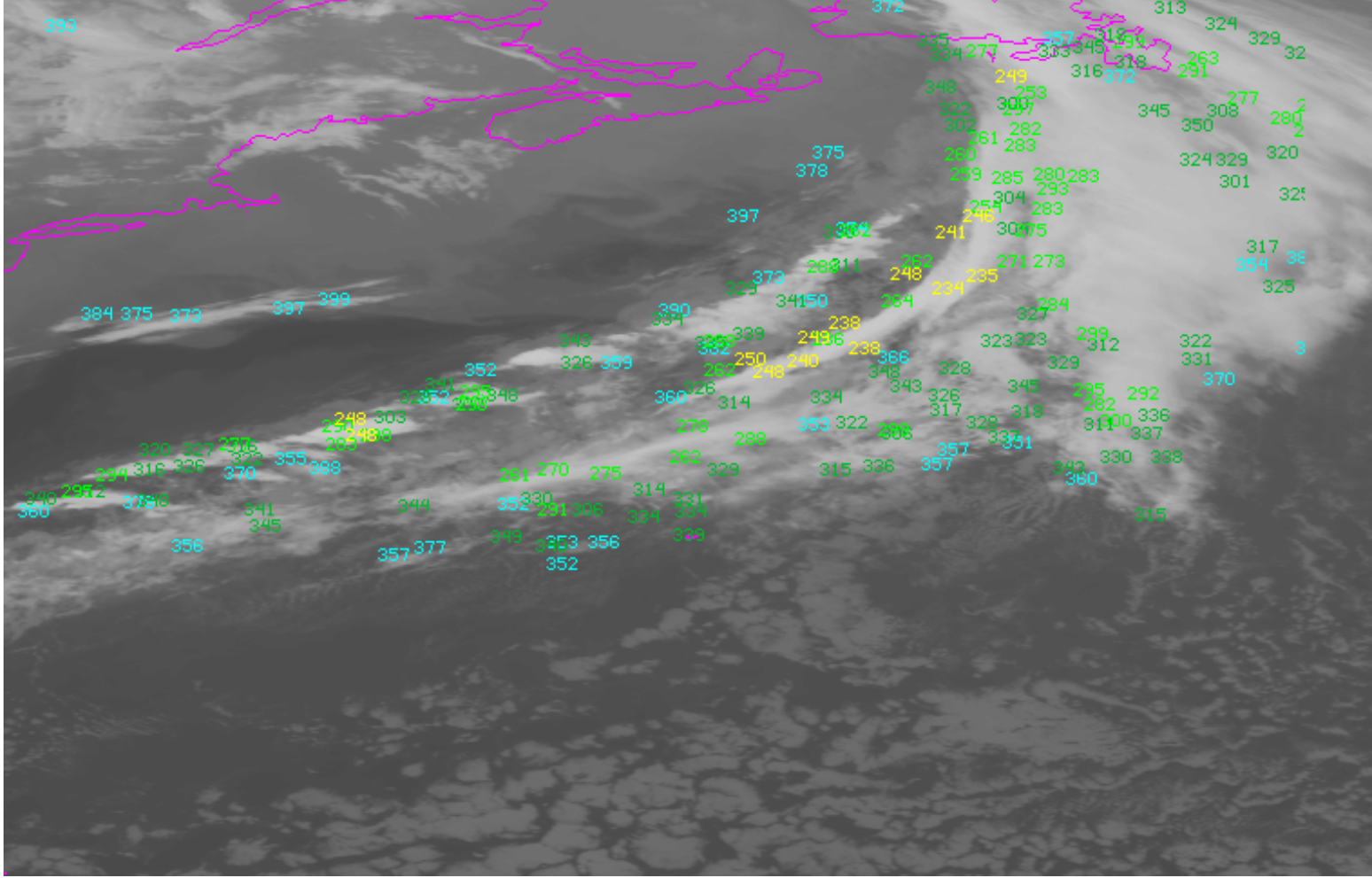


Nested Tracking

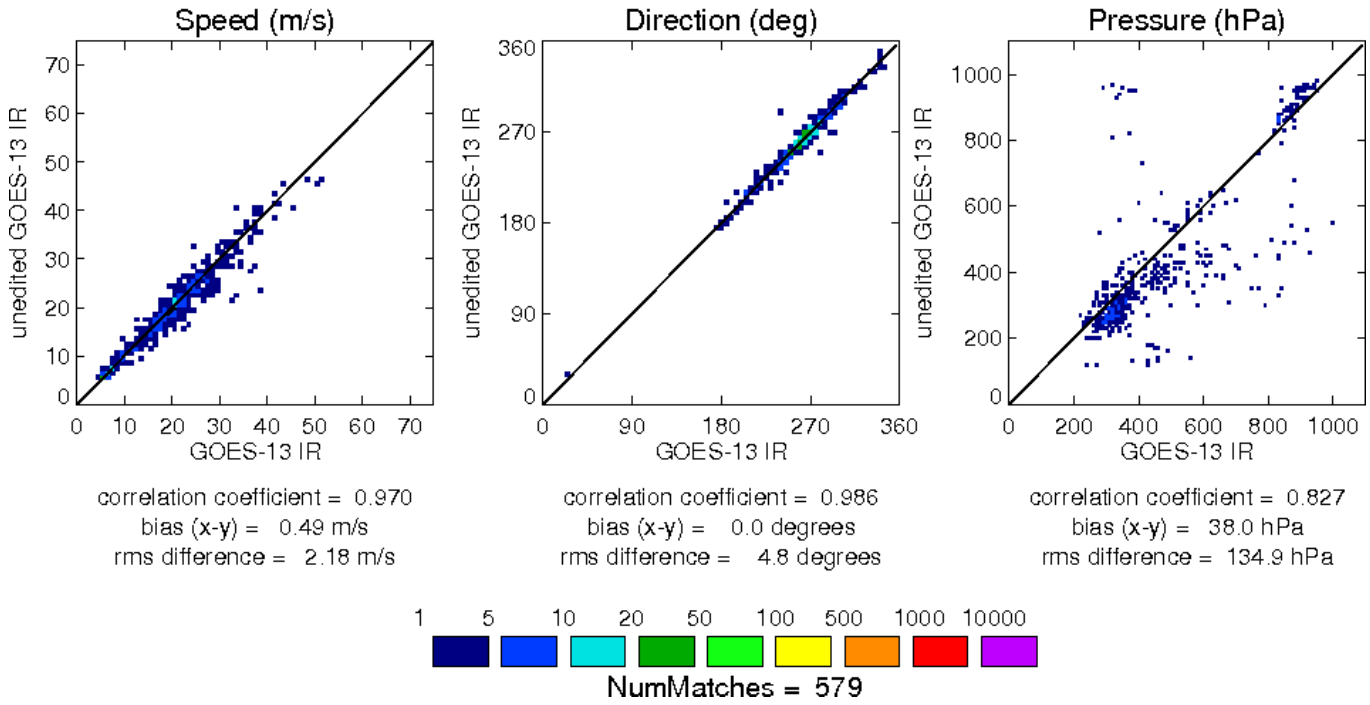
9th March 2017

0545 UTC

GOES-13 IR



Collocation Plots , March 2017



Co-located within 10km, 10 minutes.

9th March 2017 06Z cycle

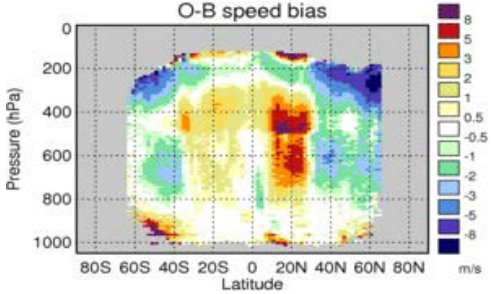
Positive Speed Bias in Tropics

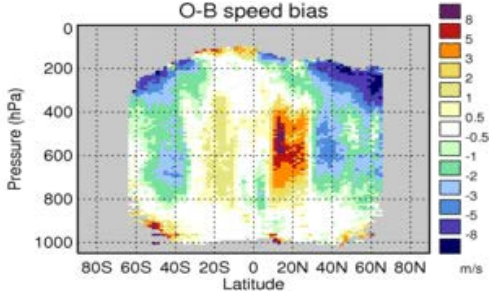
High–Level (heights above 400 hPa)

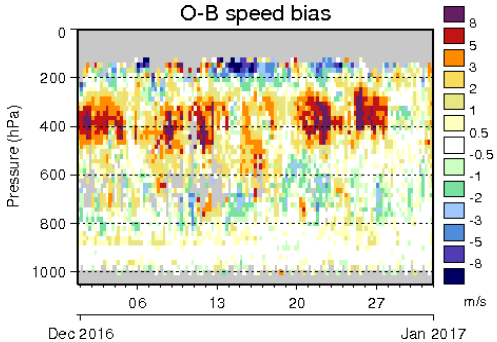
Feature 2.13

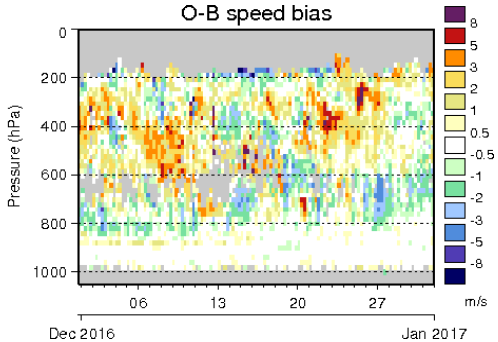
Operational Heights (CLA)

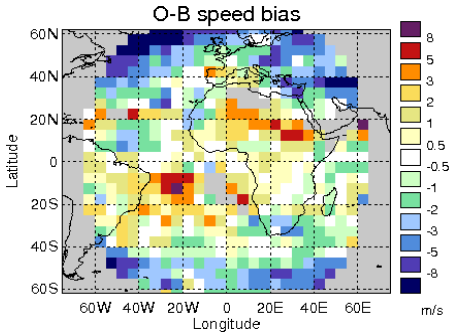
OCA

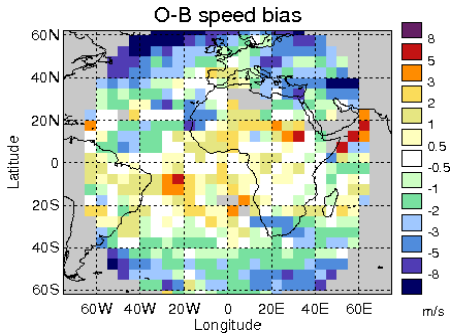












Infra-red 10.8 micron

December 2016

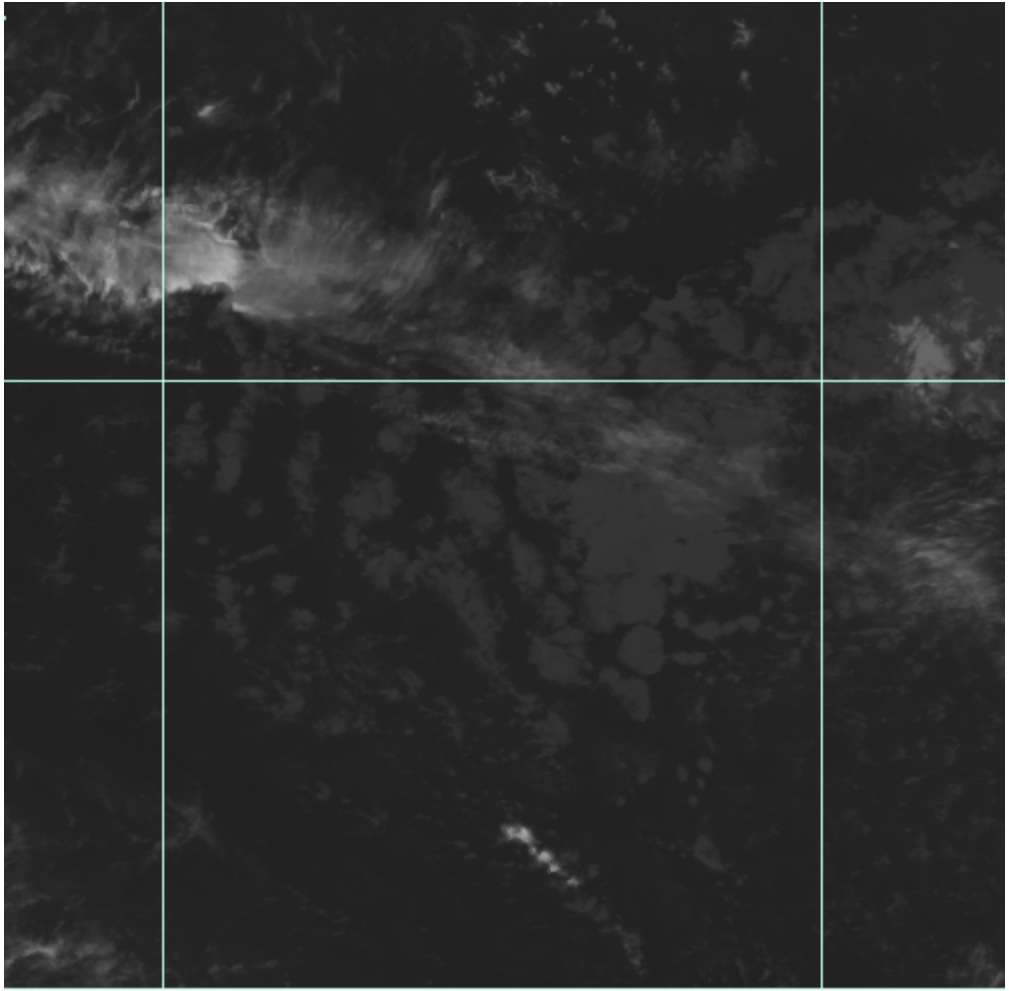
← Data over South Atlantic

← Heights above 400 hPa
24th-27th December

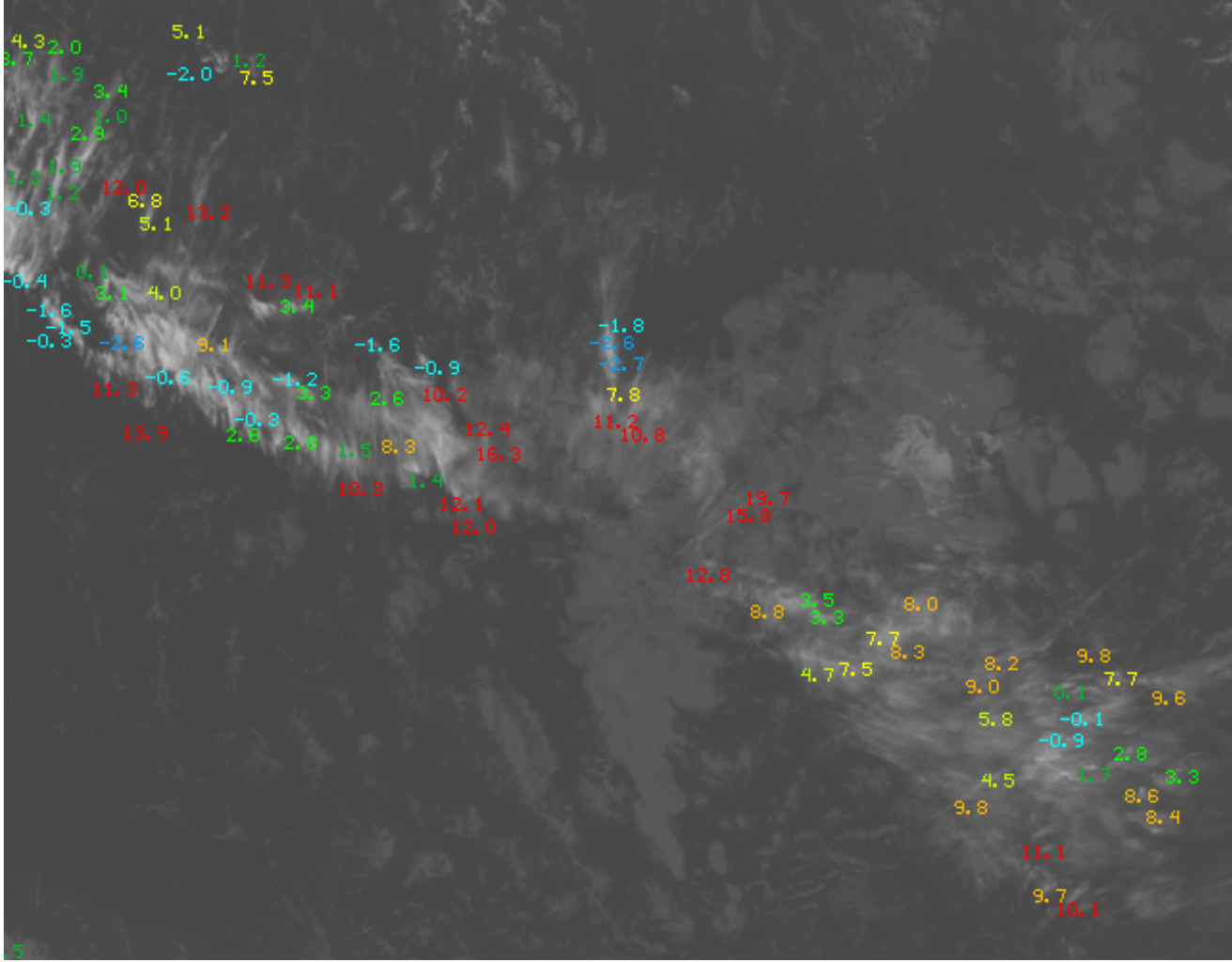
Meteosat-10 IR 10.8

26th December 2016

1500-2100 UTC (18Z cycle)



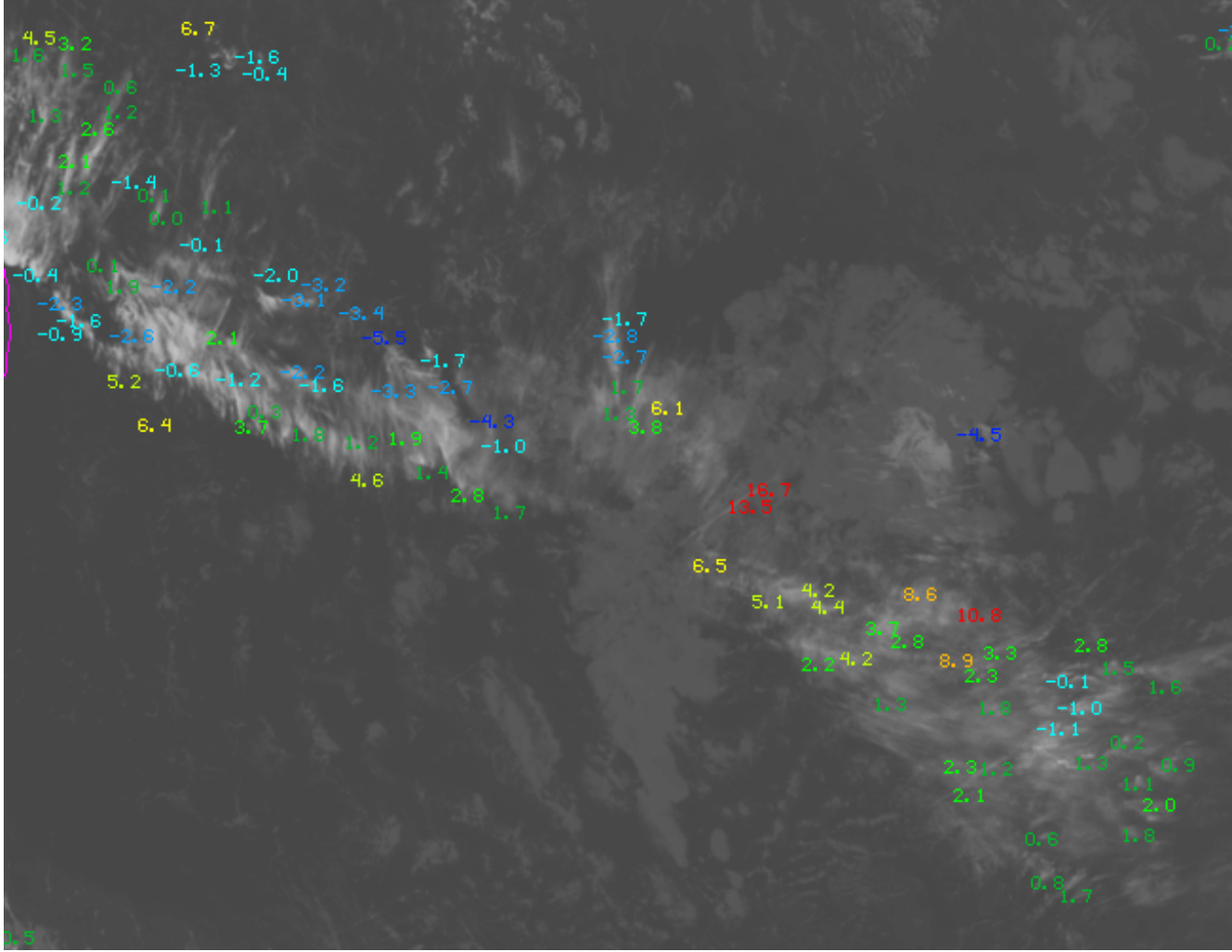
Operational Heights (CLA)



Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016

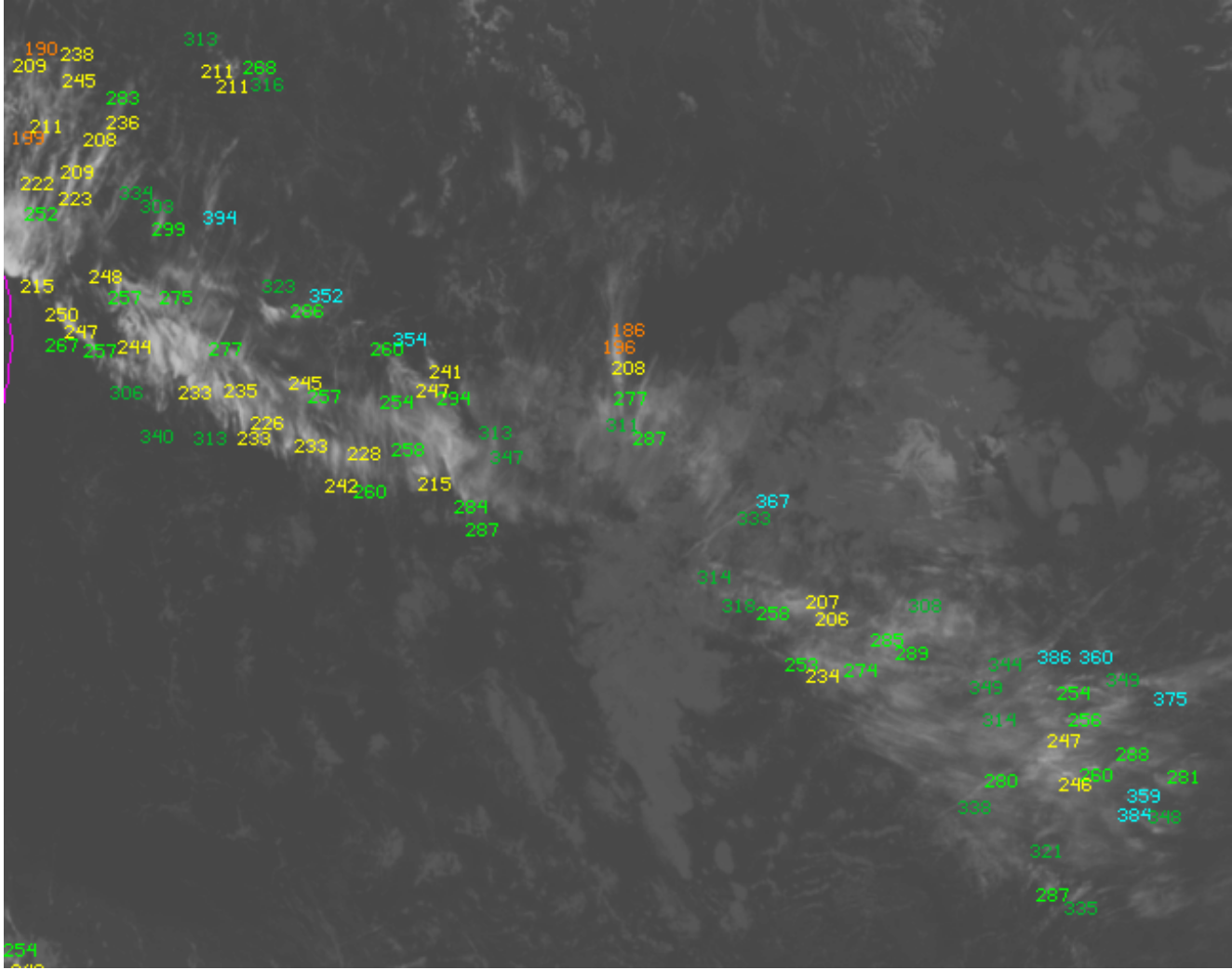
OCA



Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016

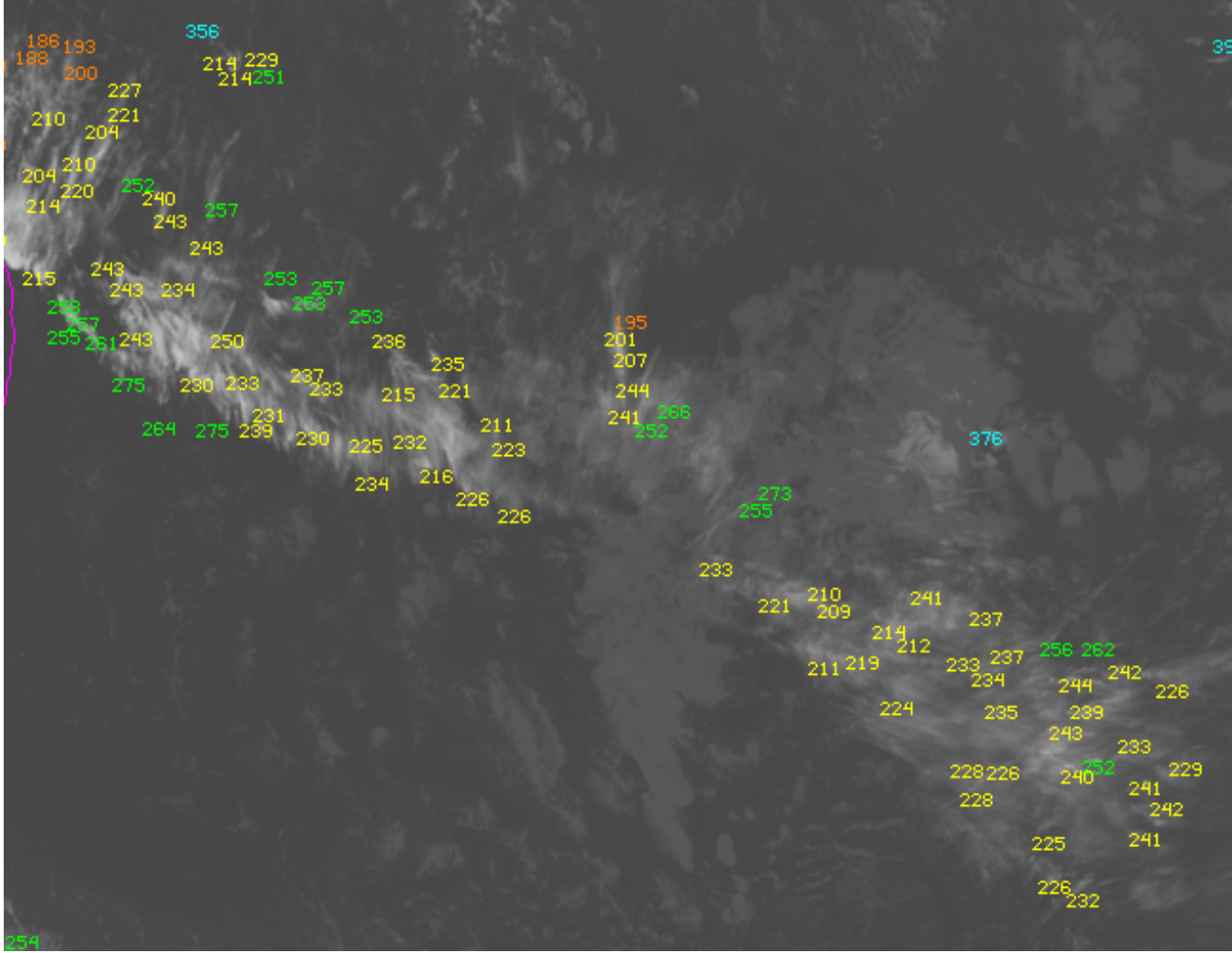
Operational Heights (CLA)



Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016

OCA

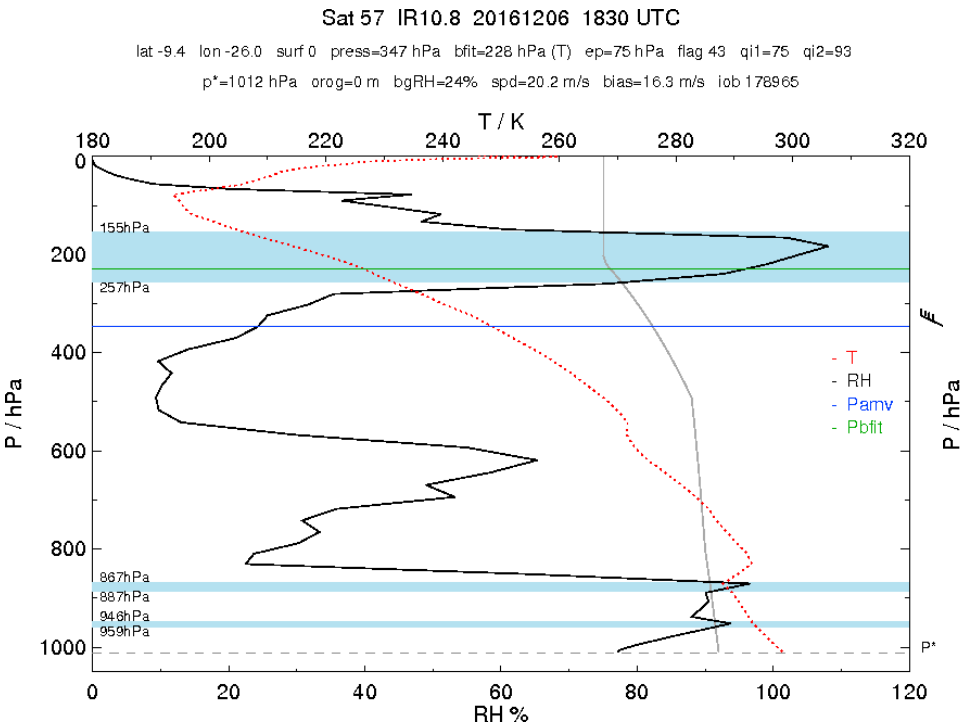


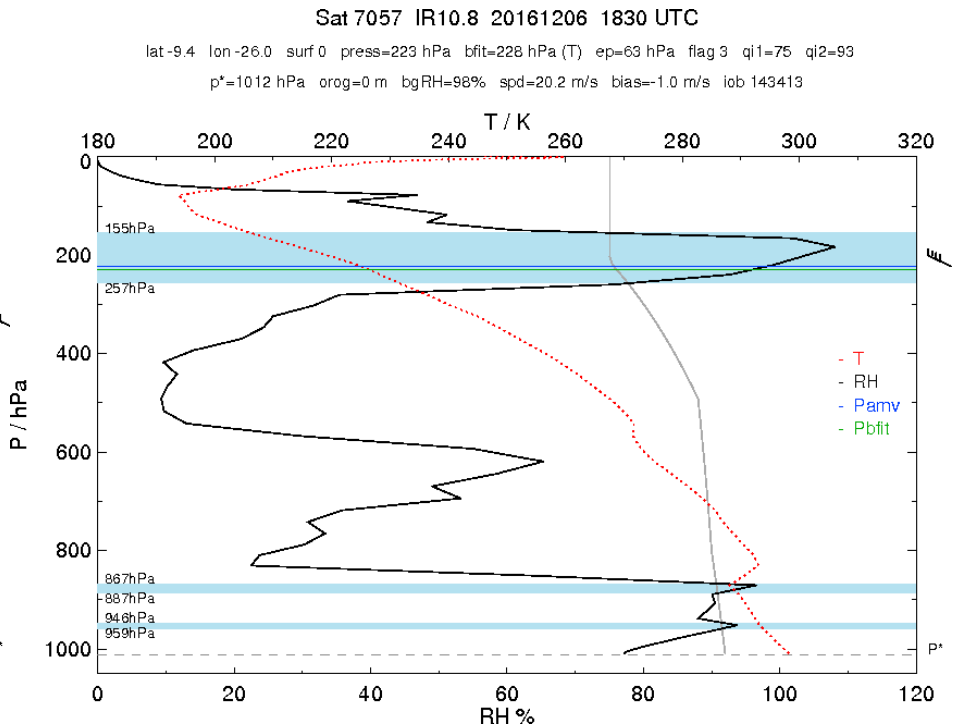
Meteosat-10 infra-red 10.8 micron

1815 UTC
26/12/2016

Operational Heights (CLA)

OCA





MSG Positive Bias over North Africa

Low–Level (heights below 700 hPa)

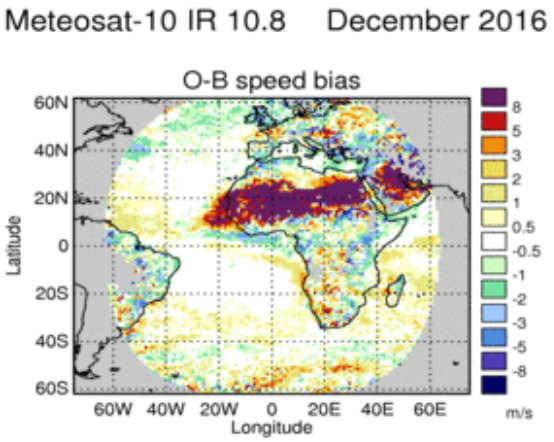
Feature 2.6

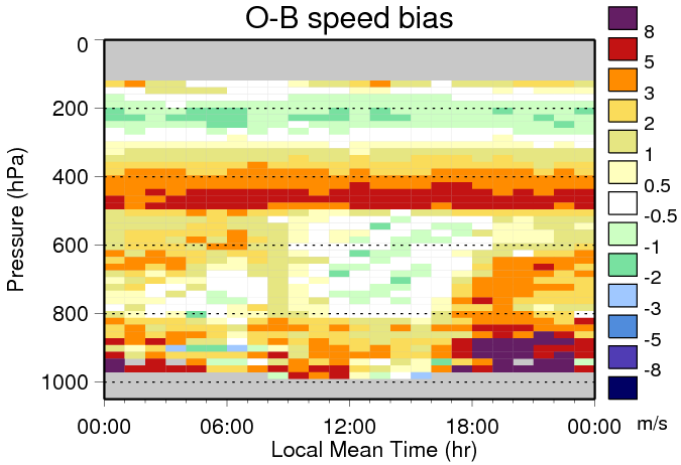
- Seen in MSG visible and infra-red over desert

- Worse in winter (position of jet)

- Linked with cirrus & semi-transparent cloud

Below 700 hPa

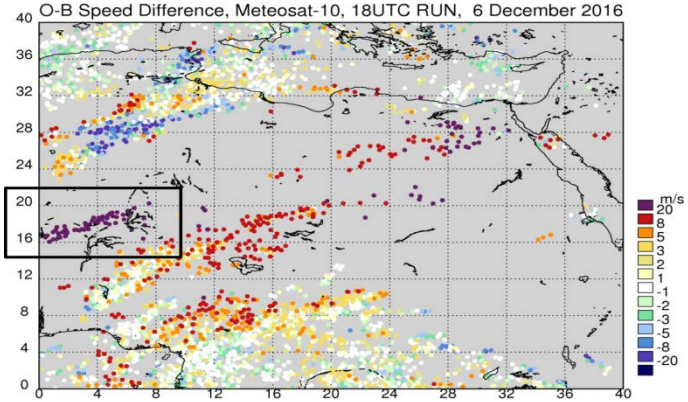


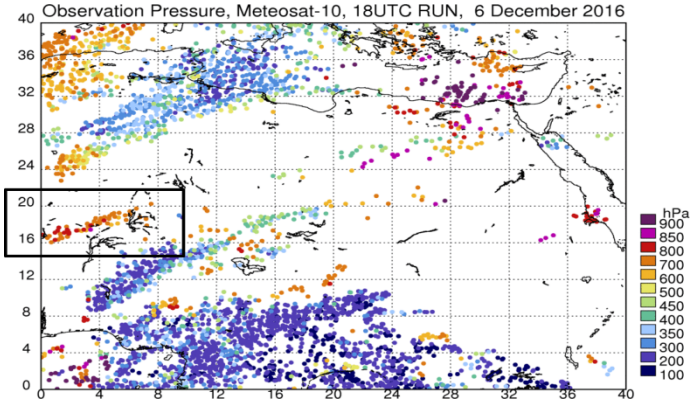


Meteosat-10 IR 10.8

Sahara

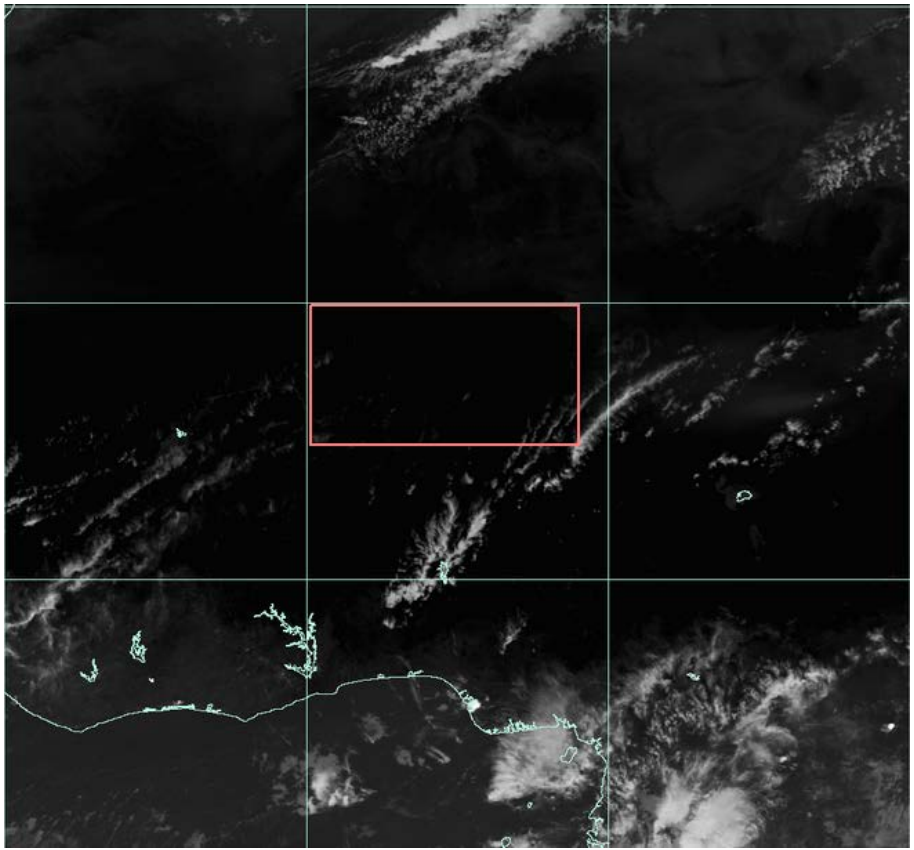
December 2016

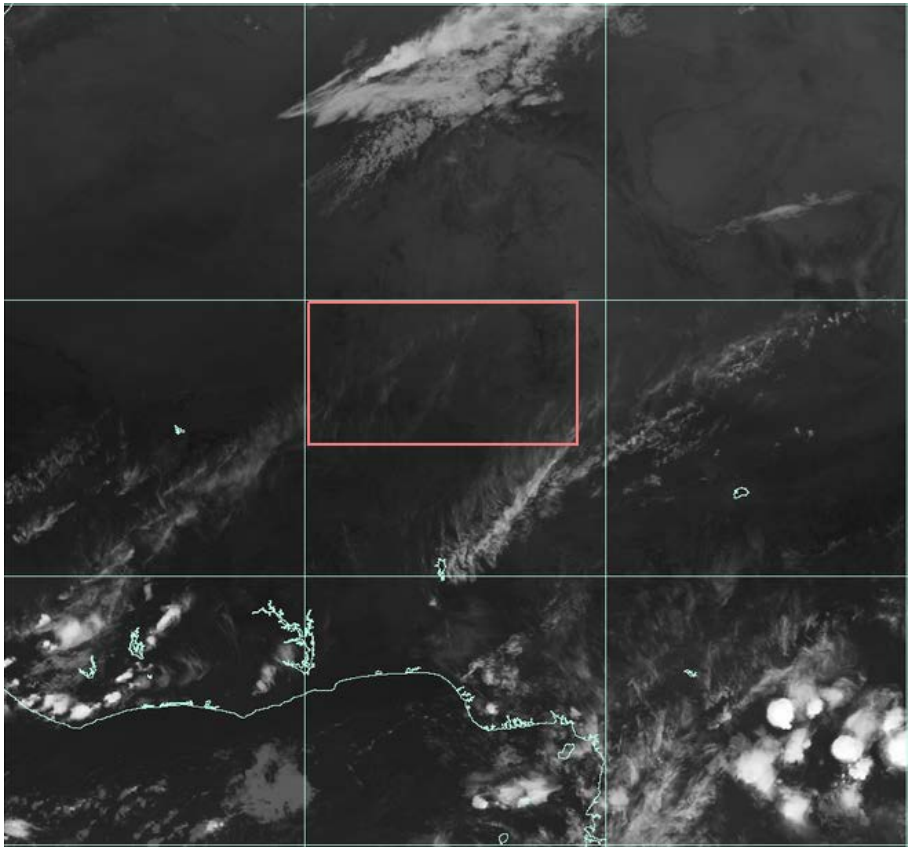




Why is this feature only present in the 18Z cycle, and not the 00, 06 and 12Z cycles?

Faint cloud is moving north-east ward



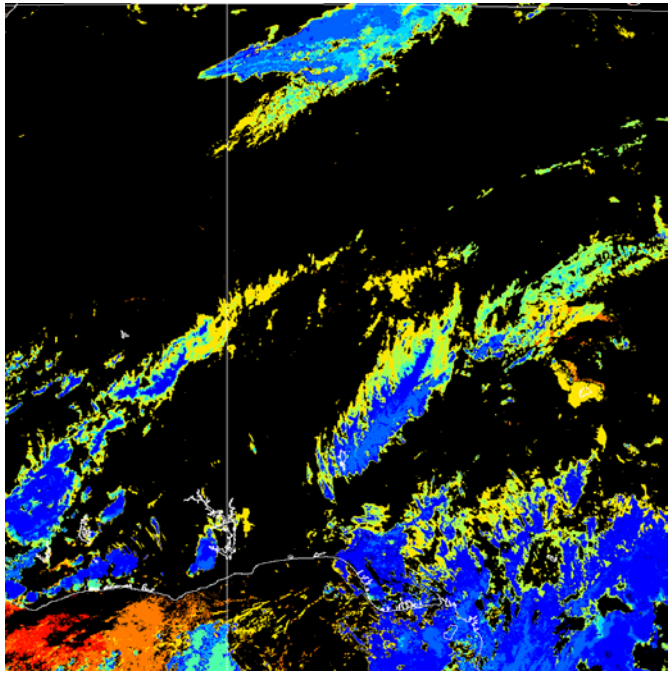


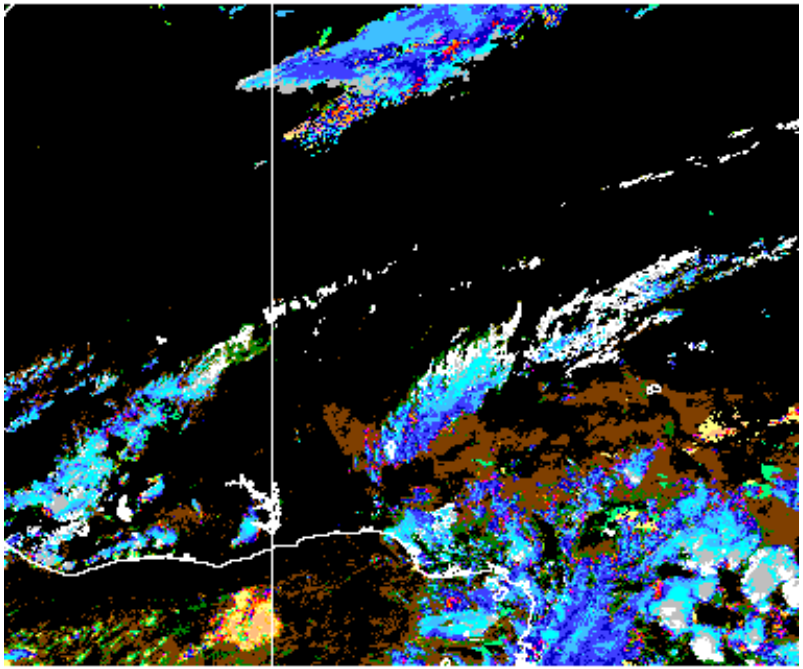
Cloud Top Pressure (hPa)

1125
1000
875
750
625
500
375
250
125
0

OCA

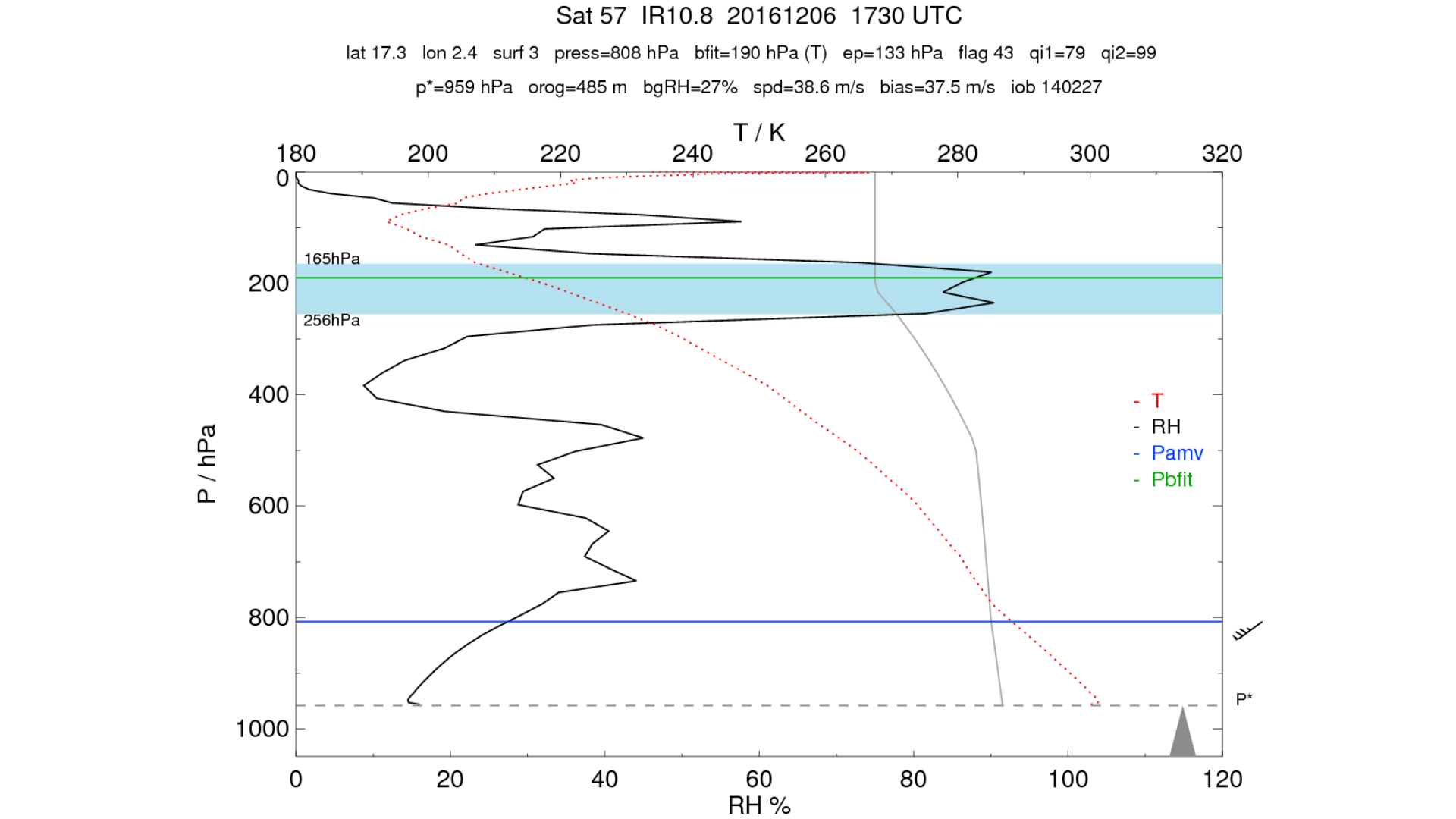
Met Office Cloud Product





Temperature °C

20
15
10
5
0
−3
−6
−9
−12
−15
−18
−29
−40
−51
−62
−73

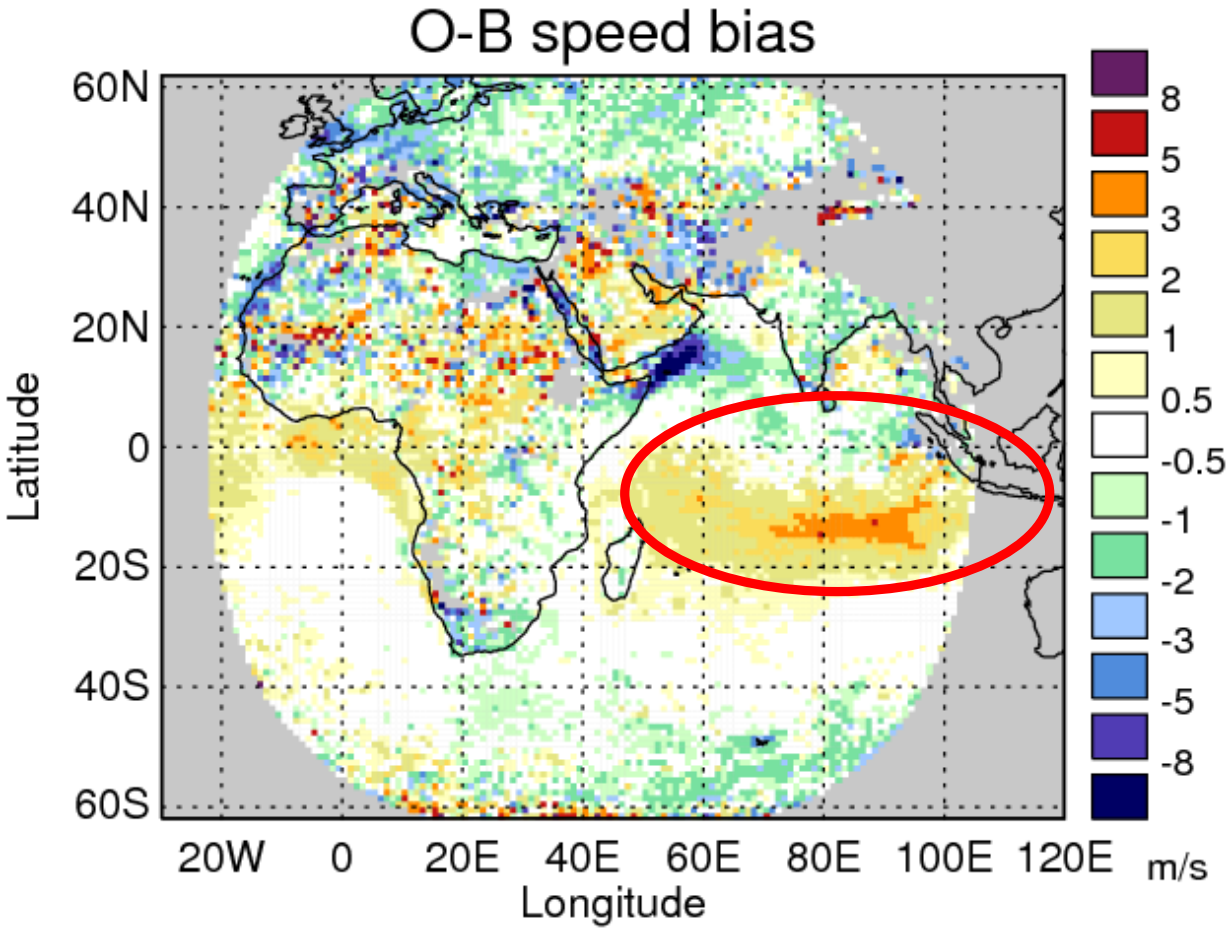

Sat 57 IR10.8 20161206 1730 UTC
lat 17.3 lon 2.4 surf 3 press=808 hPa bfit=190 hPa (T) ep=133 hPa flag 43 qi1=79 qi2=99
p*=959 hPa orog=485 m bgRH=27% spd=38.6 m/s bias=37.5 m/s iob 140227
T / K
180
200
220
240
260
280
300
320
0
165hPa
200
256hPa
400
600
800
1000
P / hPa
- T
- RH
- Pamv
- Pbfit
P*
0
20
40
60
80
100
120
RH %

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

Low–Level (heights below 700 hPa)

Feature 8.1

Meteosat-8, visible 0.8 micron channel, August 2017

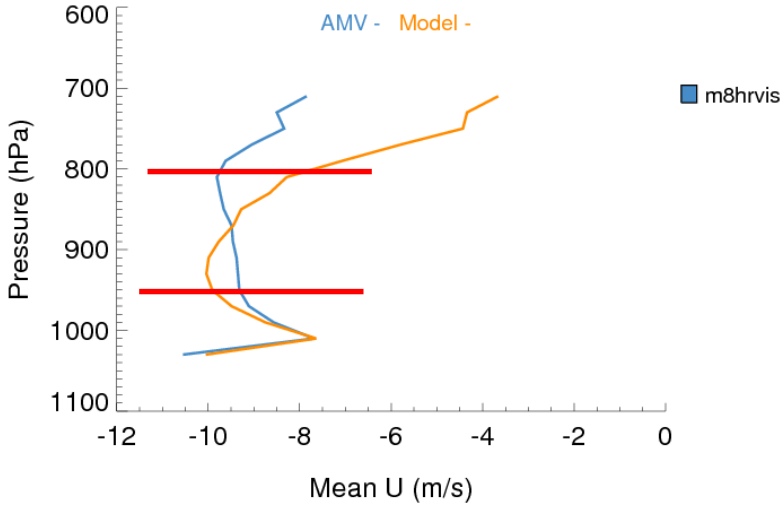


Feature Background:

Peaks June-August

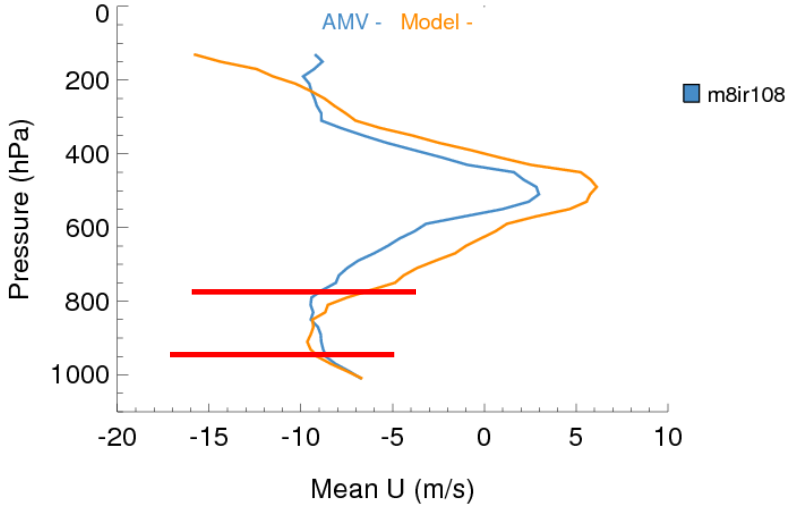
AMV minus best-fit pressure averages -100 hPa, suggesting AMVs assigned too high

AMV profile versus model



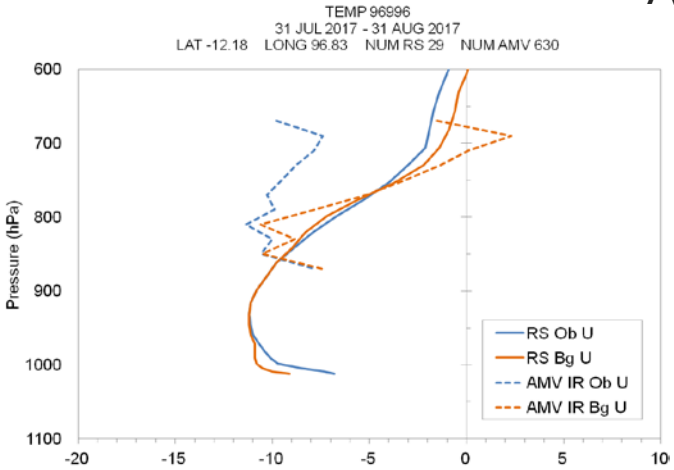
Lack wind shear ~800-950 hPa

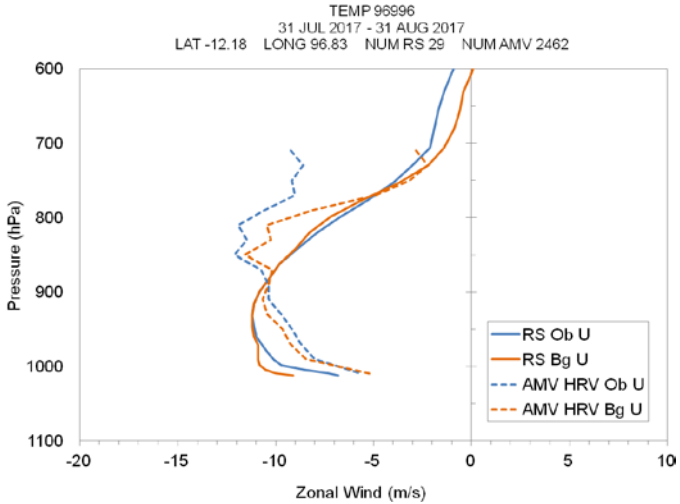
(also seen versus ECMWF model)



AMV profile versus sondes

Cocos Islands



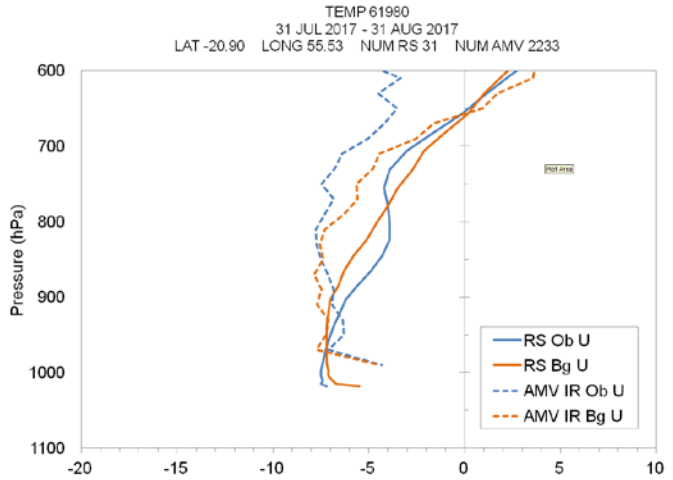


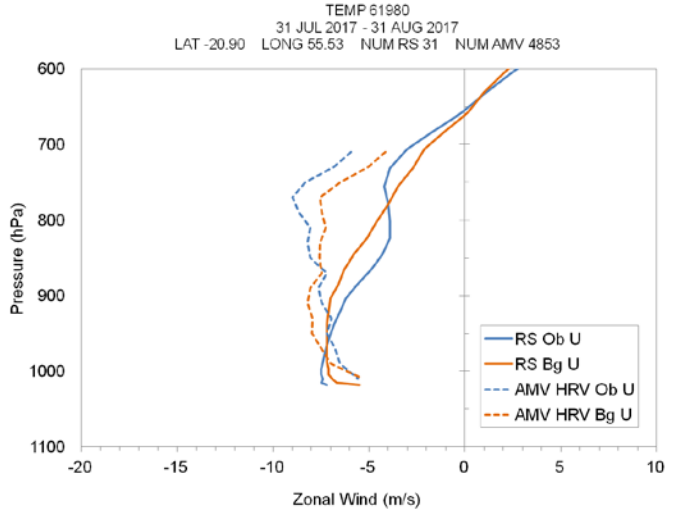
Only 2 sites available in region of interest…

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