Met Office

OCA Heights & GOES-R Preparation

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Talk Outline

GOES-16 Preparation:

- Comparison of 'Nested Tracking' GOES 13 & 15 O-Bs to the 'Heritage' product.
- Forecast impact of the new derivation
- Quick look at GOES-16 sample AMVs

OCA Heights:

- O-B Assessment
- Trials Results

Nested-Tracking GOES AMVs: Overview

Nested Tracking OGES-13/15 AMVs available Sep 2016 to Apr 2017

• Water Vapour (cloudy): Lots of missing QI values until Feb 2017

• Height Assignment: Will be different with actual GOES-R winds due to pixel-based cloud-top height product.

Heritage Product

200

400

60

800

1000

200

600

800

1000

^pressure (hPa)

Pressure (hPa)

Met Office: GOES-15 IR, February 2017

Nested Tracking

Met Office: GOES-15 IR, February 2017



60 N

40 N

20N

205

40.9

60.5

60 N F

40 N

20 N

205

40 S

605

atitude

atitud.

Heritage Product

Met Office: GOES-15 IR hl, February 2017





Met Office: GOES-15 IR hl. February 2017

Nested Tracking





5000

1000

500

200

100

50

60 N

40 N

20 N

205

40 S

605

60 N F

40 N

20 N

205

40 S

605

-atitude

600

20.0

100

atitude

Heritage Product

Nested Tracking



Met Office: GOES-15 IR ml, February 2017





1000

80S 60S 40S 20S 0 20N 40N 60N 80N

Latitude

Heritage Product

Met Office: GOES-15 WV, February 2017



Nested Tracking



1000

mé

80S 60S 40S 20S 0 20N 40N 60N 80N

Latitude

40

20 N

205

40 S

60 N I

40 N

20N

20 9

40 S

605

Latitude

atitude

Heritage Product

Met Office: GOES-15 WV hl, February 2017





Met Office: GOES-15 WV hl, February 2017

Nested Tracking



70

60 50

40

35

30

25

20

15

10

m/s

200

40

600

800

1000

Pressure (hPa)

Heritage Product

Met Office: GOES-15 IR 3.8, February 2017



0 20N 40N 60N 80N

Latitude

600

800

1000

80S 60S 40S 20S

ň



Latitude

Met Office: GOES-15 IR 3.8, February 2017

Nested Tracking





Heritage Product

Nested Tracking

m(s

1000

500

200

50





60N 🔤

205

40S







Lonaitude

Heritage Product

Nested Tracking

70

m/s



Met Office: GOES-15 VIS, February 2017

atitude

atitude

Heritage Product

Met Office: GOES-15 VIS II, February 2017





Met Office: GOES-15 VIS II, February 2017

Nested Tracking



25 160E 180 160W 140W 120W 100W 80W m/s Lonaitude Number of Winds 50.00 20.00 1000 750 500 4 🔲 ₂₀₀ 100 50

Longitude

20

Mean Observation Speed

Auto-Editor

 Increases speeds for winds above 300 hPa, polewards of 25 N/S. (+ exceptions)

• Changes pressures to better agree with NWP and neighbouring observations. Most move by < 100 hPa, but some by ~ 250 hPa



Heritage Product

Met Office: unedited GOES-15 IR, February 2017





Met Office: GOES-15 IR. February 2017

Nested Tracking





8000 5000

2000

1000

750







70

60

50

40

30

25

20

15

10

m/s

Heritage Product

Met Office: unedited GOES-15 WV, February 2017







Nested Tracking







a 70

60

*4*0

/ 35

Ū 30

20 20

10

25

m/s

50

Met Office: GOES-15 WV, February 2017

Heritage Product

Nested Tracking



Met Office: GOES-15 IR 3.8. February 2017

Heritage Product

Met Office: unedited GOES-15 VIS, February 2017



Nested Tracking



Heritage Product

IR, above 400 hPa

Nested Tracking





Heritage Product

IR, 400-700 hPa

Nested Tracking





Heritage Product

WV, above 400 hPa

Nested Tracking





Heritage Product

SWIR, below 400 hPa

Nested Tracking





Heritage Product

VIS, below 400 hPa

Nested Tracking







Nested-Tracking GOES AMVs: Summary of trials

• 12th February to 12th April – so that the water vapour winds have QI values.

Comparisons:

- Nested GOES vs Heritage GOES
- Nested GOES vs Heritage GOES filtered by QI2 because the Nested data only has QI2
- Nested GOES vs no GOES
- Heritage GOES vs no GOES
- Nested GOES vs Unedited GOES (QI2)

Nested GOES versus Heritage GOES



Nested Tracking (only QI2 available) vs Heritage (filtered by QI2)

-0.39-0.57 -0.48 vs sondes vs MetO analyses vs ECMWF analyses Verification vs Analysis From 20170212 to 20170412 Verification vs Analysis From 20170212 to 20170412 Verification vs Observations From 20170212 to 20170412 Validity Times: 0 1200 Validity Times: 0 1200 Validity Times: 0 1200 Cntl Exp Id: u-am321-GM, Test Exp Id: u-ak950-GM Cntl Exp Id: u-am321-GM, Test Exp Id: u-ak950-GM Cntl Exp Id: u-am321-GM, Test Exp Id: u-ak950-GM NH PMSL NH PMSL NH PMSL NH H500 NH H500 NH H500 NH W250 NH W250 NH W250 Fc Range Fc Range Fc Range T+12 T+12 T+12 Trop W250 T+24 Trop W250 Ť+24 T+24 T+36 Trop W250 T+36 T+36 T+48 T+48 T+48 T+60 T+60 T+60 Trop W850 Trop W850 Trop W850 SH PMSL SH PMSL SH PMSL SH H500 SH H500 SH H500 SH W250 SH W250 SH W250 -2 -1 0 2 2 -2 -1 0 1 -2 2 -1 0 Fc RMS Diff (%) Fc RMS Diff (%) Fc RMS Diff (%)

Nested GOES versus No GOES



Heritage versus No GOES



Nested versus Un-Edited Heritage GOES

+0.08 -0.13 +0.39vs sondes vs ECMWF analyses vs MetO analyses Verification vs Analysis From 20170212 to 20170412 Verification vs Analysis From 20170212 to 20170412 Verification vs Observations From 20170212 to 20170412 Validity Times: 0 1200 Validity Times: 0 1200 Validity Times: 0 1200 Cntl Exp Id: u-an229-GM, Test Exp Id: u-ak950-GM Cntl Exp Id: u-an229-GM, Test Exp Id: u-ak950-GM Cntl Exp Id: u-an229-GM, Test Exp Id: u-ak950-GM NH PMSL NH PMSL NH PMSL NH H500 NH H500 NH H500 NH W250 NH W250 NH W250 Fc Range Fc Range Fc Range T+12 T+12 T+12 Trop W250 T+24 Trop W250 T+24 Trop W250 T+24 T+36 T+36 T+36 T+48 T+48 T+48 T+60 T+60 T+60 T+72 Trop W850 Trop W850 Trop W850 SH PMSL SH PMSL SH PMSL SH H500 SH H500 SH H500 SH W250 SH W250 SH W250 -2 -1 0 2 -2 -1 0 1 2 -2 -1 0 2 1 Fc RMS Diff (%) Fc RMS Diff (%) Fc RMS Diff (%)

Nested-Tracking GOES AMVs: Re-cap of headline scores

Comparison	Vs Sondes	Vs MetO Analyses	Vs ECMWF Analyses
Nested Tracking vs Heritage Algorithm	-0.42	-0.67	-0.37
Nested Tracking vs no GOES AMVs	+0.05	-0.18	+0.31
Heritage vs No GOES AMVs	+0.47	+0.49	+0.68
Nested Tracking (only QI2 available) vs Heritage (filtered by QI2)	-0.39	-0.57	-0.48
Nested Tracking vs Heritage without 'auto-editor'	-0.13	+0.39	+0.08

GOES-16 Samples



GOES-16 IR, September 2017, Below 700 hPa



GOES-16 WV 6.2, September 2017, Above 400 hPa



GOES-16 IR 3.8, September 2017, Below 700 hPa



GOES-16 Samples

GOES-16 VIS, June 2017, Below 700 hPa





OCA Heights



CI A Met Office: Meteosat-10 IR 10.8 Mean Difference (hPa) 300 200 200 200 essure (hPa) Pressure (hPa) 100 400 400 - n 600 600 -100 800 800 -200 1000 1000 -300 90S 70S 50S 305 10S 0 10N 30N 50N 70N 90N 905 705 505 305 Latitude





















































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CLA



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OCA vs CLA O-Bs: Impact on forecasts



Trial period: 1st December 2016 – 31st January 2017

OCA vs CLA O-Bs: Impact on forecasts

Background Fit-to-Observations Changes to forecast fields Trial - Control, 20161201-20170131 V Component of Wind (m/s) at 850hPa Trial - Control, 20161201-20170131 U Component of Wind (m/s) at 850hPa • Reduced fit to IASI, CrIS, ATMS, AIRS Fit to AMVs mixed 6014 -1 00E-02 DWC-Min: -1 12E+00 Max: 1 16E+0 Aean: 2.41E-03_ BMS: 1.01E-01_ Min: -1.15E+00_ Max: 1.33E+0 -1.104 -0.912-0.72 -0.336 0 144 0.336 0.528 0.012 -0.825 -0.605 -0.385 -0.165 0.385 0.605 0.825 1.045 Fc RMS Error: Trial - Control, T+48 V Component of Wind (m/s) at 850hPs Fc RMS Error: Trial - Control, T+48 U Component of Wind (m/s) at 850hP cris npp:: standard deviation in O-B: iasi ma:: standard deviation in O-B: % difference between experiment and control, (lel-lcl)/lcl ifference between experiment and control, (|e|-|c|)/|c 0.5 0/ 0.3 0.2 0.1 0.0 24E-02 DMC-1 20 Max: 1.53E+00 Mean: 8.80E-03, RMS: 1.18E-01, Min: -9.54E-01, Max: 1.34E+00 -0.1 -14 -12 -0.8 -0.6 -0.4 -0.2 0.2 0.4 0.6 0.8 12 -1.4 -1.2 -0.8 -0.6 -0.4 -0.2 0.2 0.4 0.6 0.8 1.2 14

Trial period: 1st December 2016 – 31st January 2017



Questions?

