30 YEARS 1986-2016

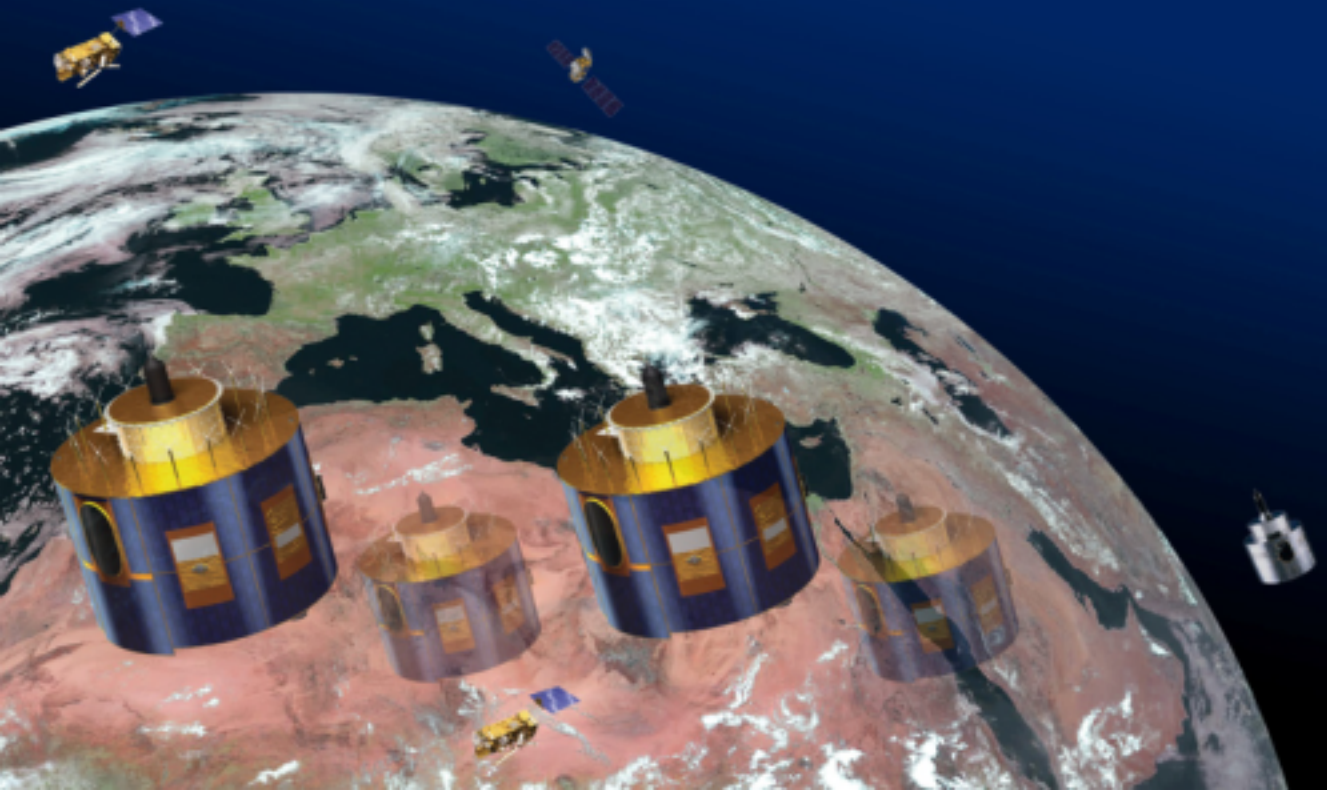
EUMETSAT

Generation of Himawari-8 AMVs using the future MTG AMV processor

Manuel Carranza

Régis Borde

Masahiro Hayashi



Summary

MSG Nested Tracking results

Introduction to MTG

MTG's FCI vs Himawari-8's AHI

MTG AMV processor

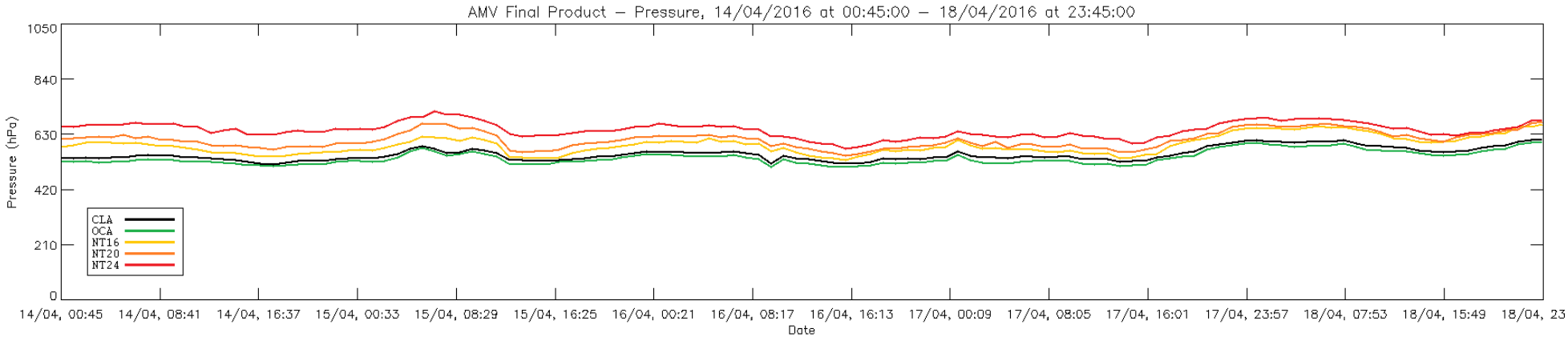
Preliminary results

Future work

MSG Nested Tracking results

Test description

- Nested tracking (NT) algorithm implemented on test chain (collaboration with J. Daniels and W. Bresky)
- Several target box sizes tested (16x16, 20x20 and 24x24)
- Wind guess not used for tracking
- Period studied from 14/04/2016 to 18/04/2016 (5 days)
- Comparison against MSG algorithm performances (CLA and OCA)



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AMV Final Product statistics against forecast

MSG CLA

	SPEED BIAS (m/s)			
	all	high	mid	low
GLO	0.49	0.72	1.08	-0.12
NH	1.07	1.73	0.21	0.36
TR	2.04	2.62	3.67	0.68
SH	-2.45	-4.50	-0.50	-1.38

	SPEED NRMS (-)			
	all	high	mid	low
GLO	0.45	0.41	0.48	0.42
NH	0.43	0.37	0.54	0.58
TR	0.49	0.47	0.64	0.35
SH	0.39	0.36	0.35	0.41

NT 16

	SPEED BIAS (m/s)			
	all	high	mid	low
GLO	0.86	1.42	1.89	-0.11
NH	1.94	2.86	1.55	0.44
TR	2.51	3.40	5.26	0.79
SH	-2.12	-4.13	0.11	-1.32

	SPEED NRMS (-)			
	all	high	mid	low
GLO	0.42	0.39	0.45	0.38
NH	0.40	0.34	0.51	0.50
TR	0.47	0.45	0.64	0.31
SH	0.38	0.35	0.32	0.37

NT 20

	SPEED BIAS (m/s)			
	all	high	mid	low
GLO	0.32	0.67	0.91	-0.20
NH	0.80	1.53	-0.01	0.20
TR	2.06	2.88	4.38	0.70
SH	-2.46	-4.76	-0.71	-1.50

	SPEED NRMS (-)			
	all	high	mid	low
GLO	0.43	0.41	0.45	0.38
NH	0.42	0.35	0.53	0.50
TR	0.48	0.46	0.63	0.31
SH	0.39	0.38	0.33	0.38

NT 24

	SPEED BIAS (m/s)			
	all	high	mid	low
GLO	-0.51	-0.76	-0.32	-0.36
NH	-0.88	-0.84	-2.17	-0.15
TR	1.11	1.26	3.27	0.61
SH	-2.75	-5.40	-1.78	-1.78

	SPEED NRMS (-)			
	all	high	mid	low
GLO	0.47	0.46	0.49	0.38
NH	0.50	0.41	0.62	0.50
TR	0.48	0.49	0.60	0.31
SH	0.42	0.43	0.36	0.38

MSG Nested Tracking results

First conclusions and upcoming work

First conclusions

- NT AMVs generally found at lower altitude
- RMS statistics are very similar between MSG CLA and NT
- Speed biases show important differences between MSG and NT, but also among the various NT configurations (16x16, 20x20 and 24x24), including the sign of the biases (NH for example)
- Performances vary as function of altitude and geographical area
- No best configuration actually found
- NT takes much longer to compute than CLA/OCA (twice as much)

Upcoming work

- Study performances using a longer period
- Compare also with MSG code using OCA

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MSG Nested Tracking results

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Preliminary results

Future work

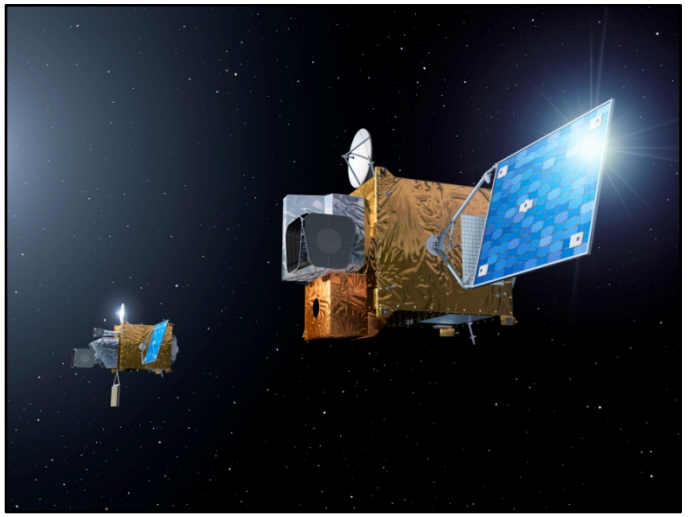
Introduction to MTG

Programme concept

Twin satellite concept, based on 3-axis stabilized platforms.

- Four imaging satellites (MTG-I) (20 years operational)
- Two sounding satellites (MTG-S) (15.5 years operational)

MTG-I payload:



- Flexible Combined Imager (FCI)
- Lightning Imager (LI)
- Data Collection System (DCS)

MTG-S payload:

- Infrared Sounder (IRS)
- Ultra-violet, Visible and Near-Infrared Sounder (UVN)

Introduction to MTG
Flexible Combined Imager (FCI)

- Continuation of the very successful SEVIRI on board MSG.
- Additional channels with better spatial, temporal and radiometric resolution, compared to MSG.
- Full Disk Scan (FDS), with a basic repeat cycle of 10 minutes.
- European Regional Rapid Scan (RRS), which covers one quarter of the full disk with a repeat cycle of 2.5 min.
- Eight channels in the solar spectral domain (0.4 µm to 2.1 µm), with 1 km resolution.
- Eight channels in the thermal spectral domain (3.8 µm to 13.3 µm), with 2 km resolution.

Summary

MSG Nested Tracking results

Introduction to MTG

MTG's FCI vs Himawari-8's AHI

MTG AMV processor

Preliminary results

Future work

MTG's FCS vs Himawari-8's AHI

Spectral channels

	MTG's FCI			Himawari-8's AHI		
Channel	**Wavelength**	**Type**	**Spatial resol.**	**Wavelength**	**Type**	**Spatial resol.**
1	0.44 µm	VIS	1 km	0.47 µm	VIS	1 km
2	0.51 µm	VIS	1 km	0.51 µm	VIS	1 km
3	0.64 µm	VIS	1 km	0.64 µm	VIS	0.5 km
4	0.87 µm	VIS	1 km	0.86 µm	VIS	1 km
5	~~0.91 µm~~	~~VIS~~	~~1 km~~	1.61 µm	NIR	2 km
6	~~1.38 µm~~	~~NIR~~	~~1 km~~	2.26 µm	NIR	2 km
7	1.61 µm	NIR	1 km	3.88 µm	IR	2 km
8	2.25 µm	NIR	1 km	6.24 µm	WV	2 km
9	3.80 µm	IR	2 km	~~6.94 µm~~	~~WV~~	~~2 km~~
10	6.30 µm	WV	2 km	7.35 µm	WV	2 km
11	7.35 µm	WV	2 km	8.59 µm	IR	2 km
12	8.70 µm	IR	2 km	9.64 µm	IR	2 km
13	9.66 µm	IR	2 km	10.41 µm	IR	2 km
14	10.50 µm	IR	2 km	~~11.24 µm~~	~~IR~~	~~2 km~~
15	12.30 µm	IR	2 km	12.38 µm	IR	2 km
16	13.30 µm	IR	2 km	13.28 µm	IR	2 km

Summary

MSG Nested Tracking results

Introduction to MTG

MTG's FCI vs Himawari-8's AHI

MTG AMV processor

Preliminary results

Future work

MTG AMV processor

- Largely based on the MSG AMV processor.
- Processing based on three images, instead of four.
- CCC method used for tracking.
- OCA used as main height assignment method, instead of CLA.
- Computation of AMV height standard deviation and height error.
- Final AMV coordinates set to the position of the tracked feature.
- No intermediate product averaging. Second intermediate component used as final product instead.

Summary

MSG Nested Tracking results

Introduction to MTG

MTG's FCI vs Himawari-8's AHI

MTG AMV processor

Preliminary results

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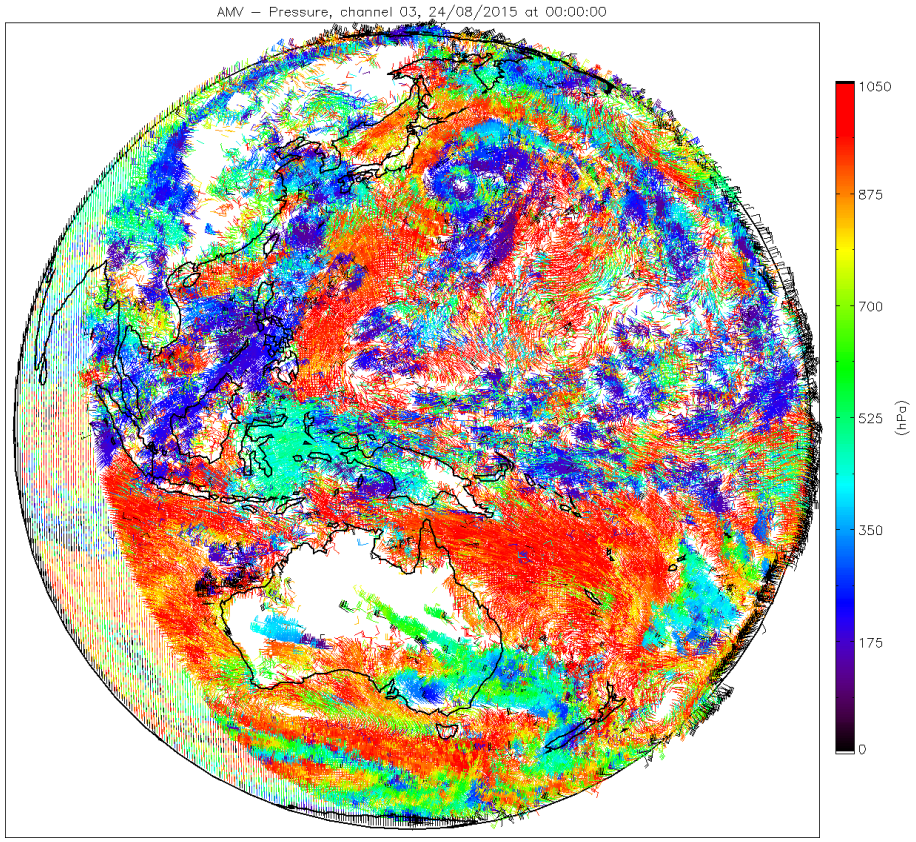
Channel VIS 0.64 µm

Himawari-8



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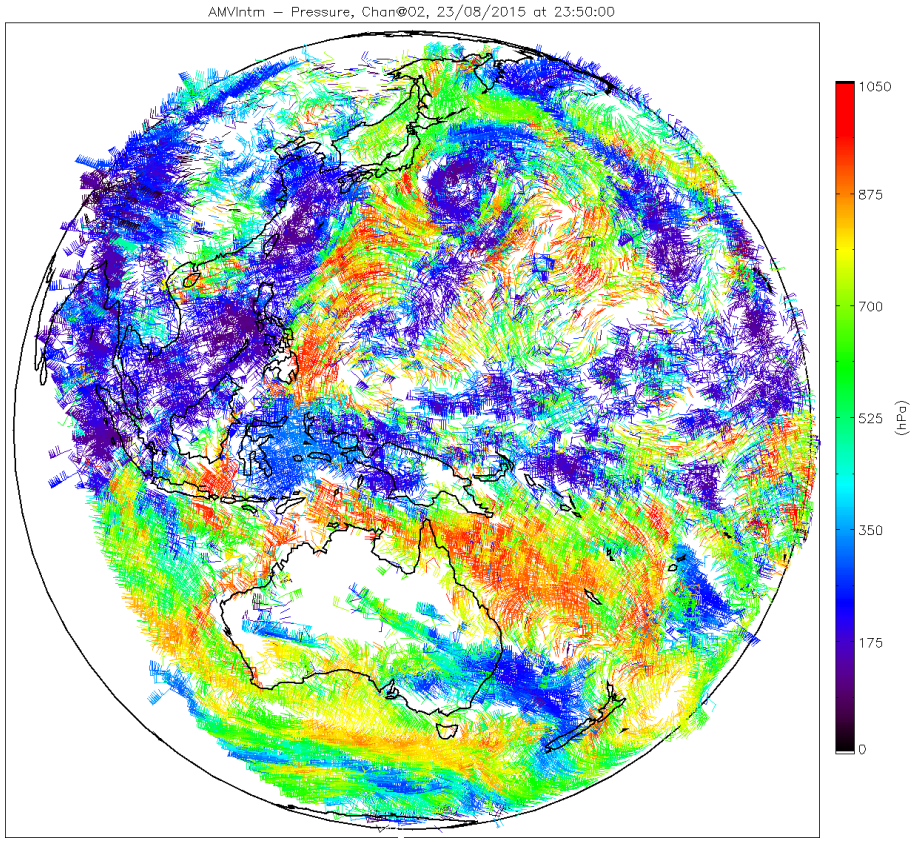
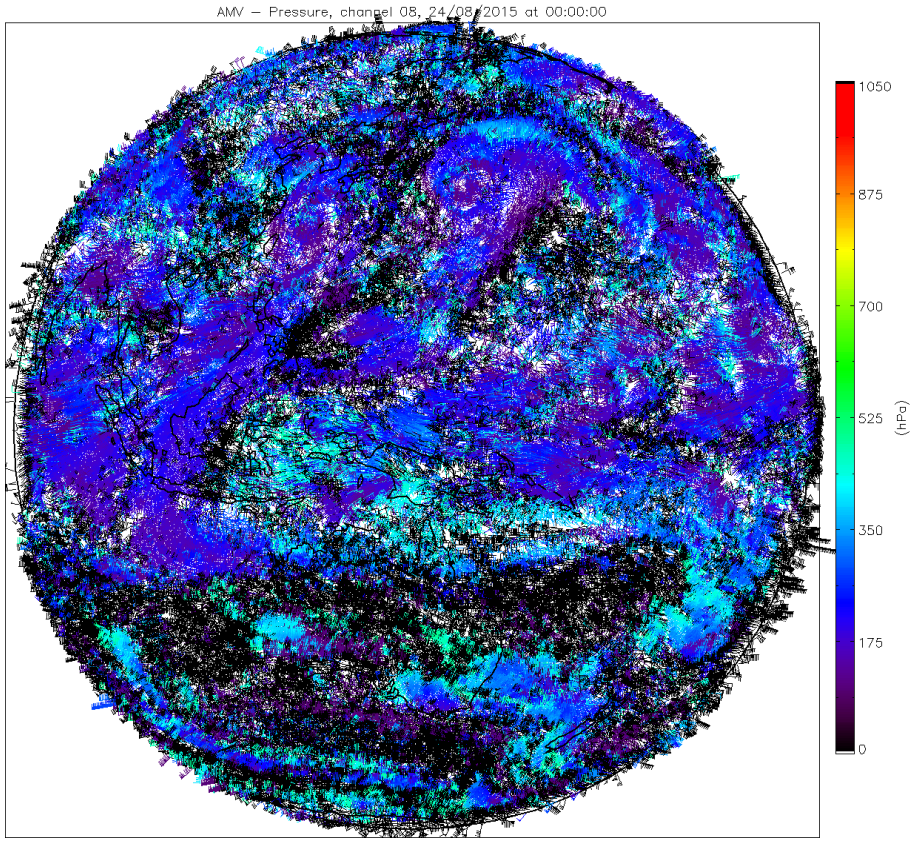


Preliminary results

Channel WV 6.24 µm

Himawari-8



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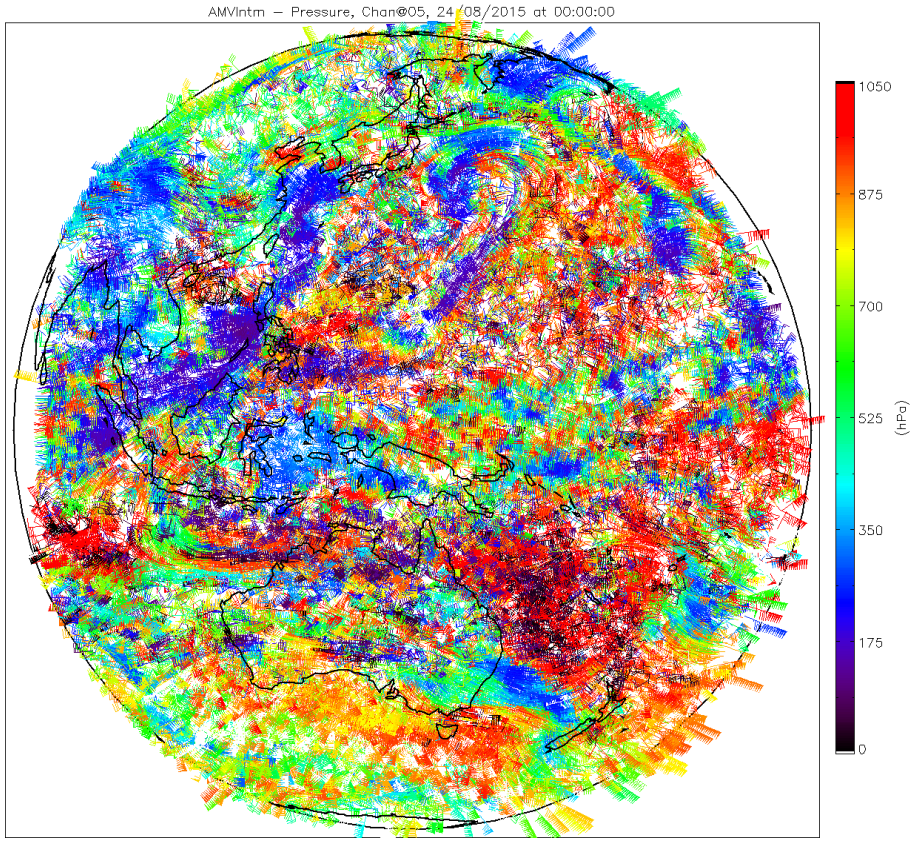
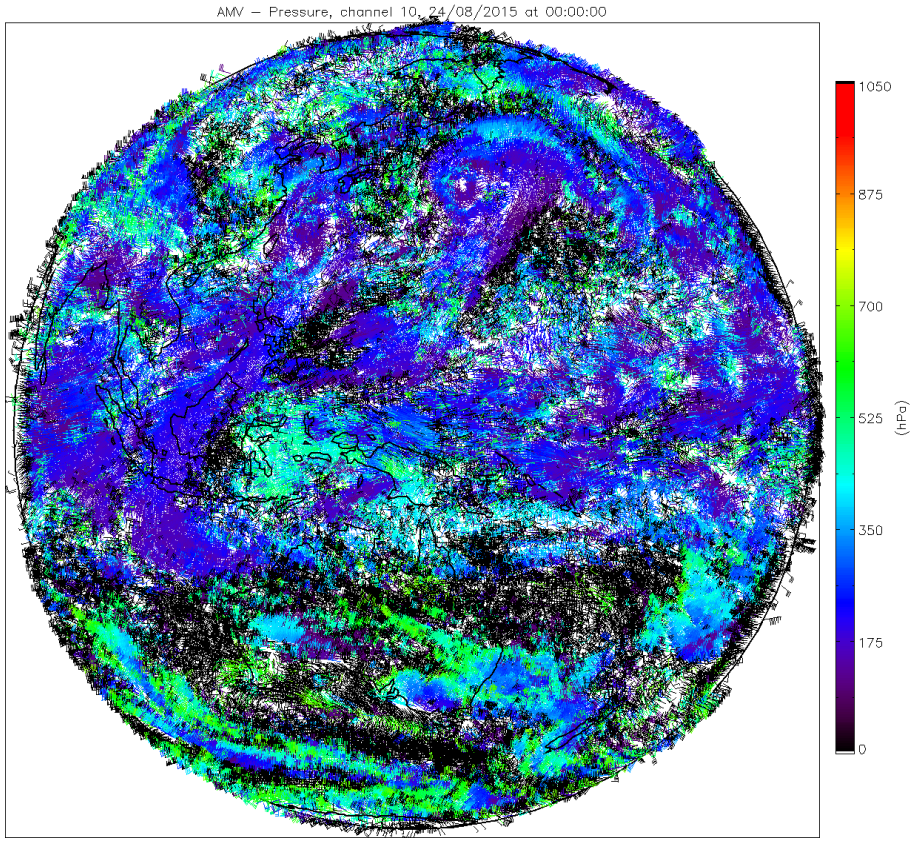


Preliminary results

Channel WV 7.35 µm

Himawari-8



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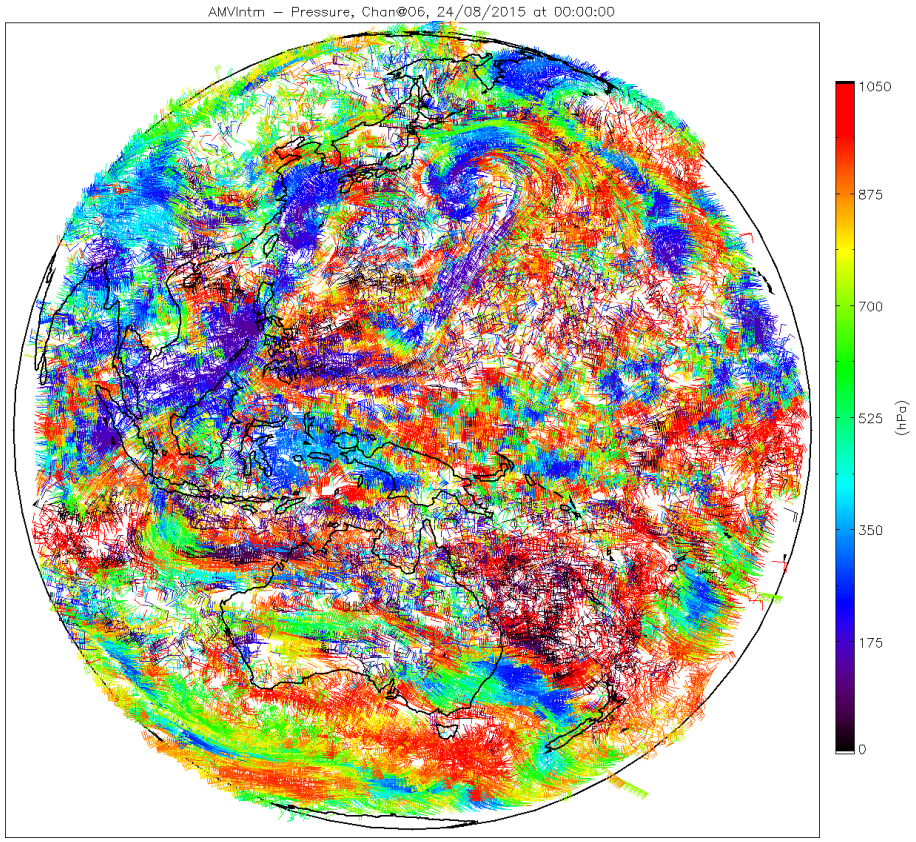
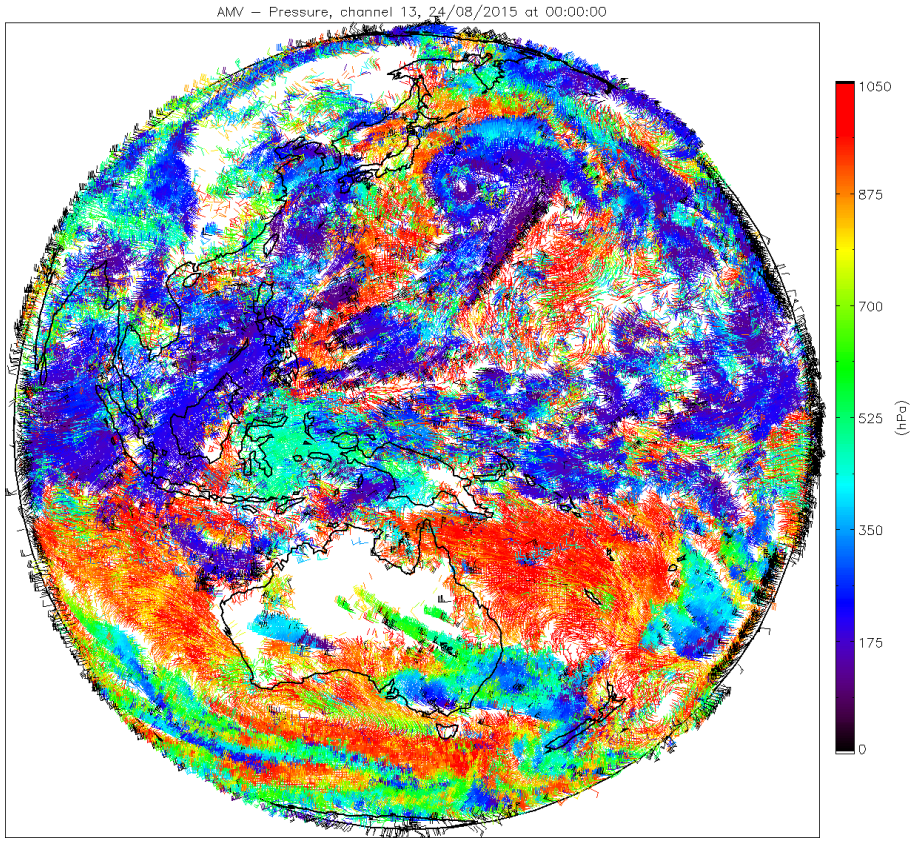


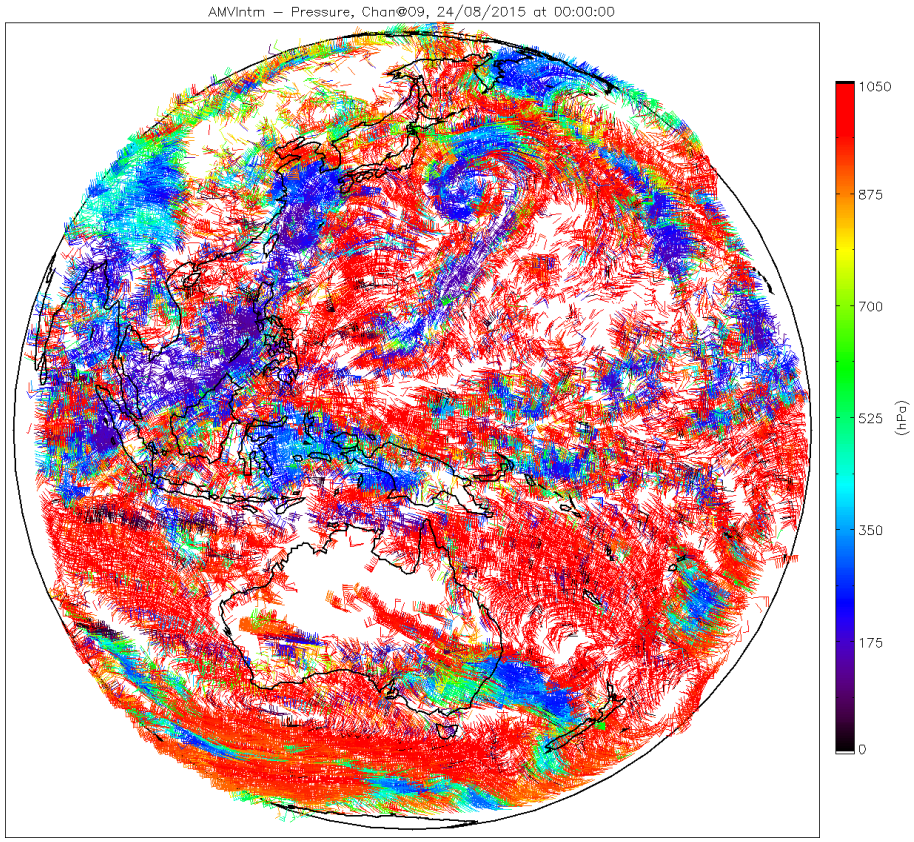
Preliminary results

Channel IR 10.41 µm

Himawari-8



MTG



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Preliminary results

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- Continue the scientific testing of the MTG prototype with Himawari-8 data.
- Compare MSG and MTG approaches using MSG data.
- Compare the MTG prototype against the GEO-KOMPSAT prototype using Himawari-8 data (collaboration with KMA).
- Participate in the upcoming 3rd AMV Intercomparison Study.
- Adapt the MTG prototype to Meteosat-8 RSS data, for comparison with industry code (L2PF – Level-2 Processing Facility).