Scatterometer Winds at ECMWF: Operational Status and Research Activities
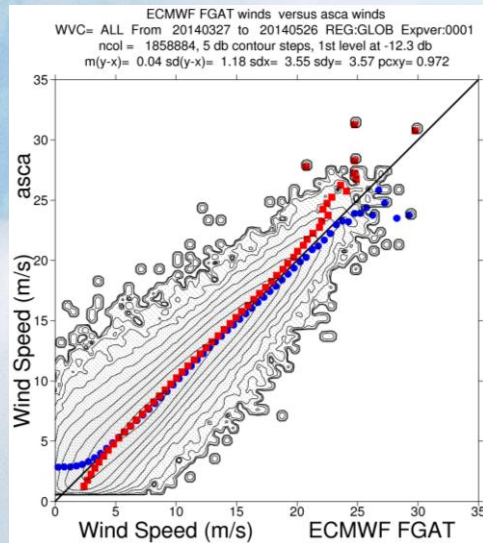
Giovanna De Chiara,
Jean Bidlot Peter, Janssen, Stephen English

Operational Status
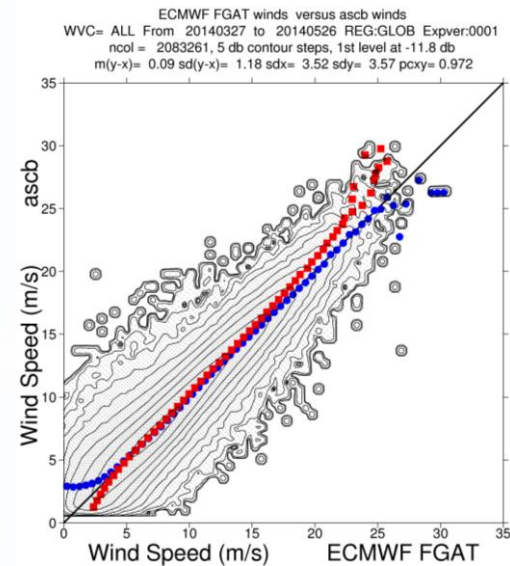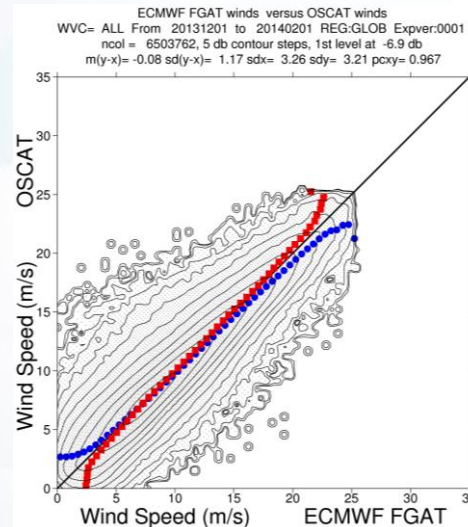
ASCAT-A operational since June 2007

ASCAT-B operational since July 2013

OSCAT Dec 2012 – Feb 2014

ASCAT impact study

Observing System Experiments in different GOS configuration

✓ **Full System:**
  copy of the Operational System

✓ **Starved System:**
  Full System without
  - **Geostationary Satellites**
  - **MW Imagers (AMSR-E/TMI/SSMIS)**
  - **AMVs**

✓ **Starved+ System:**
  Starved System without AMSU-A

Impact assessment through:
- **Forecast scores**
- **Verification against Altimeter winds**
- **Verification against buoy data**
- **Fit to scat observations**
- **Forecast Sensitivity to Observations**

Label	ASCAT-A	ASCAT-B	OSCAT
ALL in	Y	Y	Y
A-O	Y	N	Y
B-O	N	Y	Y
O	N	N	Y
Den	N	N	N

Experiments set-up
- T511 (~ 40km)
- CY38R1
- 17 Dec 2012 – 28 Feb 2013
- Use of Ocean Currents (Mercator)
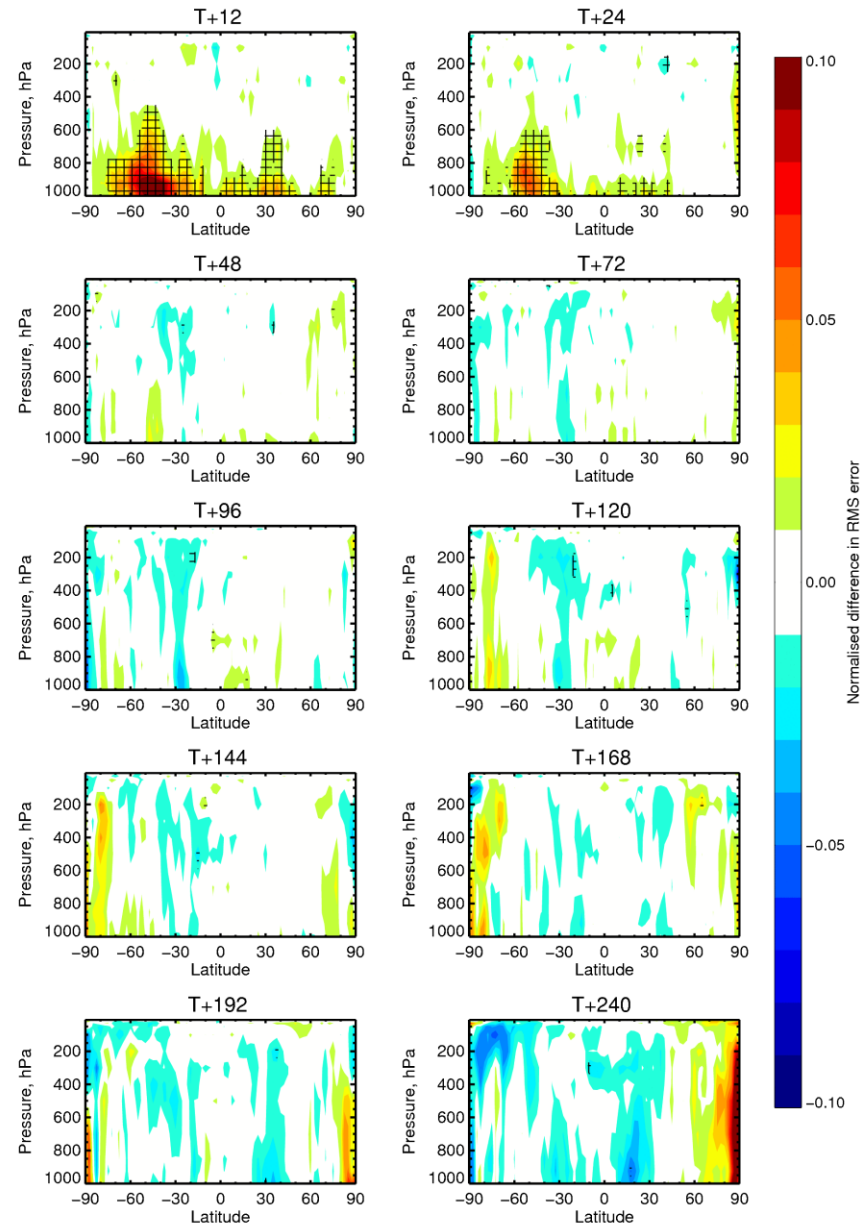
ECMWF

Forecast Verification – Full System

ALL in (A/B/O) - A/O

Vector Wind RMS forecast error

Verified against own analysis

RMS forecast errors in VW(fumf–fumg), 17–Dec–2012 to 28–Feb–2013, from 64 to 74 samples.
Point confidence 99.8% to give multiple–comparison adjusted confidence 95%. Verified against own–analysis.
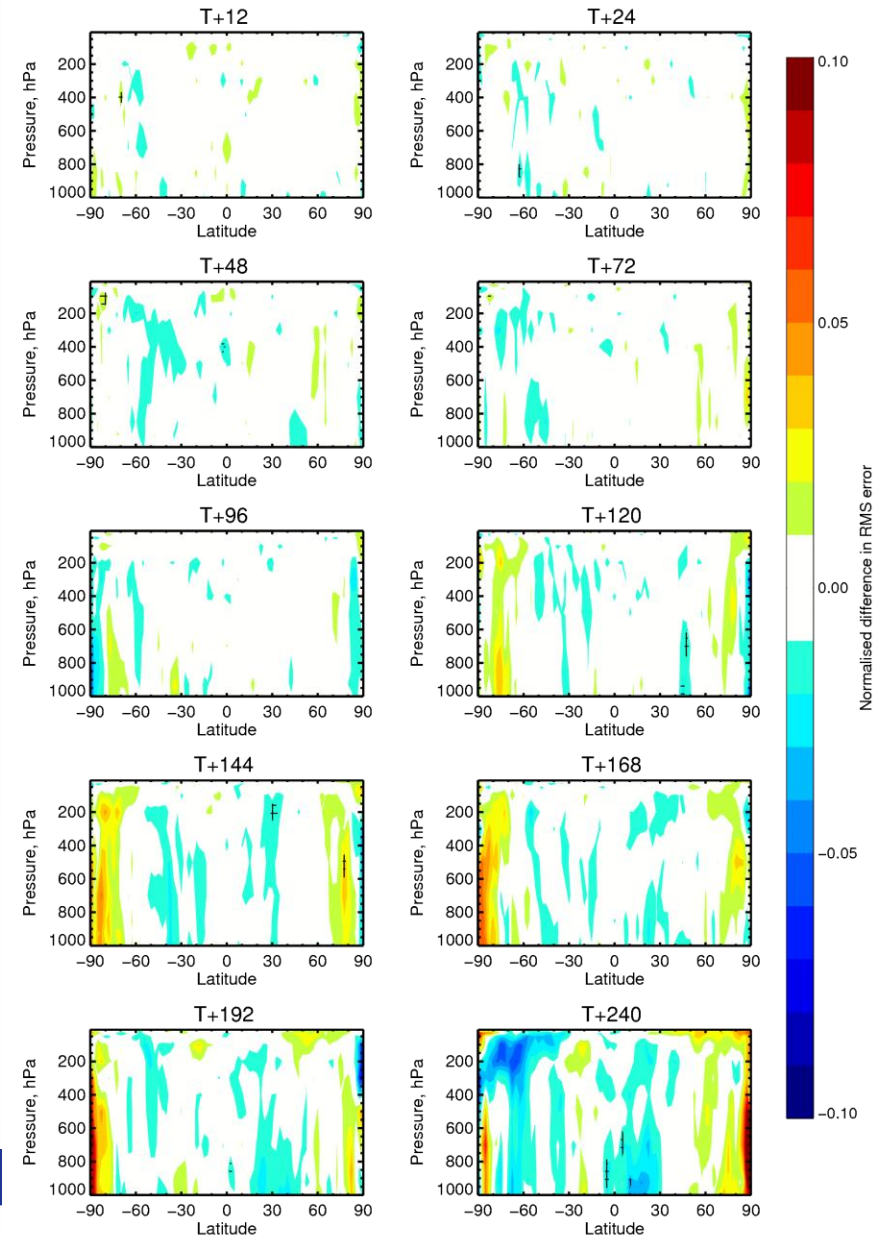
Forecast Verification – Full System

B/O - A/O

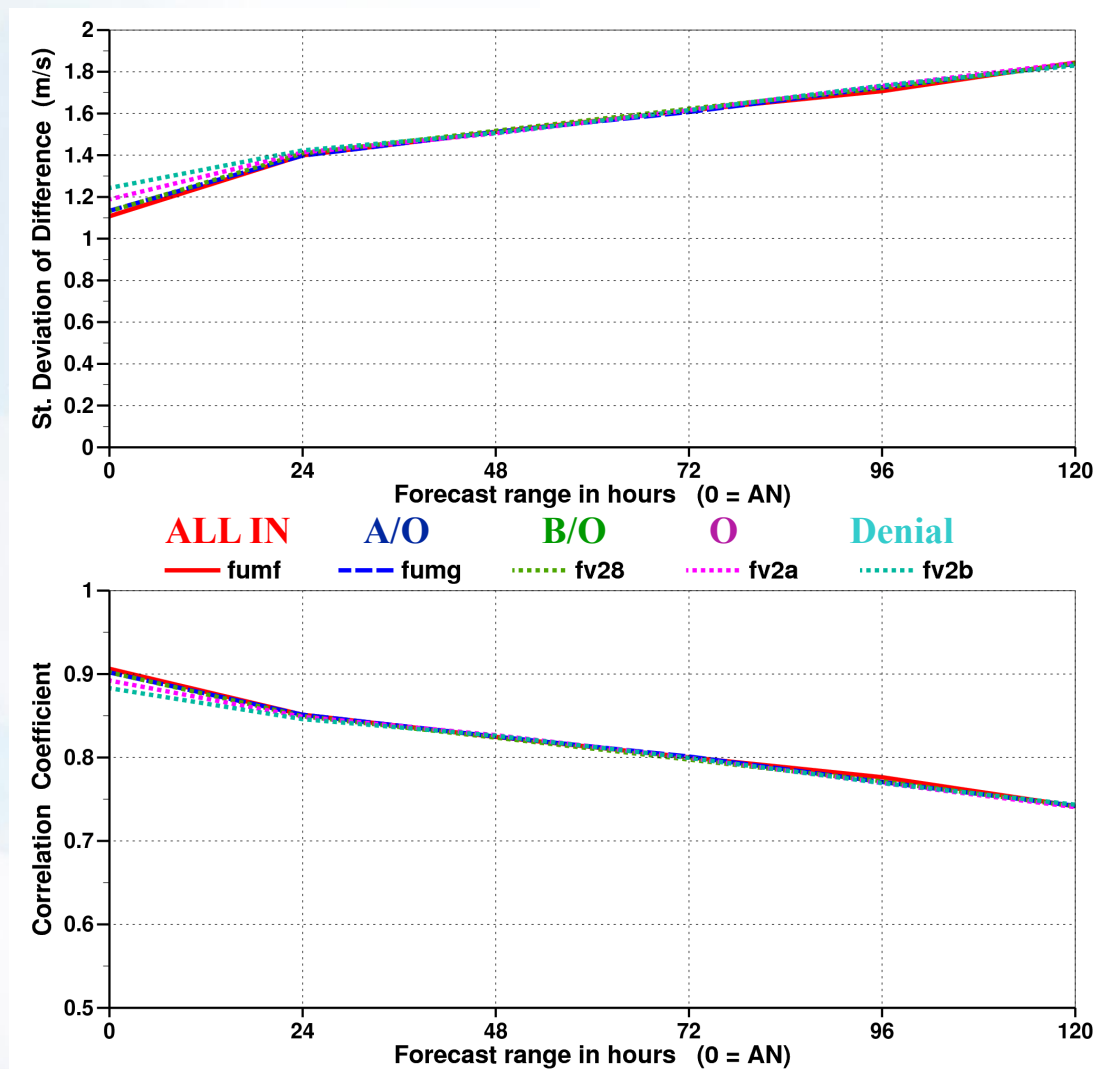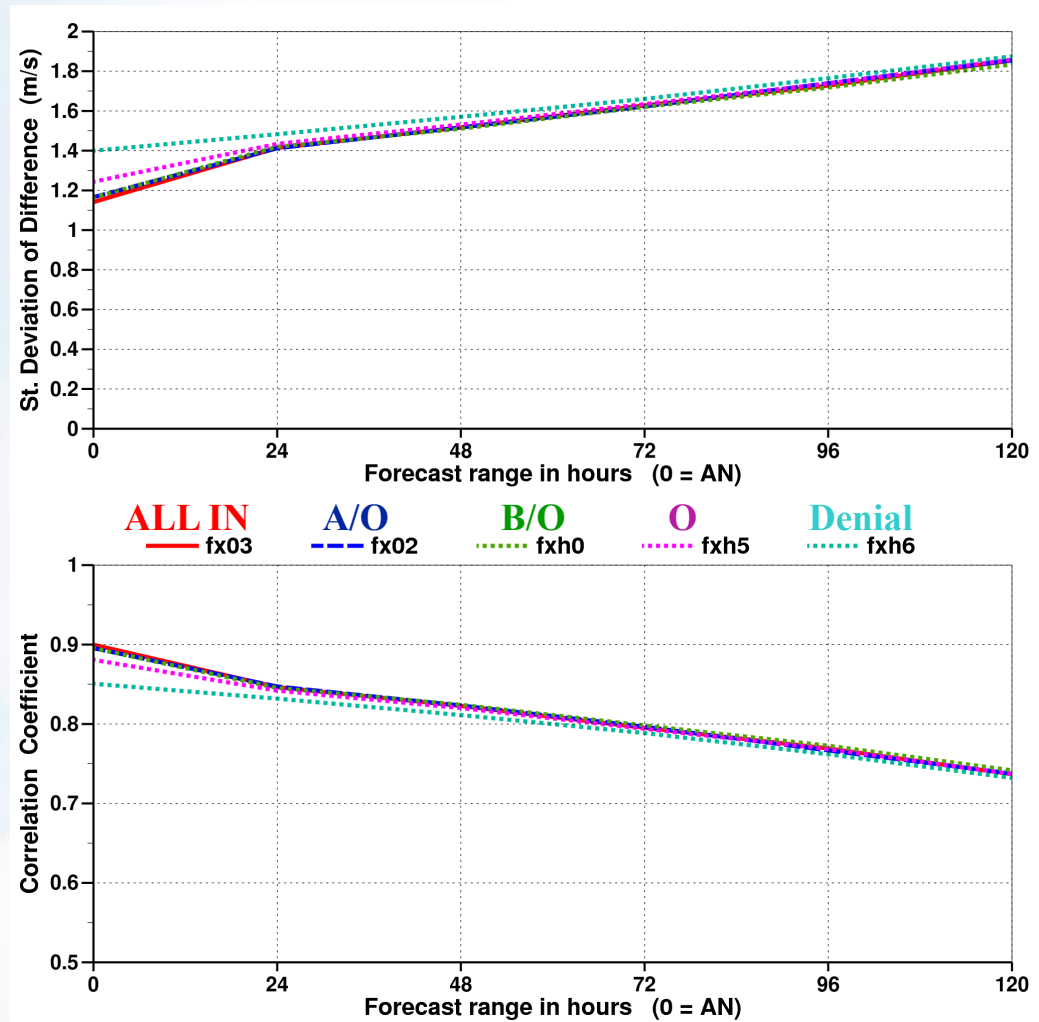**Vector Wind RMS forecast error**

Verified against own analysis

RMS forecast errors in VW(fv28−fumg), 17−Dec−2012 to 28−Feb−2013, from 64 to 74 samples.
Point confidence 99.8% to give multiple−comparison adjusted confidence 95%. Verified against own−analysis.

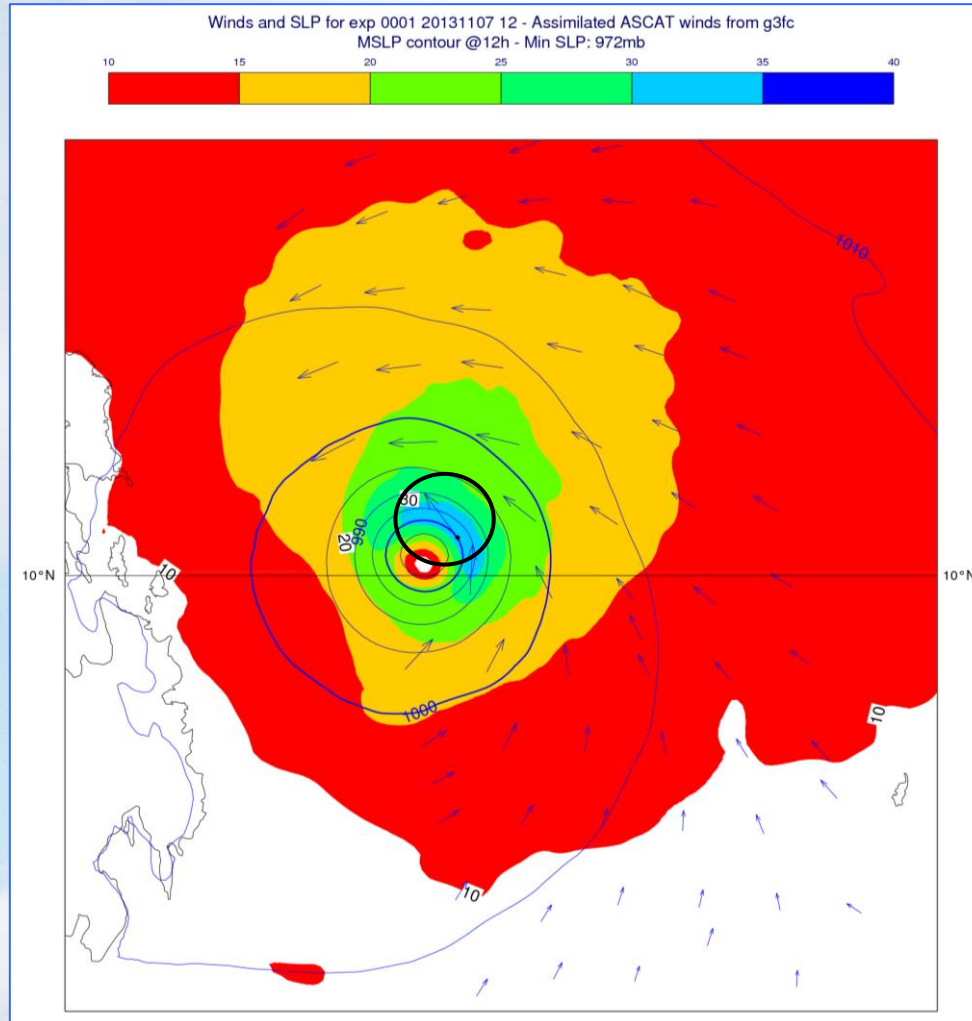# Verification vs Altimeter winds (JASON-1) – Full System

Tropics

Tropics

Single Observation Experiments (1 ASCAT-A)

**TC Haiyan – CY40R1 2013110712 [Assimilation Window 9 - 21]
1 ASCAT-A obs @ 1pm**
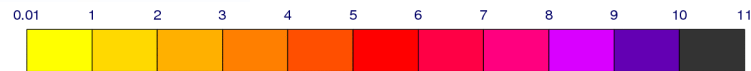
Winds and SLP for exp 0001 20131107 12 - Assimilated ASCAT winds from g3fc
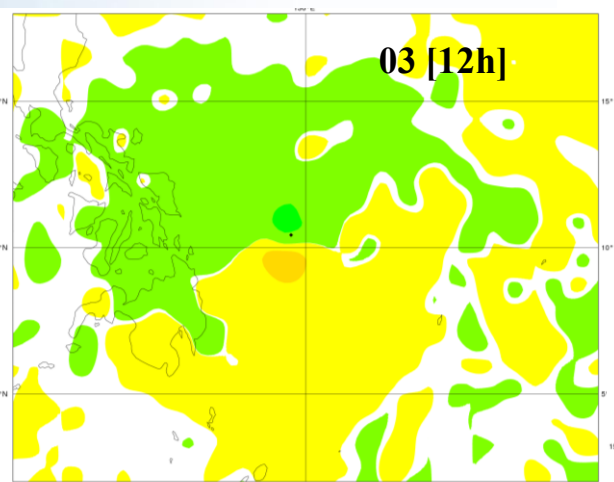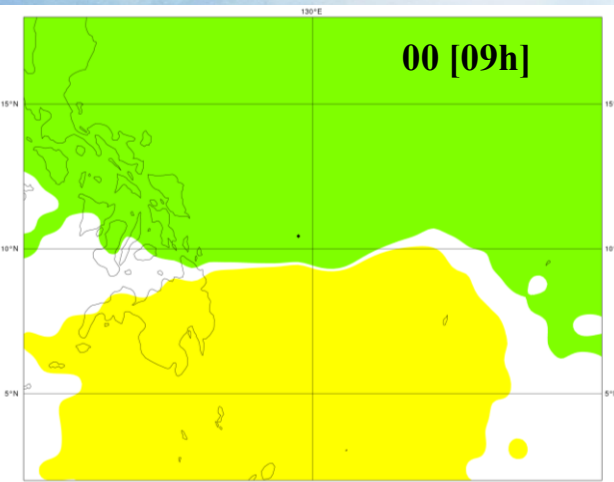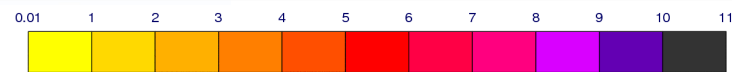MSLP contour @12h - Min SLP: 972mb
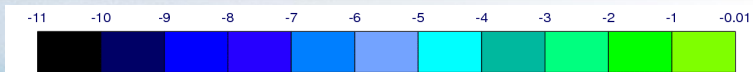
Single Observation Experiments (1 ASCAT-A)

Mean Sea Level Pressure (hPa)
Analysis Increments (Analysis - Background)
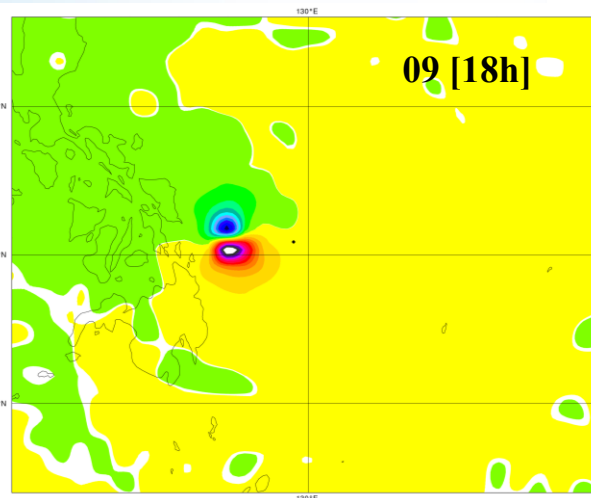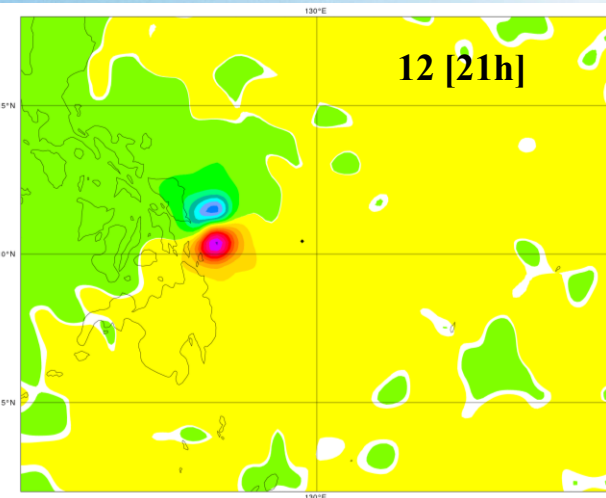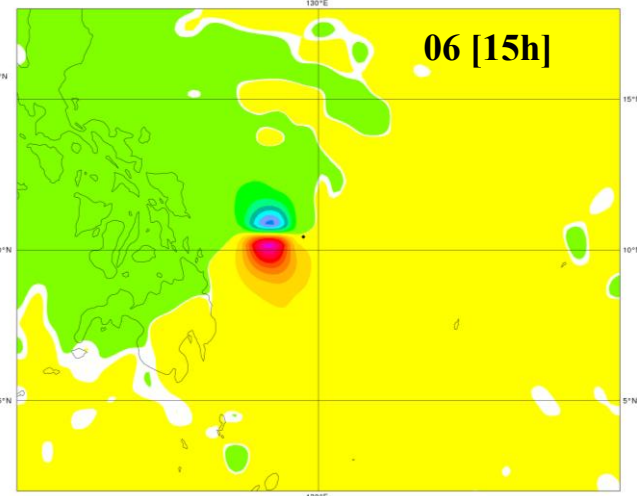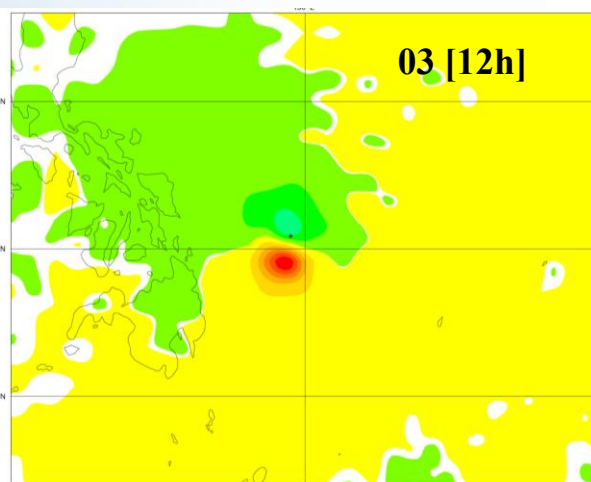Black diamond: Scatt obs assimilated

T511
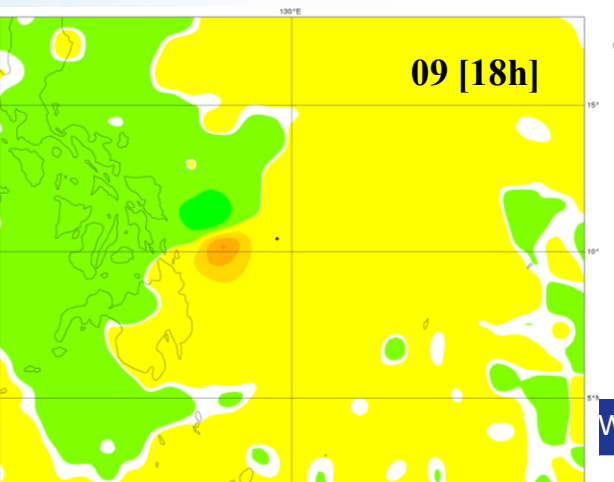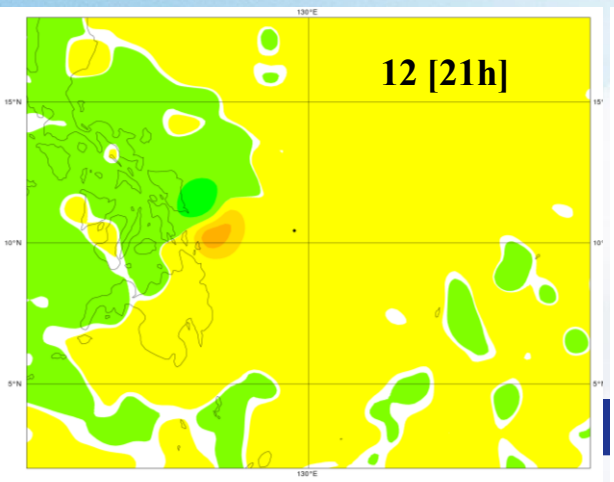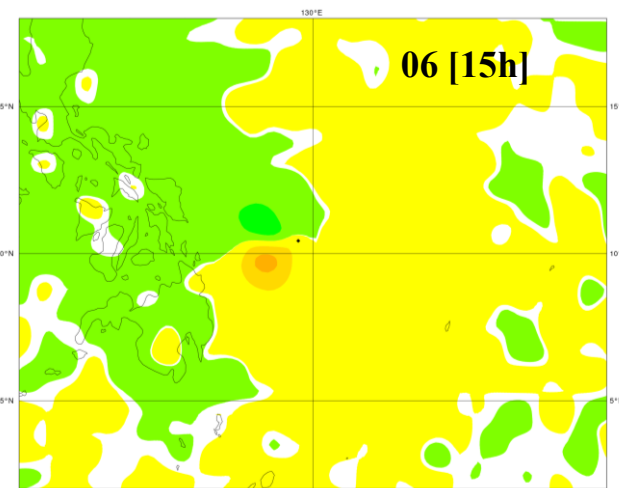
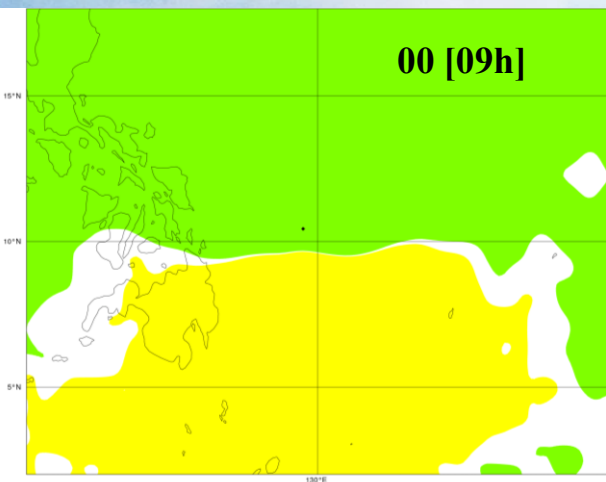# Single Observation Experiments (1 ASCAT-A)
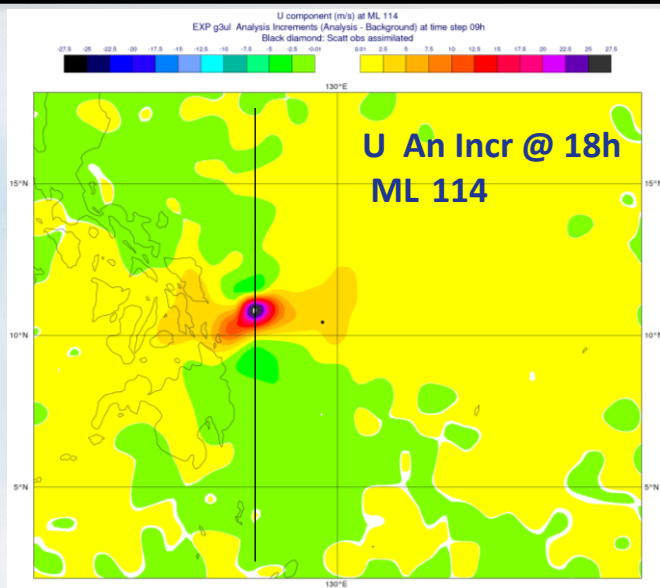

Mean Sea Level Pressure (hPa)
Analysis Increments (Analysis - Background)
Black diamond: Scatt obs assimilated

T1279

ECMWF

Single Observation Experiments (1 ASCAT-A)

T1279

U An Incr @ 18h
ML 114

ML   PL(hPa)

137 ~ 1013
114 ~ 850
 96 ~ 500
 79 ~ 250
 60 ~ 100

Model Levels
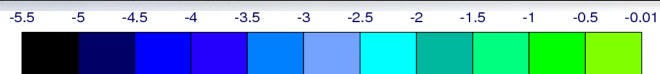
U An Incr @ 18h

V An Incr @ 18h

50   50

100   100

137   137

S   N   S   N
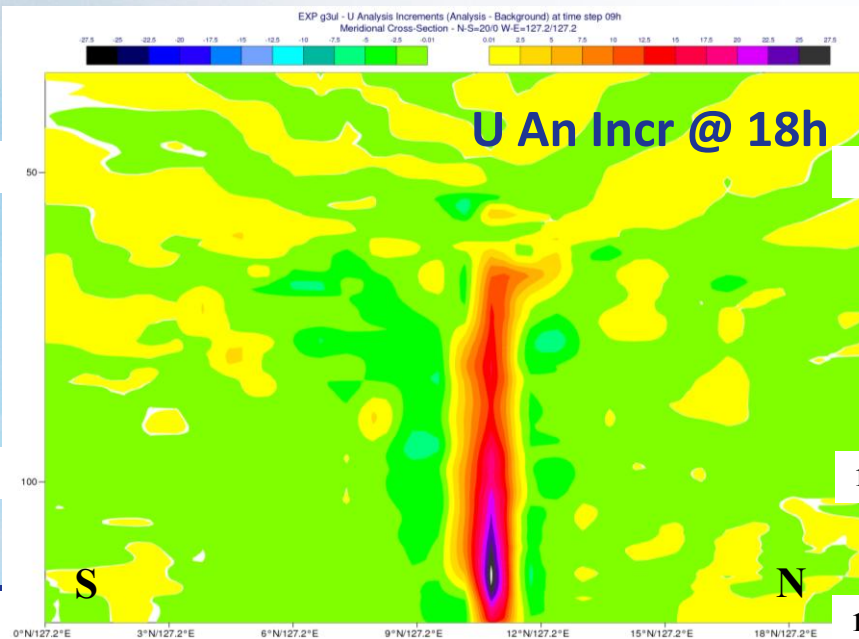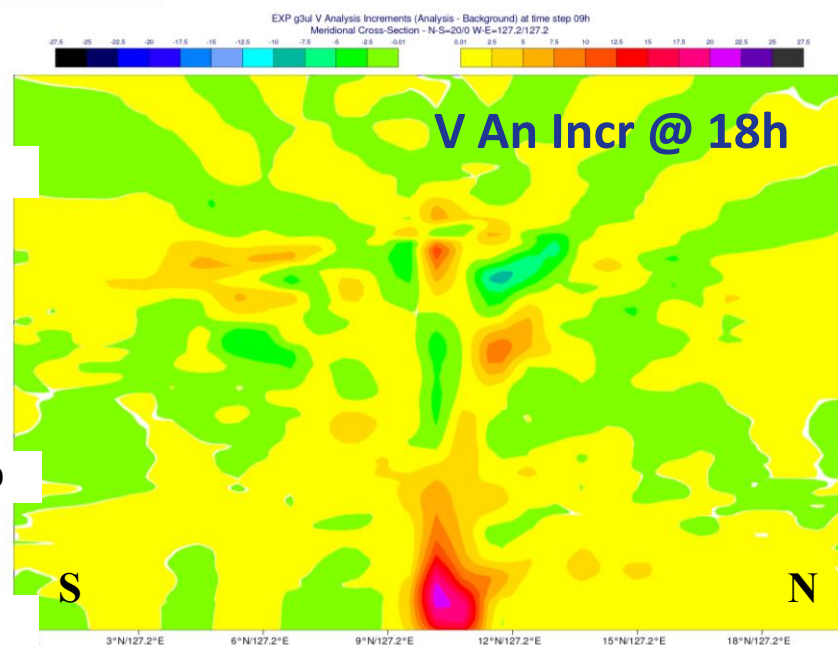
Single Observation Experiments (1 ASCAT-A)
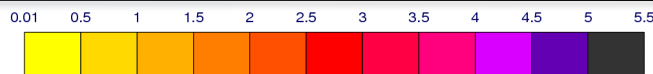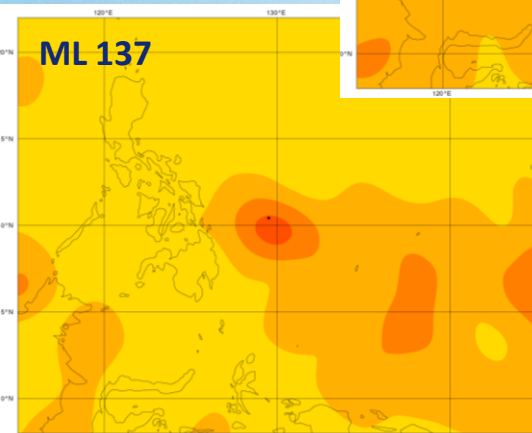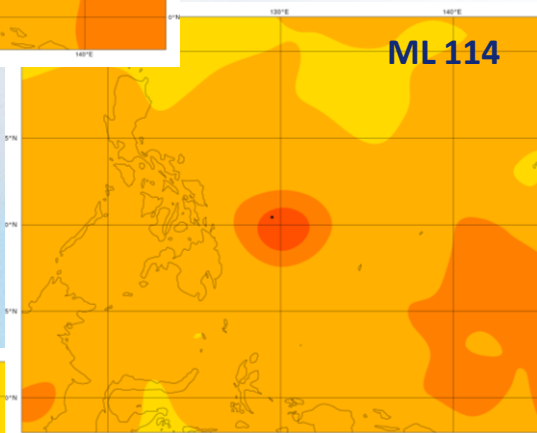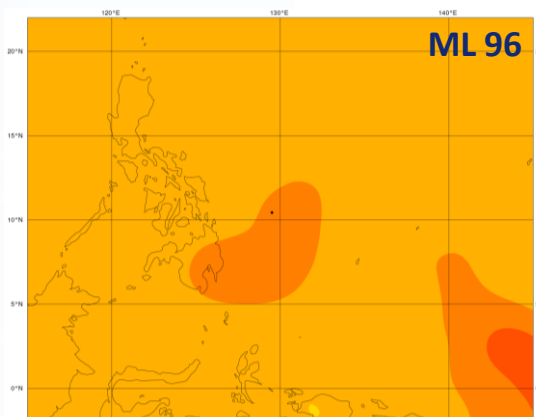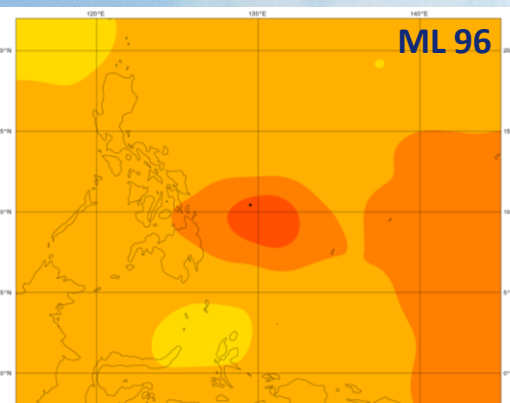
U-comp   **EDA Background Error**   **V-comp**
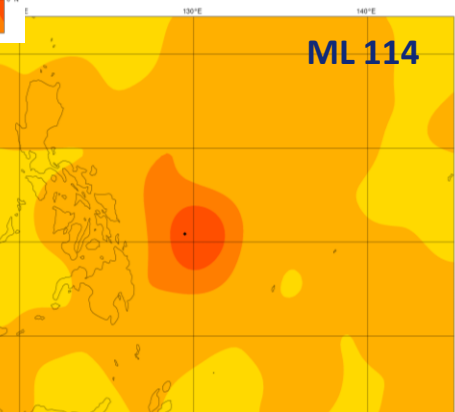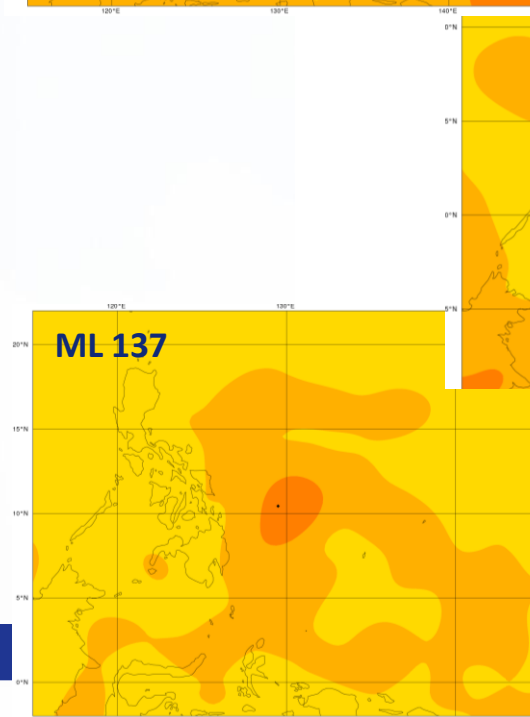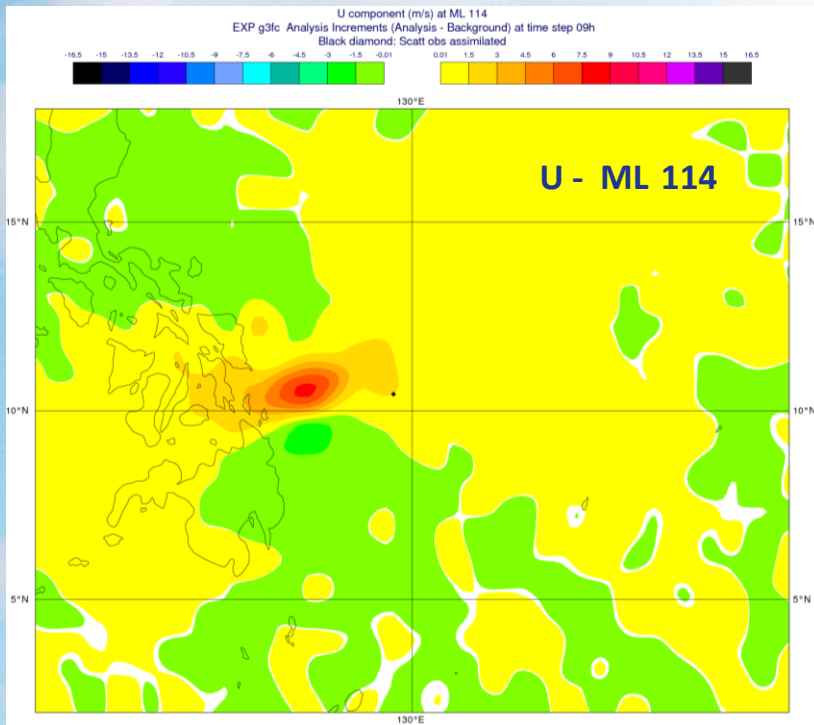
Single Observation Experiments (1 ASCAT-A + 1 AMSU-A)

1 ASCAT-A Obs   + 1 AMSU-A (METOP-A):

-    **ch5   (600 hPa / ml 100)**
-    **ch5/ch6   (600/400 hPa – ml 100/90)**
-    **ch9   (100 hPa – ml 60)**
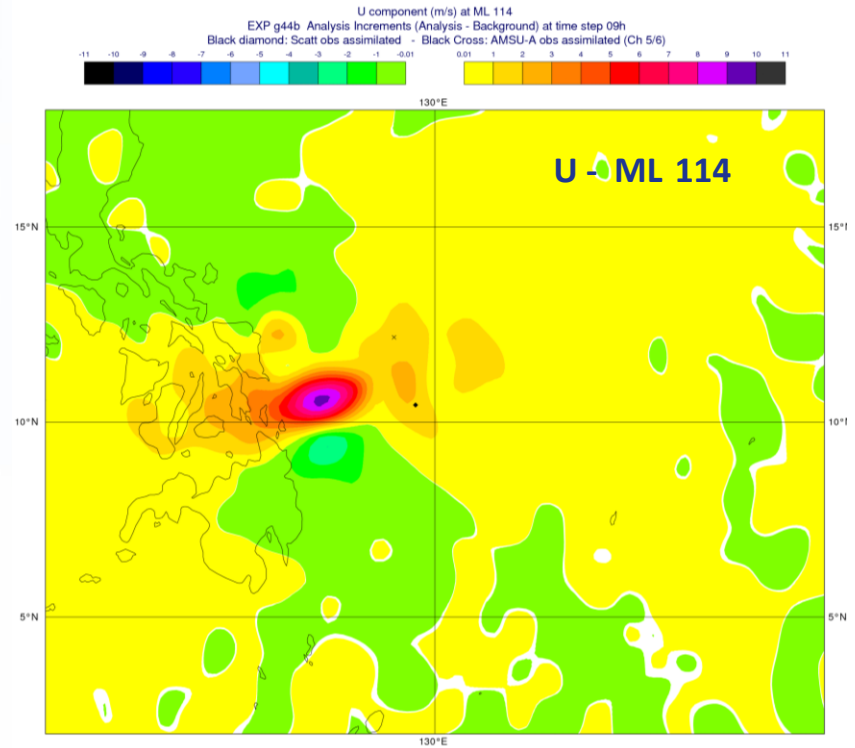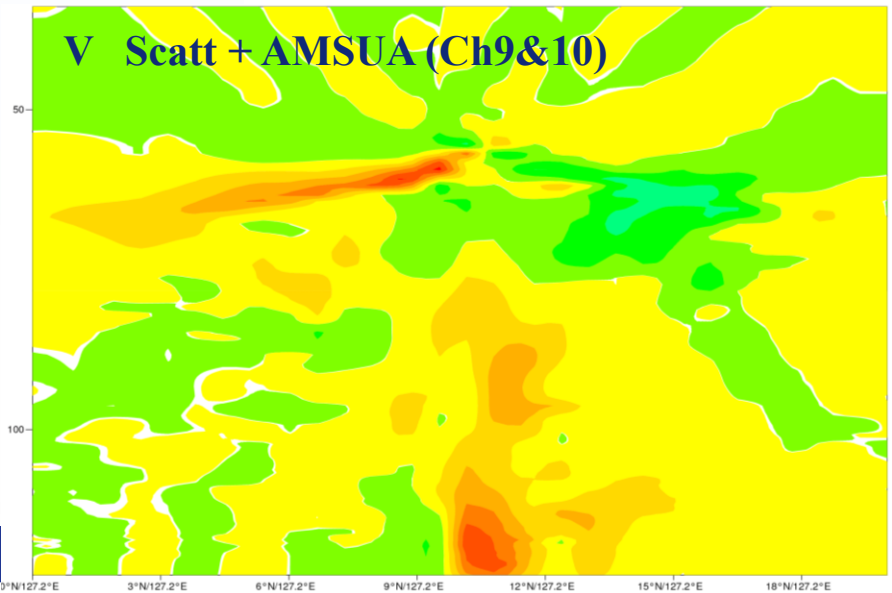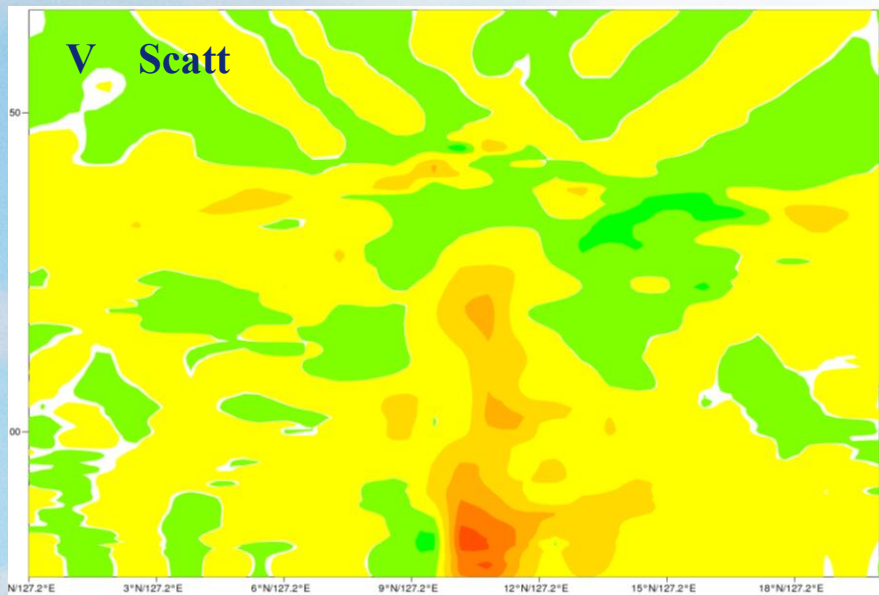-   **ch9/ch10 (100/50 hPa - ml 60/50)**
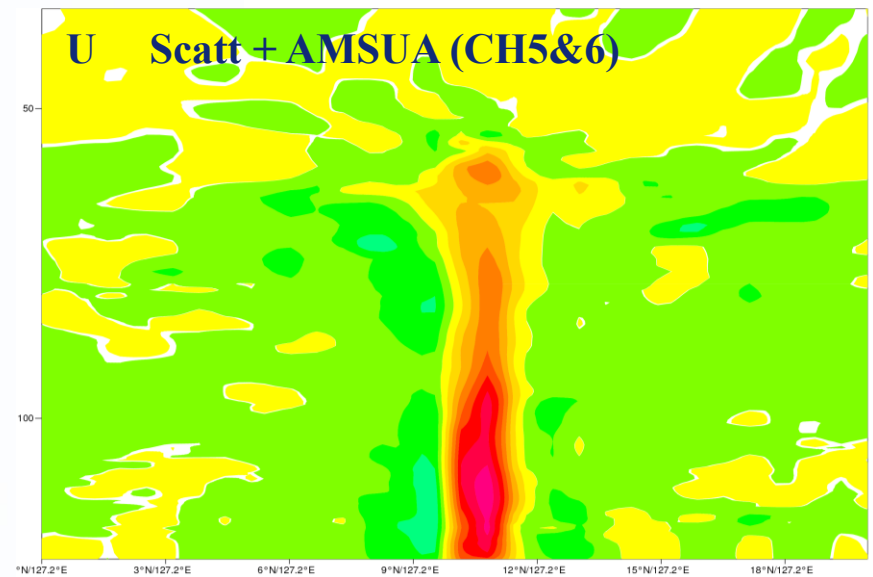
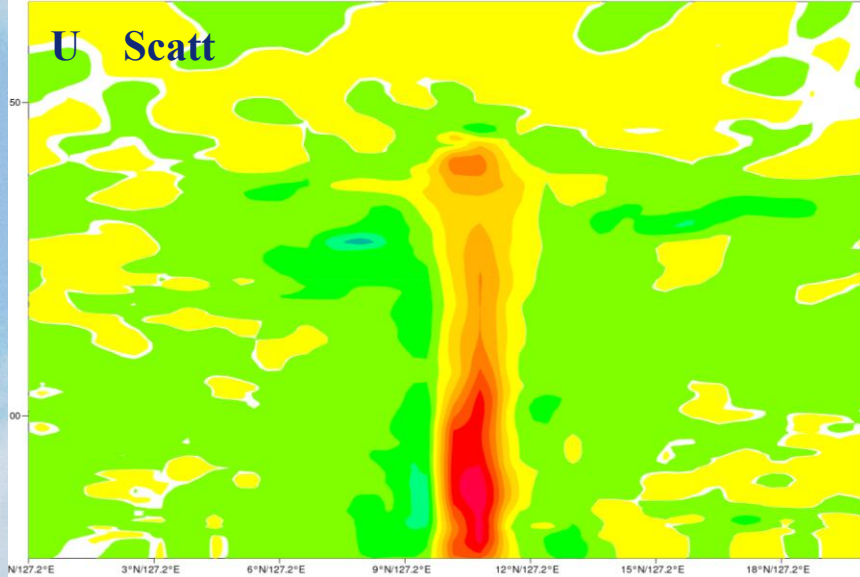**CY40R1**
T511 - An Incr 09 [18h]

ASCAT-A

ASCAT-A + AMSU-A (Ch5&6)

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Single Observation Experiments (1 ASCAT-A + AMSU-A)

Conclusions

Summary

ASCAT-A and ASCAT-B are consistent and have the same impact on the system.

OSCAT is behaving differently from ASCAT-A/B. The bias in SH may be the cause.

Verification against independent observations shows that the assimilation of scatterometer winds is beneficial on the analysis, largest impact coming from ASCAT:
- Main impact is in the Tropics
- A positive impact on the short range forecast is seen in the starved systems

Single observation experiments showed that:
- the impact of Scatterometer winds can be propagated up to the tropopause
- ASCAT and AMSU-A do not work one against each other