Intercomparison of the different AVHRR winds products at Eumetsat
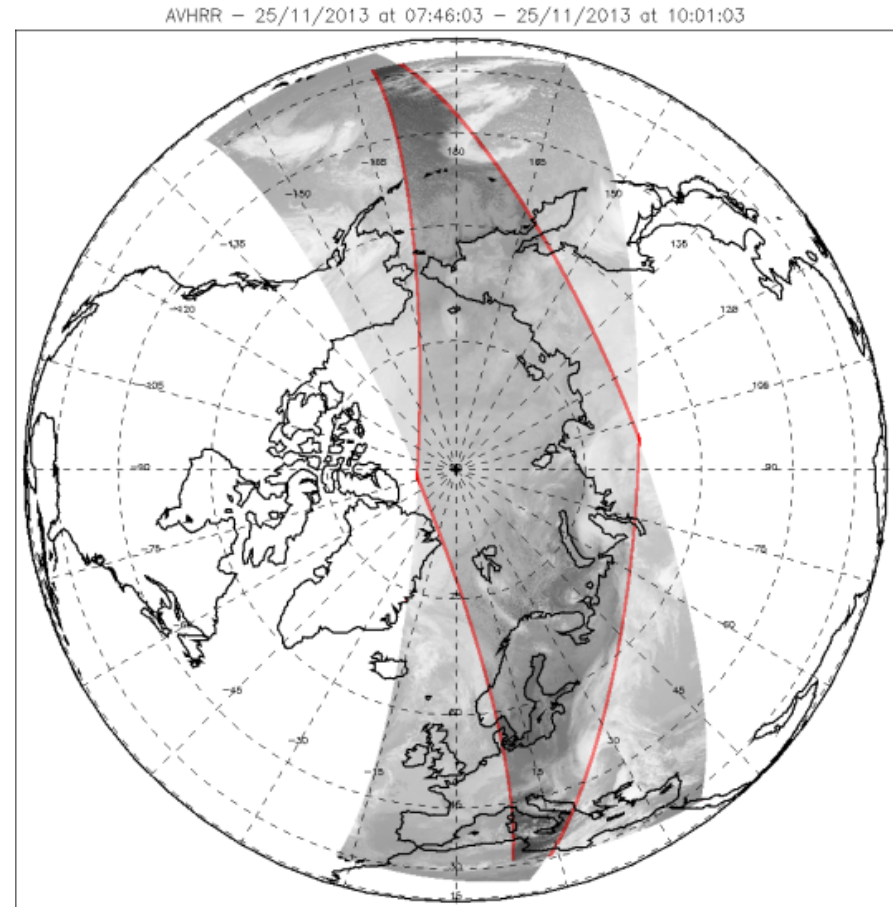
Olivier Hautecoeur (Exostaff)
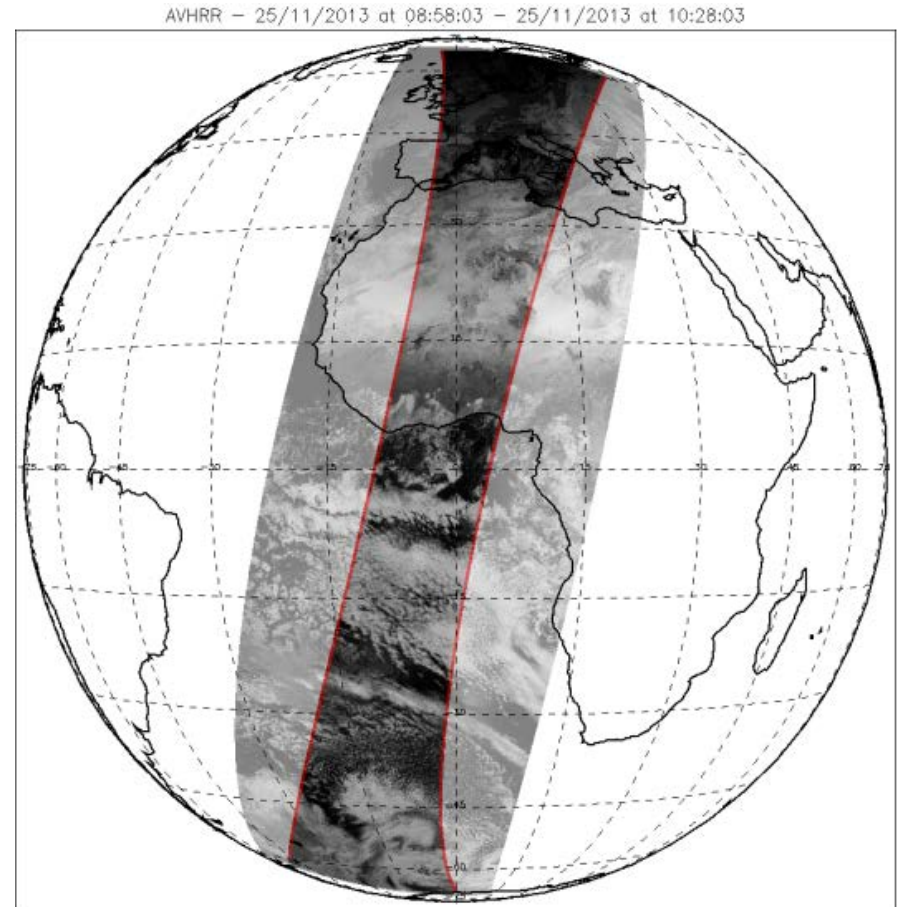
Regis Borde (Eumetsat)

The 3 AVHRR winds precessing modes

- « Single mode »

- Using two successive orbit paths of one Metop satellite

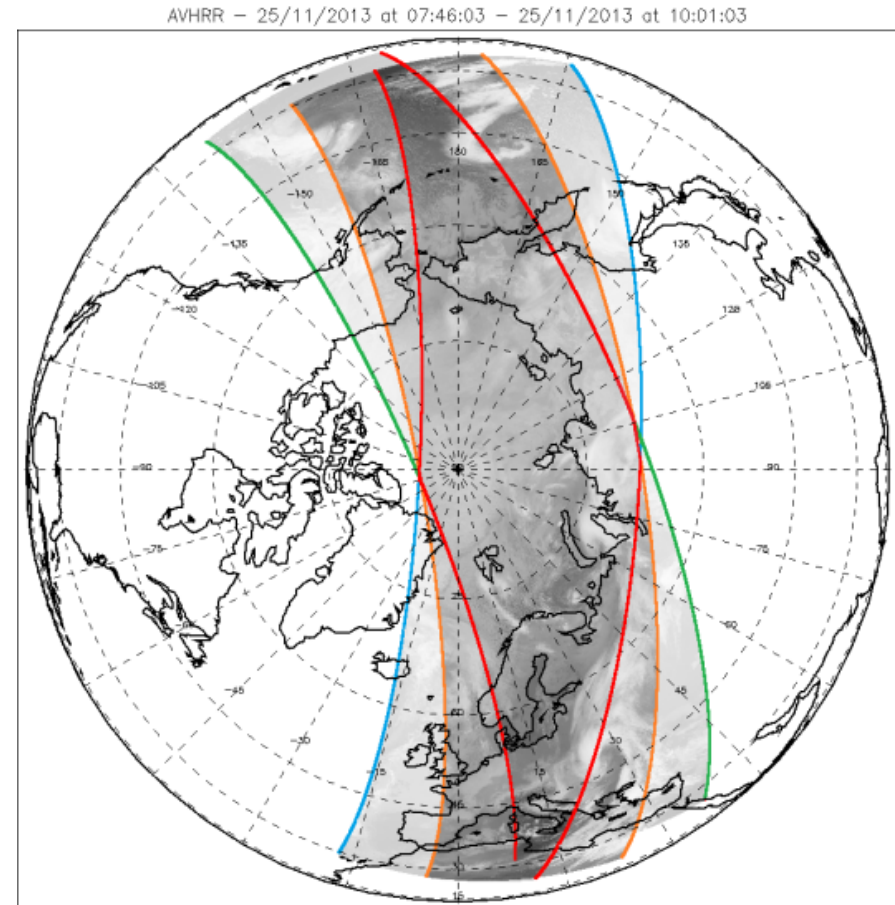- Time difference between two images is ~101 minutes.

AVHRR – 25/11/2013 at 07:46:03 – 25/11/2013 at 10:01:03

The 3 AVHRR winds precessing modes

- « Dual mode »

- Using two successive orbit paths of two different Metop satellites

- Time difference between two images is ~50 minutes.
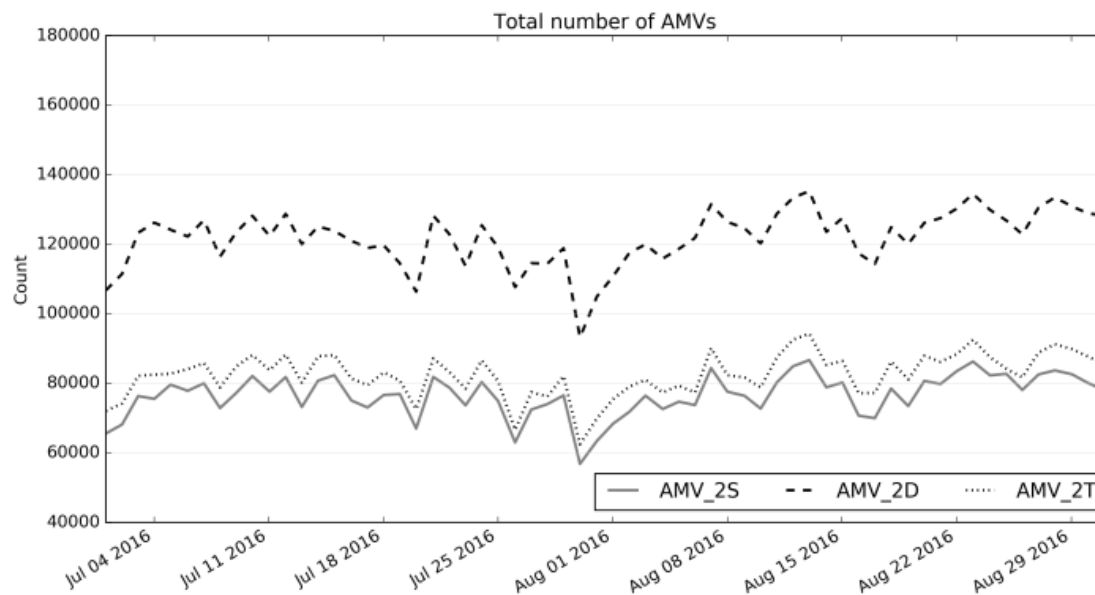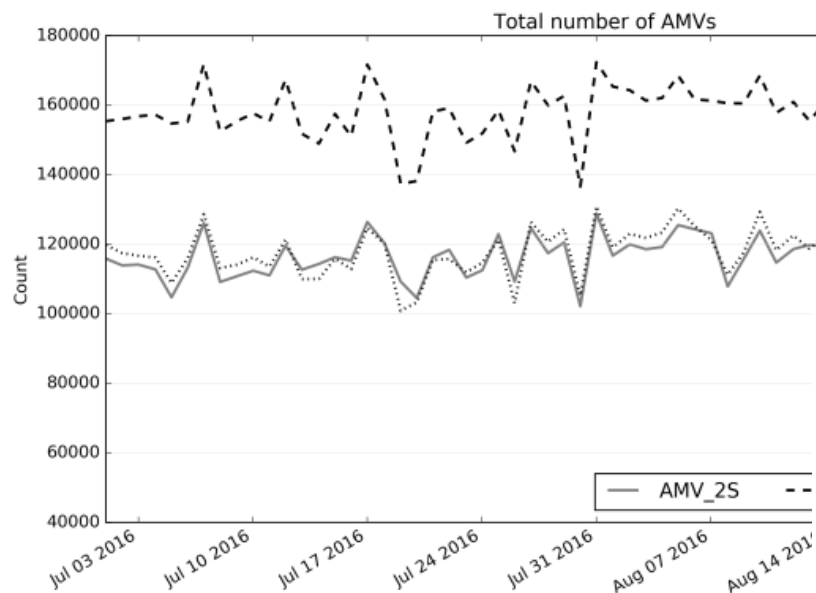
- Extended coverage

- Global product

AVHRR – 25/11/2013 at 08:58:03 – 25/11/2013 at 10:28:03

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The 3 AVHRR winds precessing modes

- « Triplet mode »

- Using three successive orbit paths from two Metop satellites

- Time difference between two images is ~50 minutes.

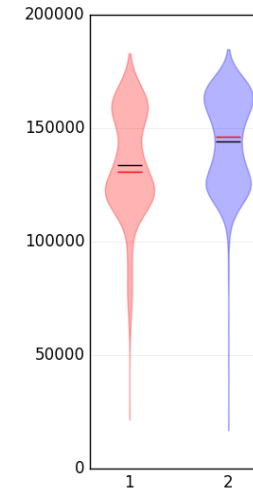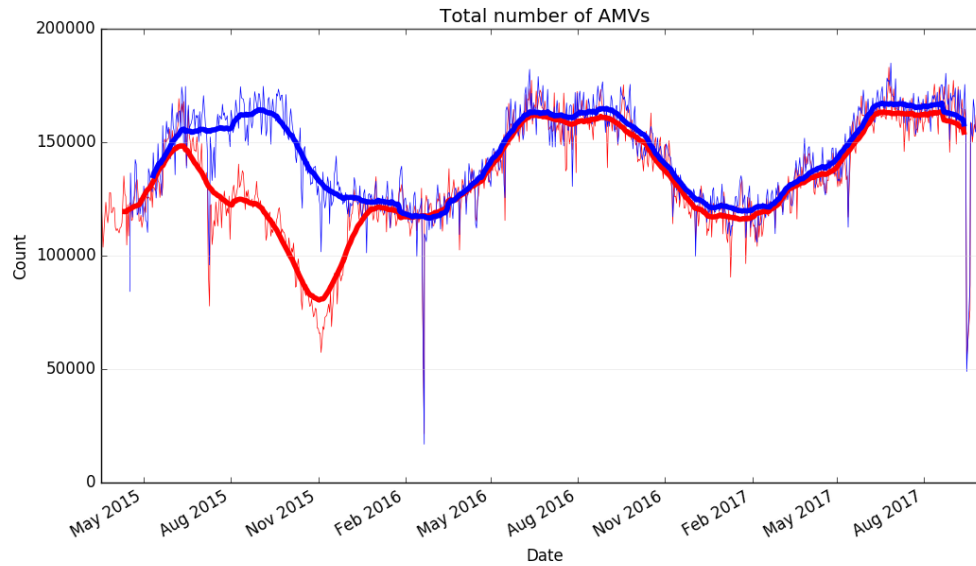- Same coverage as legacy product with additional consistency check

AVHRR – 25/11/2013 at 07:46:03 – 25/11/2013 at 10:01:03

Total number of winds

- Statistics computed poleward 50° (for North and South regions)
- Only the overlap matters

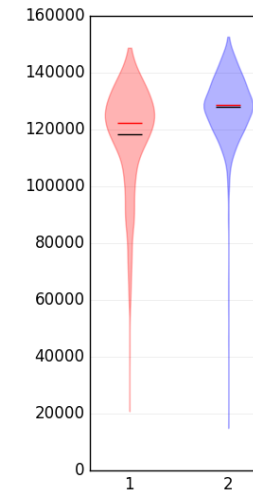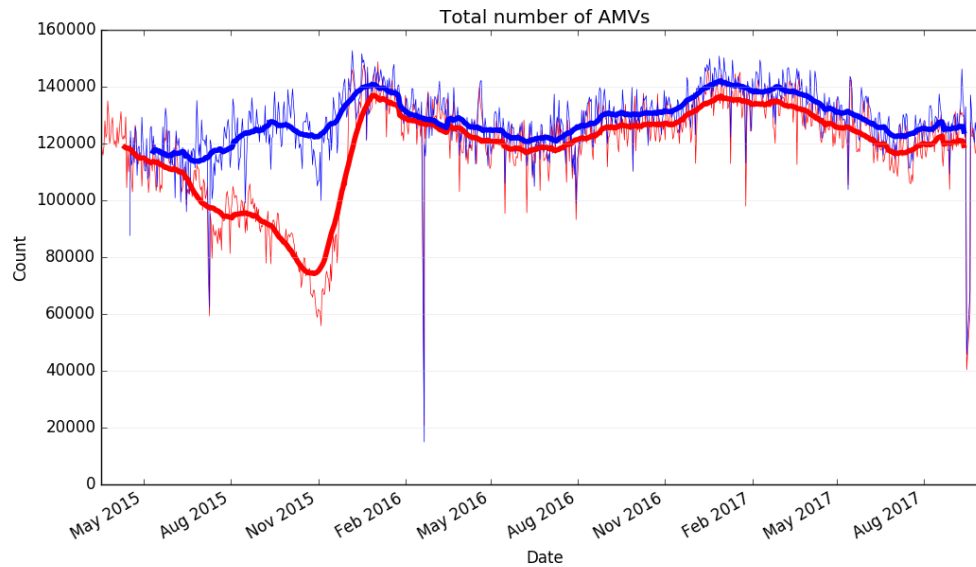IWW-14, Jeju 23-27 April 2018

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Number of winds: Seasonal effect (AVHR_AMV_2D)

Northern Hemisphere

Southern Hemisphere

EXostaff   EUMETSAT

Number of winds: Cloudiness effect

1–9 Feb 2016

1–9 Aug 2016

Cloudiness

AVHRR/MetopA

Exostaff EUMETSAT
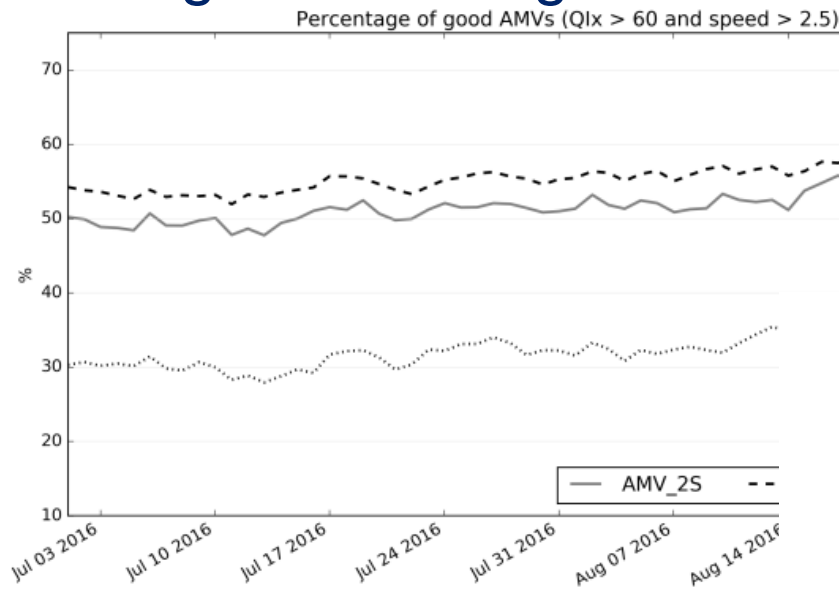
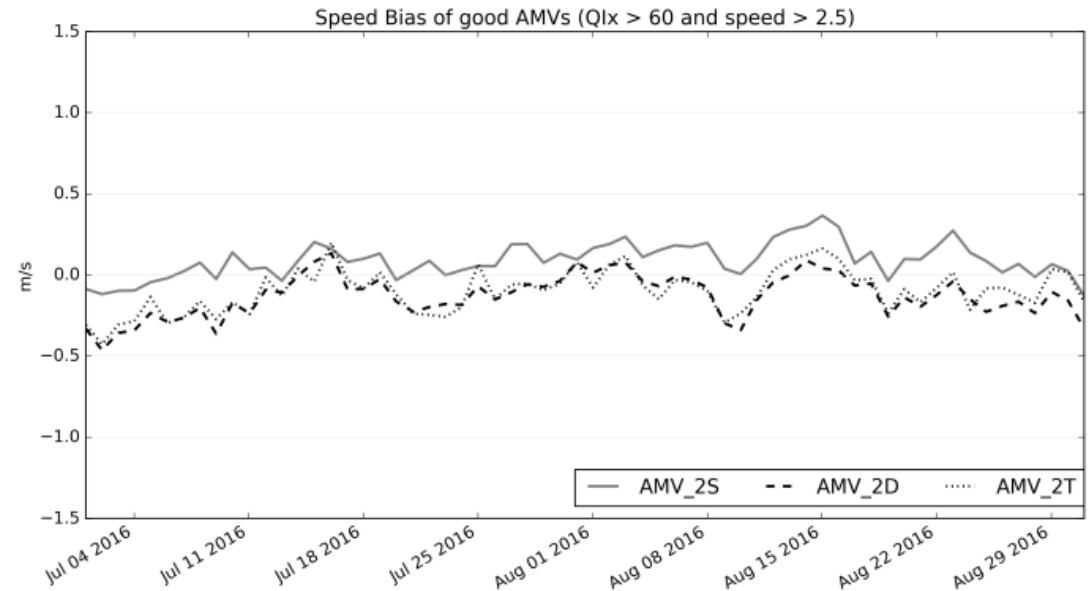# Quality screening (QIx > 60)
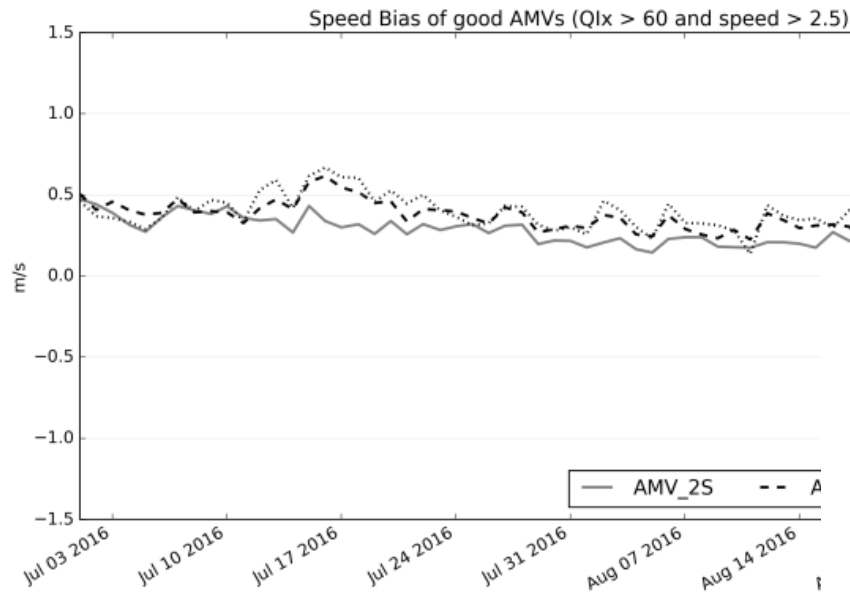
- Reducing the time difference increases the similarity between the images, and so the QI
- Adding a third image constrains the selection

Percentage of good AMVs (QIx > 60 and speed > 2.5)

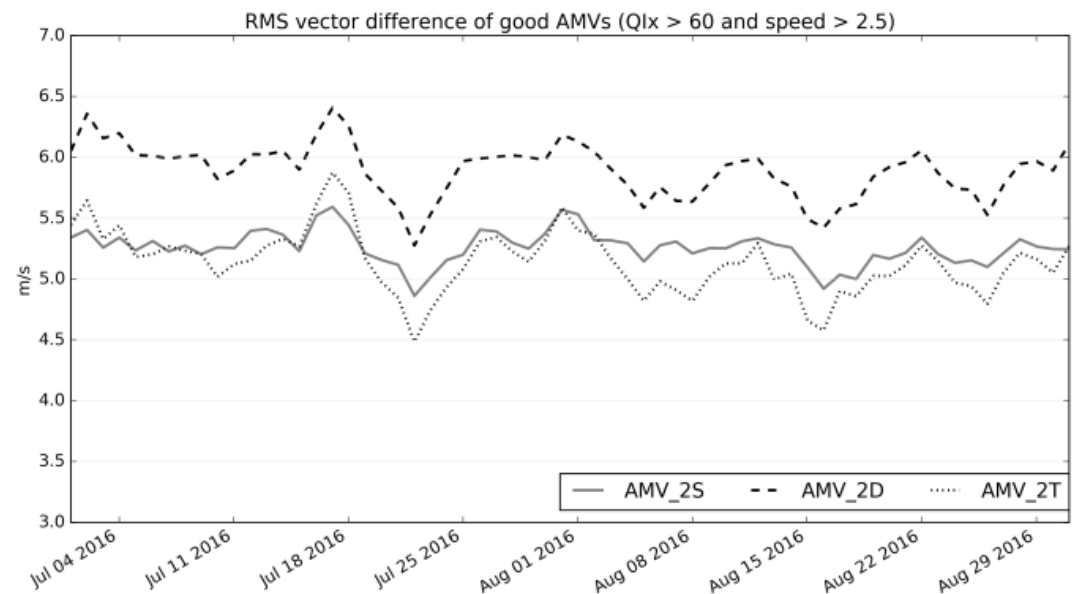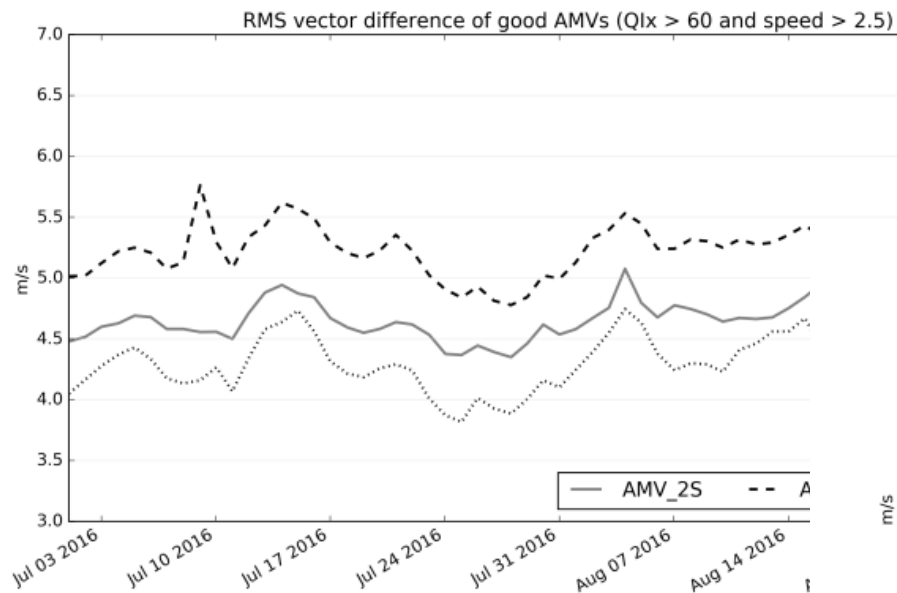Percentage of good AMVs (QIx > 60 and speed > 2.5)

Forecast Speed Bias

- AMV global and triplet share the same output

RMSVD against forecast
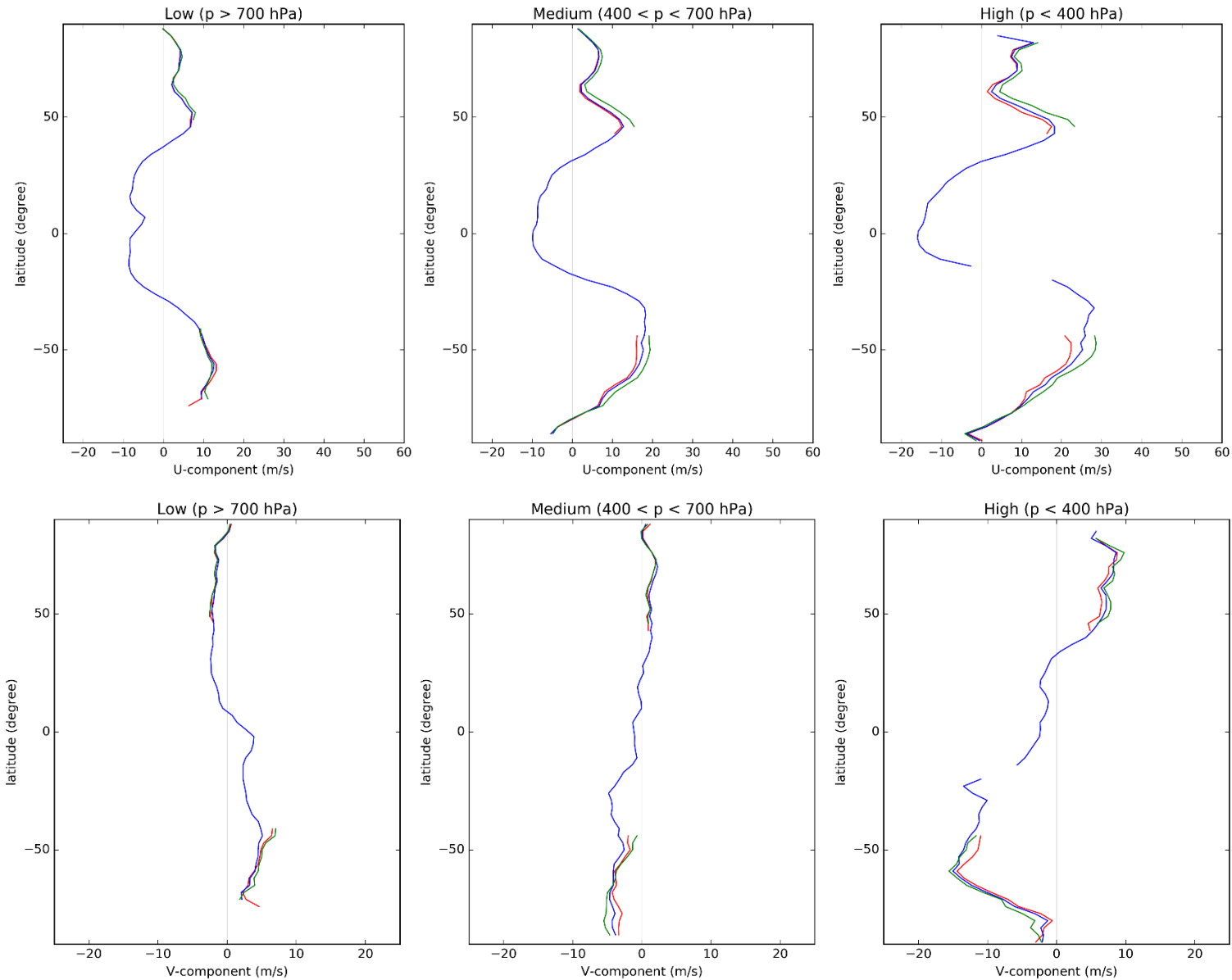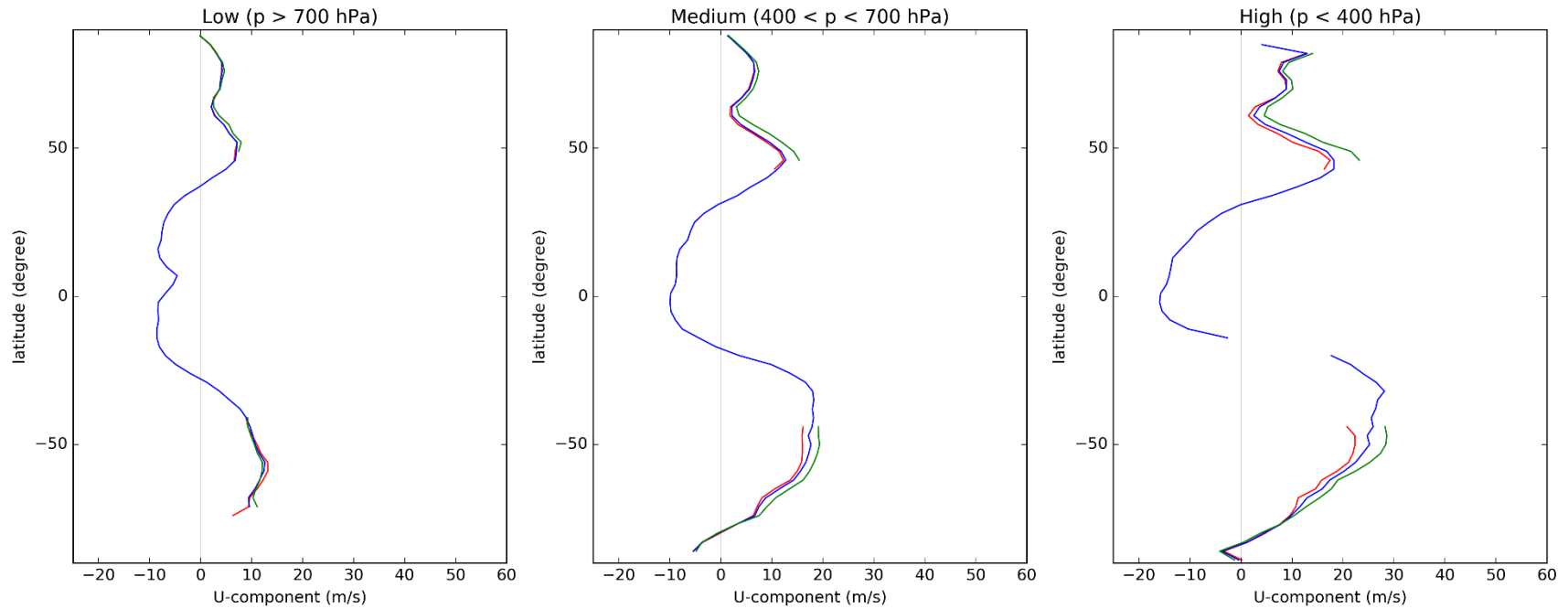
- Effect of the third image in the quality screening

AVHRR Statistics (July 2017)

AVHRR Statistics (July 2016 - July 2017)

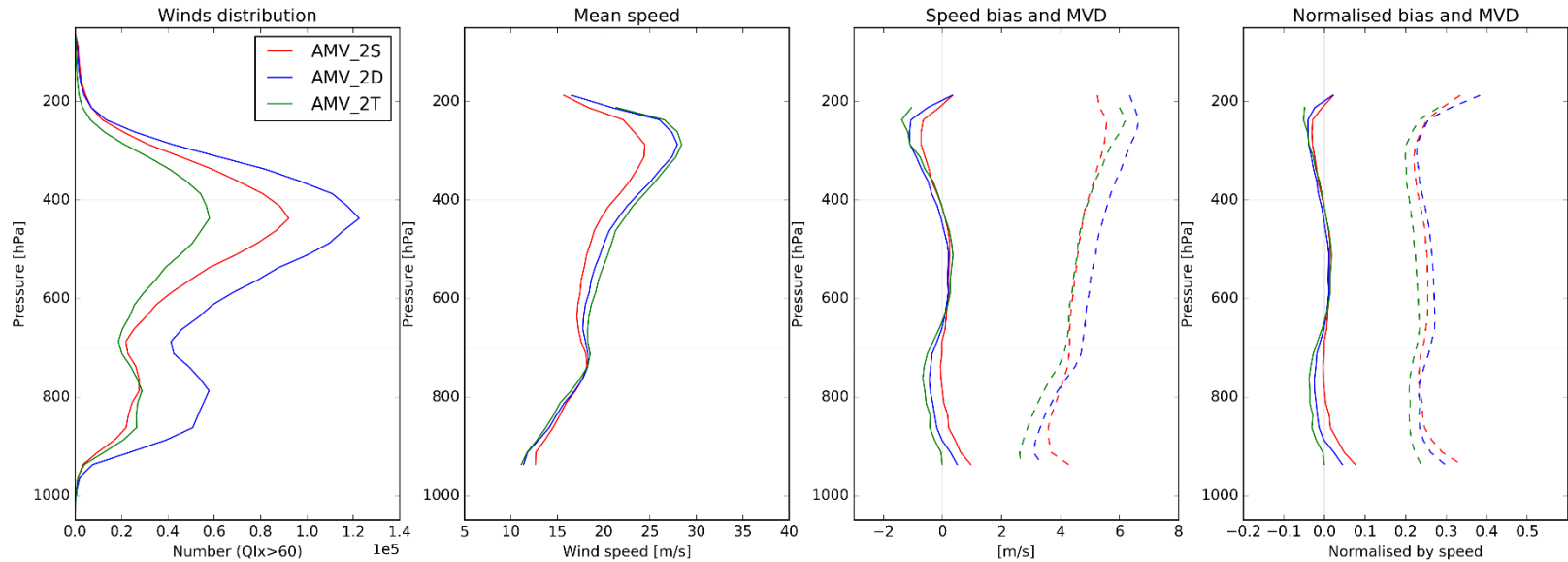Low (p > 700 hPa)   Medium (400 < p < 700 hPa)   High (p < 400 hPa)

AVHRR Statistics (July 2017)

Northern Hemisphere

Winds distribution / Mean speed / Speed bias and MVD / Normalised bias and MVD

Southern Hemisphere

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Quality comparison

Northern Hemisphere
February 2016

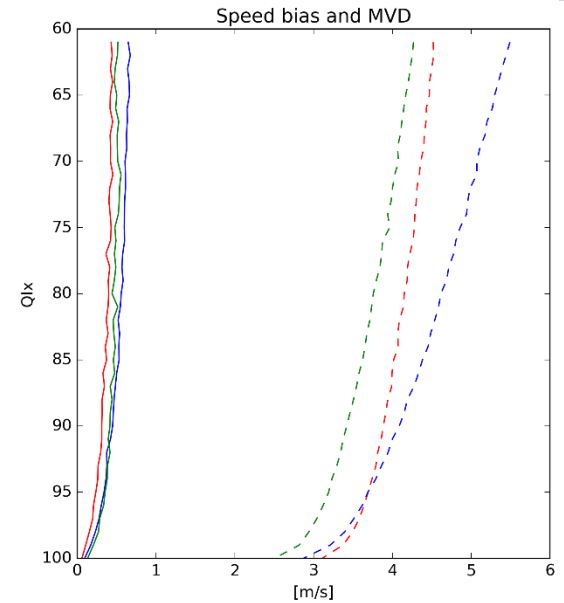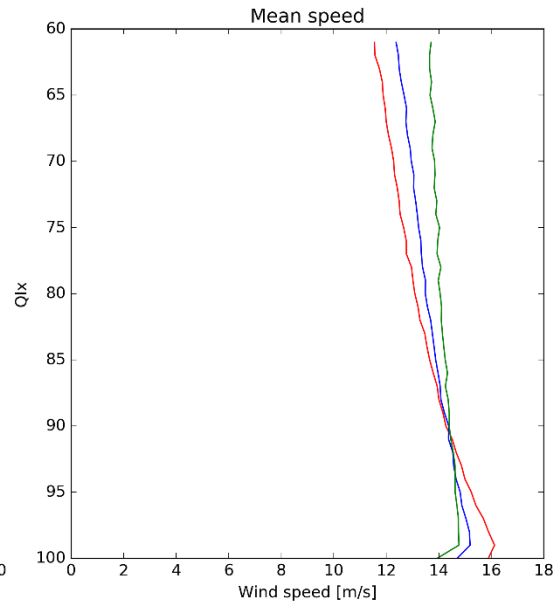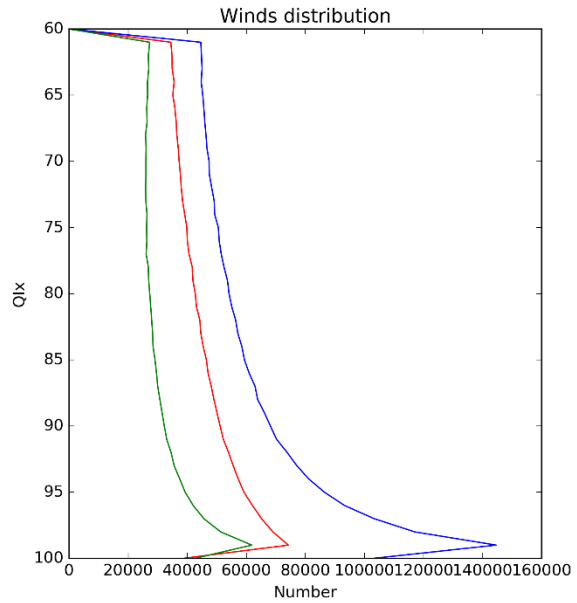|	AMV_2S				AMV_2D				AMV_2T			
	Number	Speed (m/s)	Bias (m/s)	MVD (m/s)	Number	Speed (m/s)	Bias (m/s)	MVD (m/s)	Number	Speed (m/s)	Bias (m/s)	MVD (m/s)
All	1035829	15.8	0.42	4.44	1551715	16.73	0.31	4.88	583998	16.1	0.33	3.92
Low	22%	11.41	0.61	3.79	24%	11.52	0.45	3.64	28%	10.81	0.26	2.81
Mid	65%	15.73	0.57	4.46	62%	16.56	0.53	5.02	59%	16.52	0.56	4.14
High	13%	24.2	-0.74	5.51	13%	26.94	-0.97	6.46	13%	25.86	-0.6	5.43

EXostaff   EUMETSAT
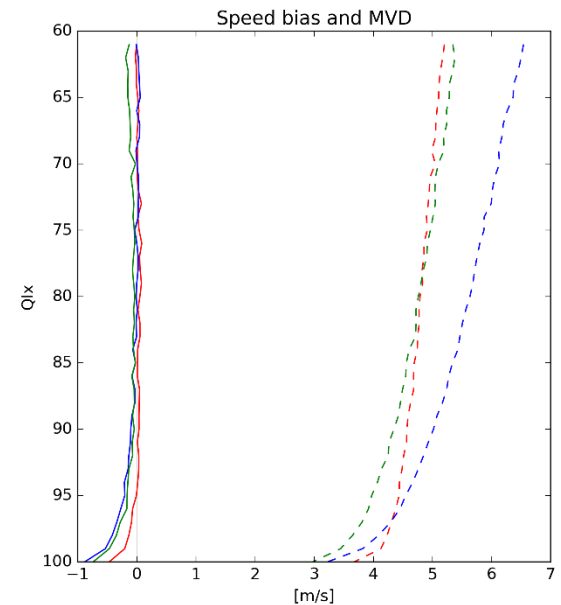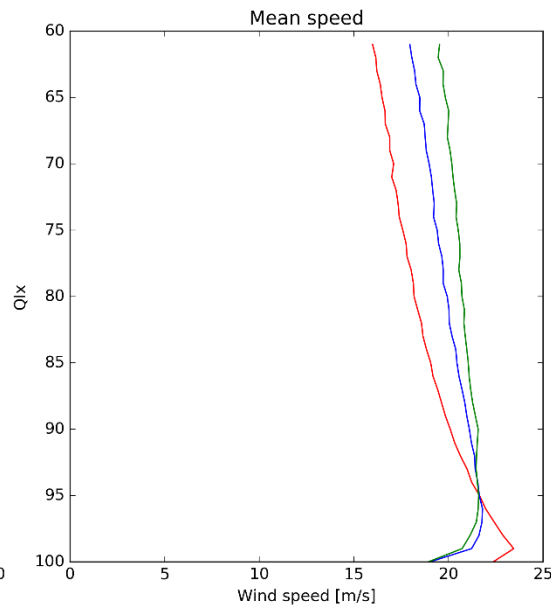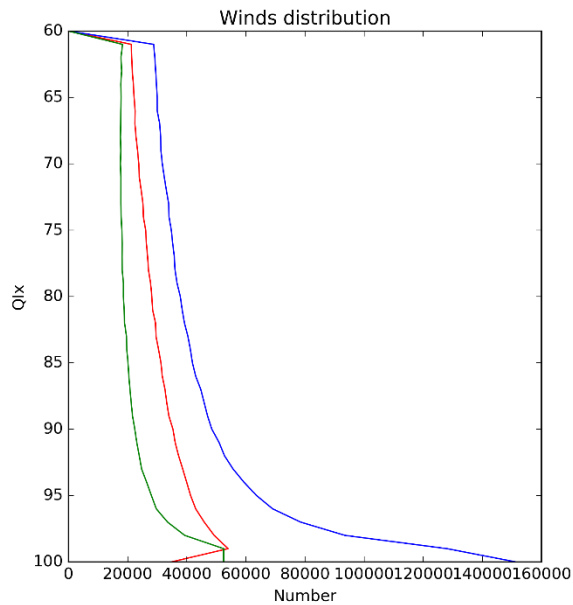
Quality comparison

Southern Hemisphere
February 2016

	AMV_2S				AMV_2D				AMV_2T			
	Number	Speed (m/s)	Bias (m/s)	MVD (m/s)	Number	Speed (m/s)	Bias (m/s)	MVD (m/s)	Number	Speed (m/s)	Bias (m/s)	MVD (m/s)
All	1302232	15.64	0.1	4.14	2092956	17.21	-0.05	4.51	1008402	16.39	-0.0	3.75
Low	26%	12.88	0.36	3.46	28%	13.37	0.08	3.38	32%	12.83	-0.04	2.86
Mid	64%	14.9	0.19	4.19	60%	16.52	0.09	4.64	58%	15.93	0.14	3.89
High	10%	27.06	-1.12	5.51	11%	30.43	-1.17	6.63	10%	30.59	-0.76	5.82

EXostaff   EUMETSAT
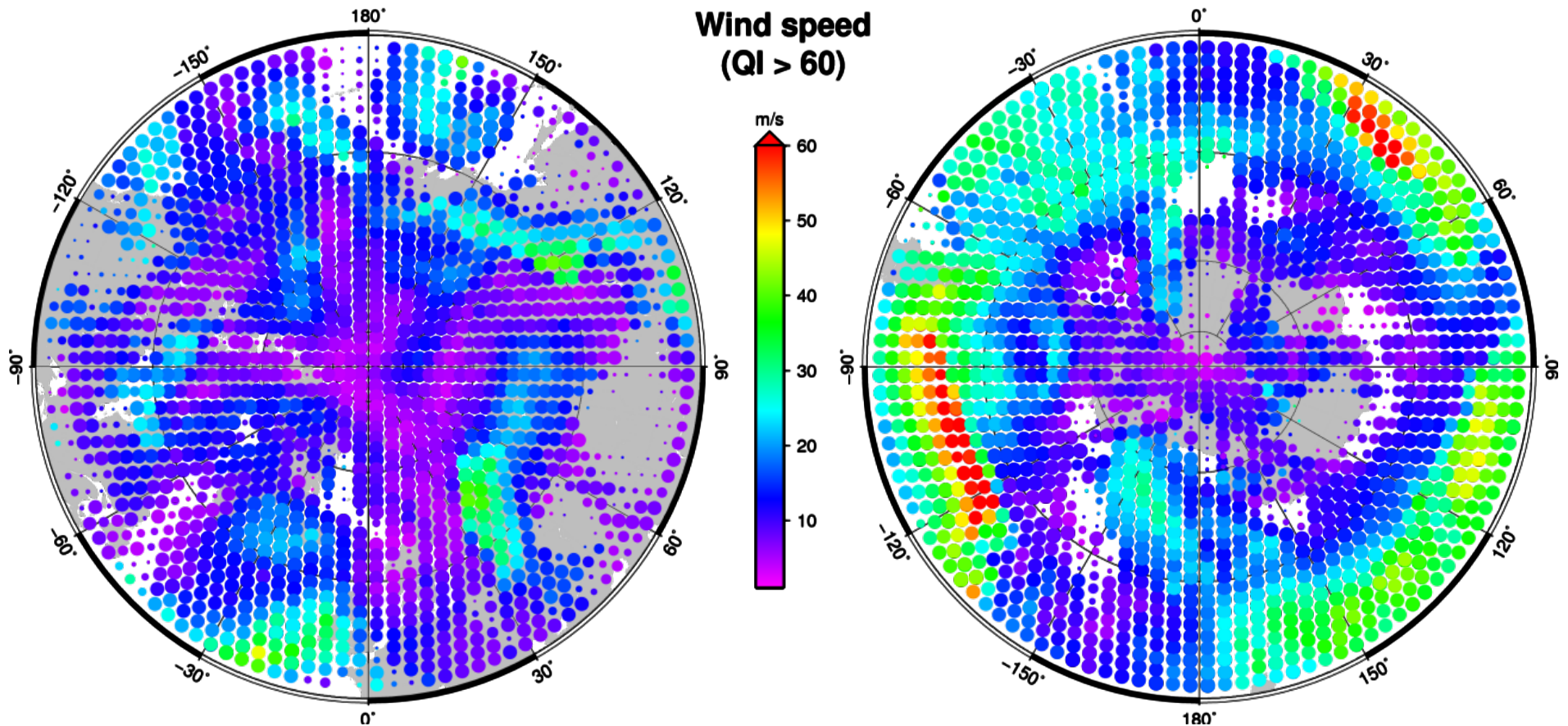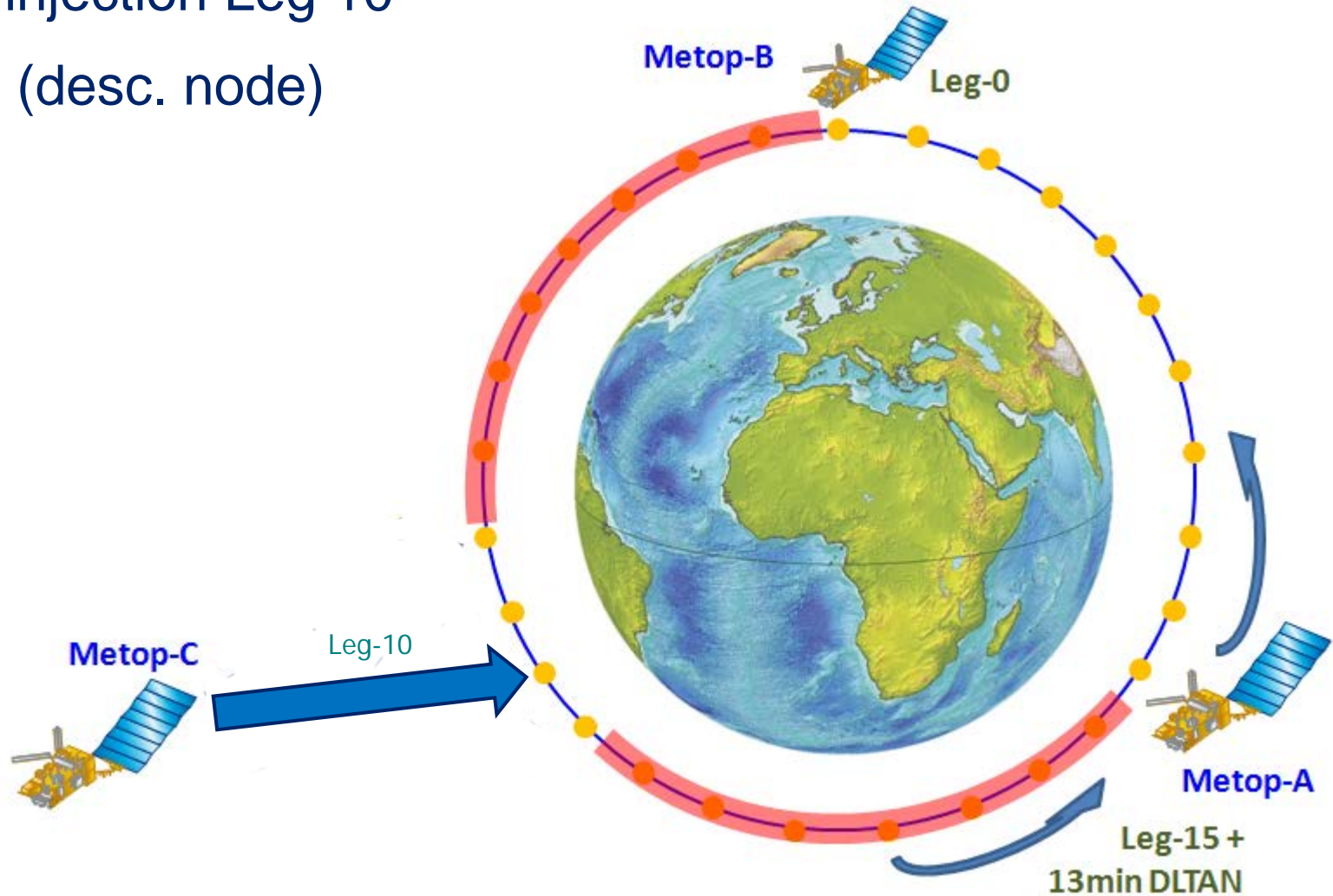
Northern Hemisphere

Southern Hemisphere

Coverage and mean speed

AVHR_AMV_2D
27 June 2015

Wind speed
(QI > 60)

Metop-A, Metop-B, Metop-C Phasing

- Metop-C injection Leg 10
- LST 9:30 (desc. node)

The high-latitude winds v2019

- Metop-A·B·C operational and processed
  - Single, Dual and possible Triple platforms products
  - Not all combinations are suitable

- Implementation of the new BUFR sequence
  - Mandatory to distinguish the product!

- Tristar configuration should provide the best ever configuration for LEO winds
  - But it is a temporary (Between 6-9 months…. to 2 years)

- Since EPS/AVHRR + EPS-SG/VII dual operation will be very difficult to implement (due to operational ground segment contraints), Sentinel 3A-3B/SLSTR dual operation will be implemented and will secure the EUMETSAT Winds production over high latitude regions (poleward 45-50°)

EXostaff EUMETSAT

감사합니다.