



# GLOBAL ATMOSPHERIC MOTION VECTOR INTER-COMPARISON STUDY

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\*\*\*NOAA/NESDIS

## MOTIVATION

*“From the various recommendations of IWW8 CGMS concluded and formulated the following actions and recommendations:...*

***Recommendation 34.15: There should be a comparison of the operational algorithms of all satellite wind producers for the height assignment of AMVs from clouds using a common data set from SEVIRI on MSG, and the same ancillary data .”***

*CGMS-34 Report excerpt*

Participants:

KMA, JMA, National Institute for Space Research - Brazil,  
National Meteorological Institute - Spain,  
CIMSS/NESDIS, EUMETSAT

## CGMS study

Use 18 August 2006, 12:00-12:30 UTC image triplet. Apply your own operational wind retrieval algorithm and extract AMVs from the VIS( $0.8\mu\text{m}$ ), IR( $10.8\mu\text{m}$ ), IR( $13.4\mu\text{m}$ ), WV( $6.2\mu\text{m}$ ) and WV( $7.3\mu\text{m}$ ) spectral bands, at first using your own forecast profile and next, using the provided by EUMETSAT forecast model data. Use 12:15 UTC image for height assignment step.

### Report:

Target/AMV ID number, Lat, Lon, Target/Search box size, Speed, Direction, Temperature, Height, Low level correction method, Guess Spd/Dir, Target Type (cloud/clear),  $0.8\mu\text{m}$  Albedo,  $10.8\mu\text{m}/13.4\mu\text{m}/6.2\mu\text{m}/7.3\mu\text{m}$  BT, Correlation Max from tracking, Tracking Method, Height Error (hPa), Height Assignment Method, Quality Indicator (forecast independent)

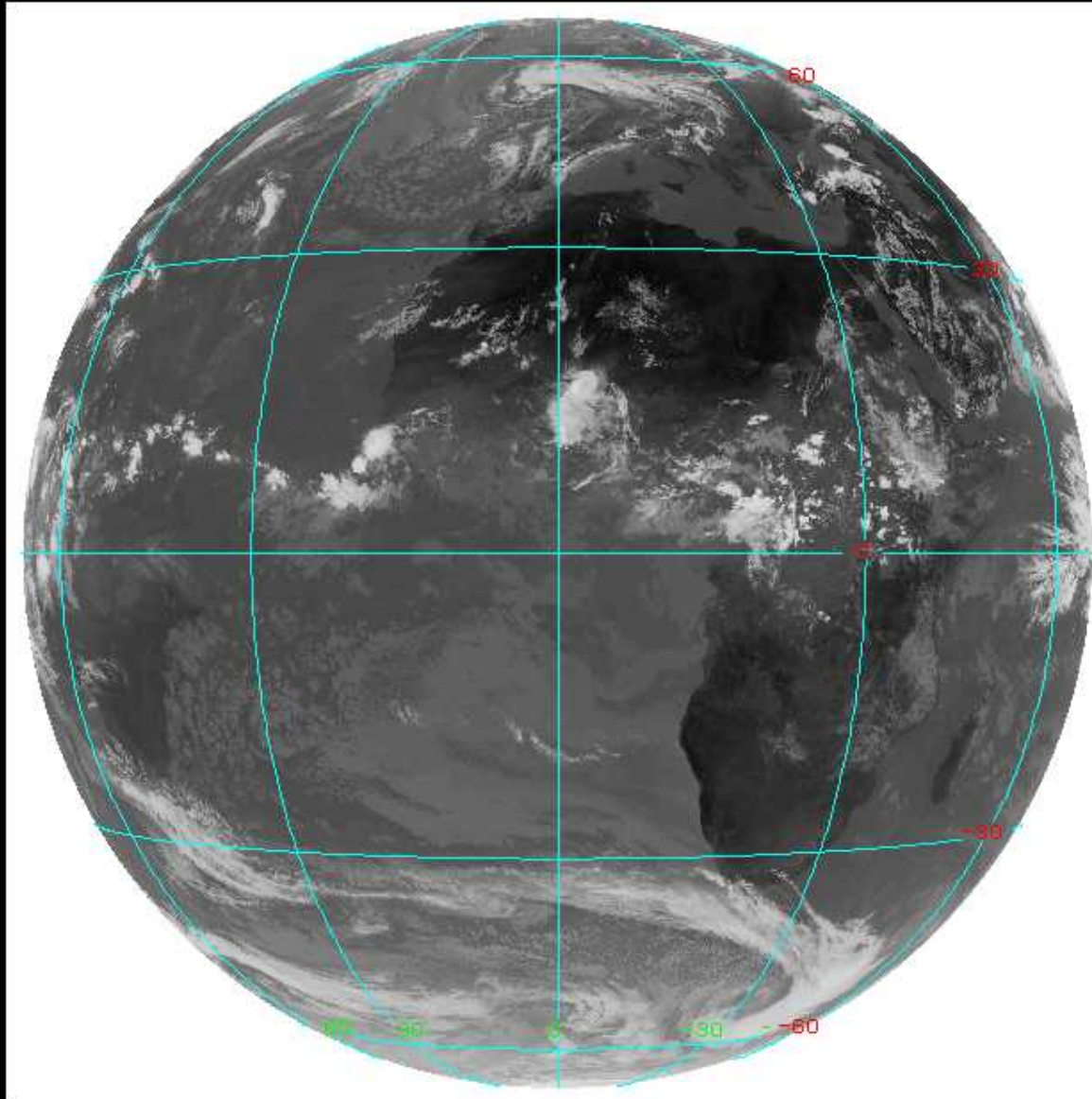
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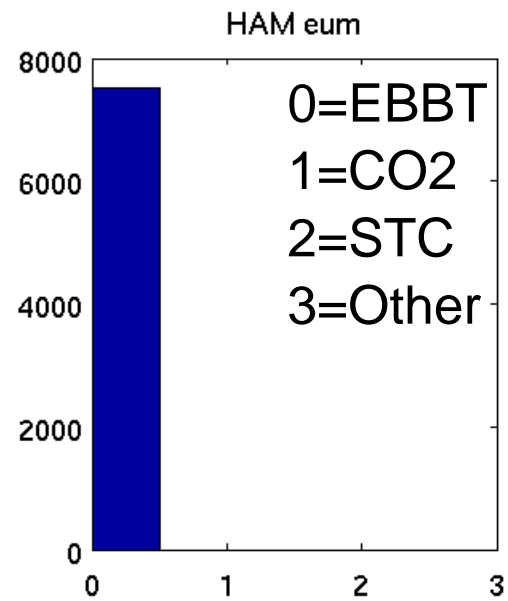
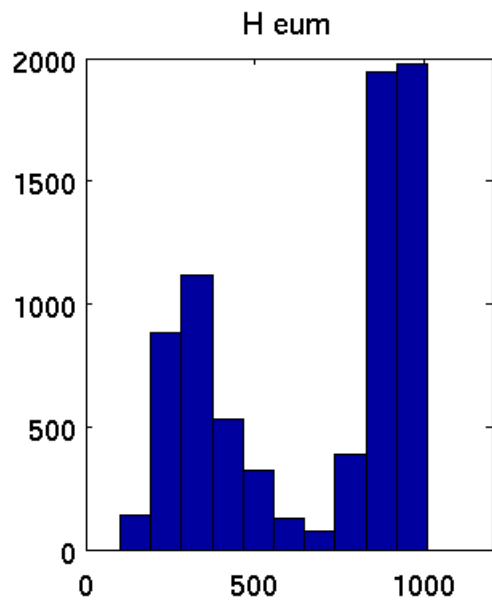
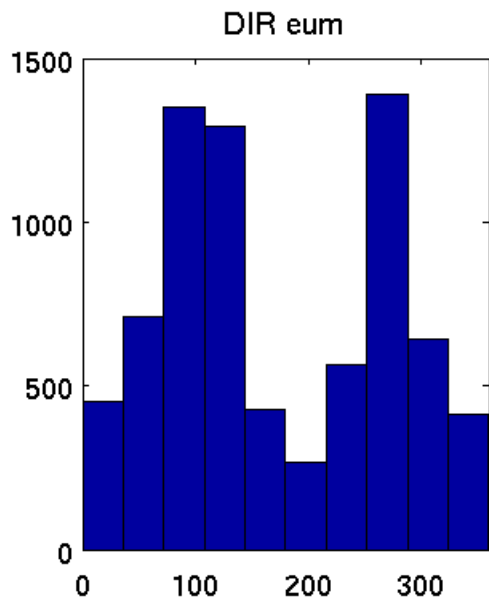
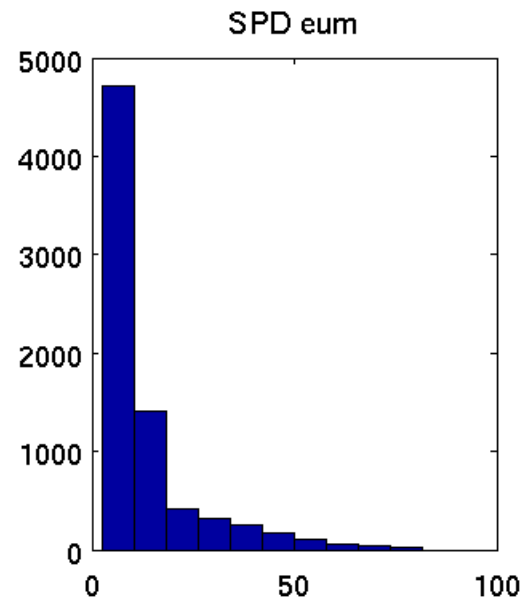
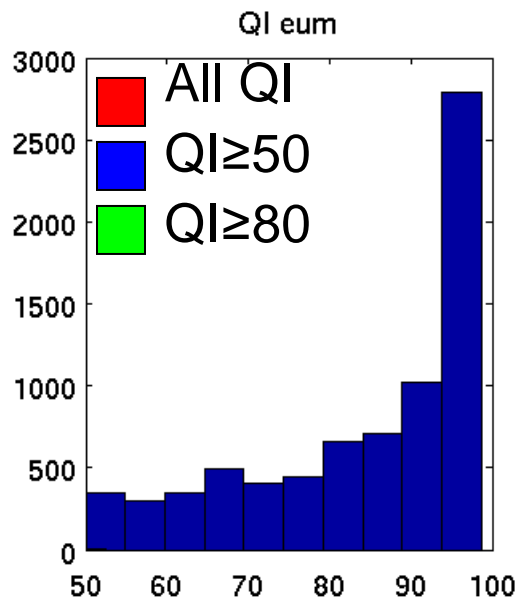
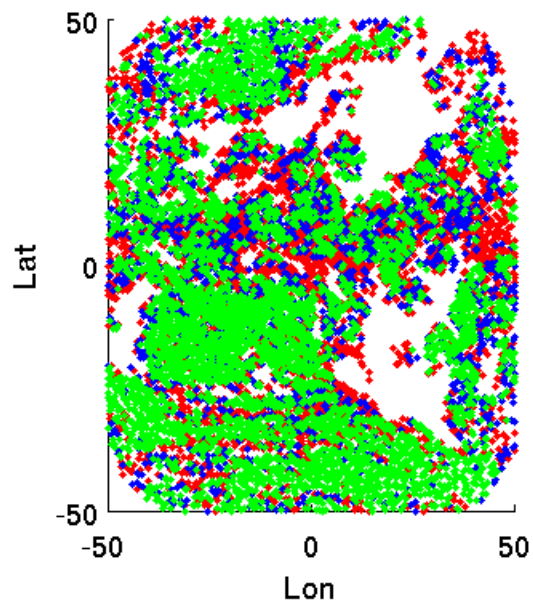
18 August 2006, 12:15 UTC Full Disk SEVIRI image, Band 9



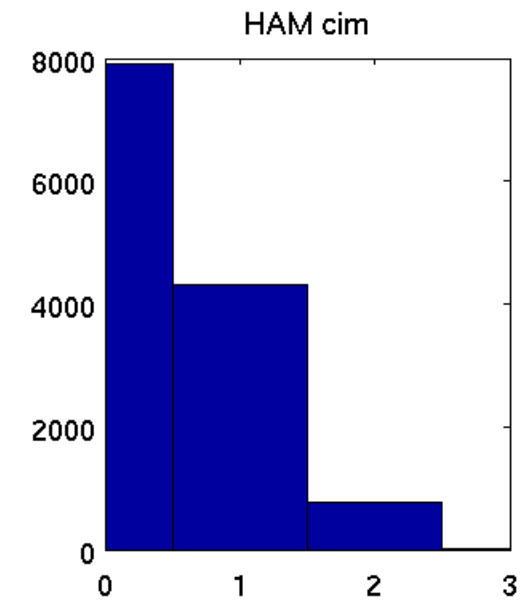
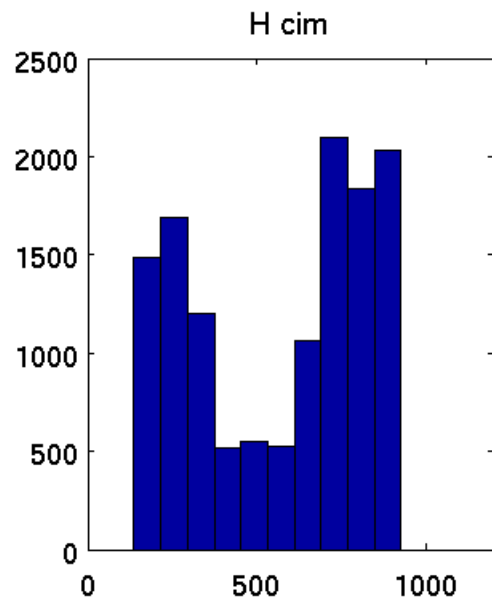
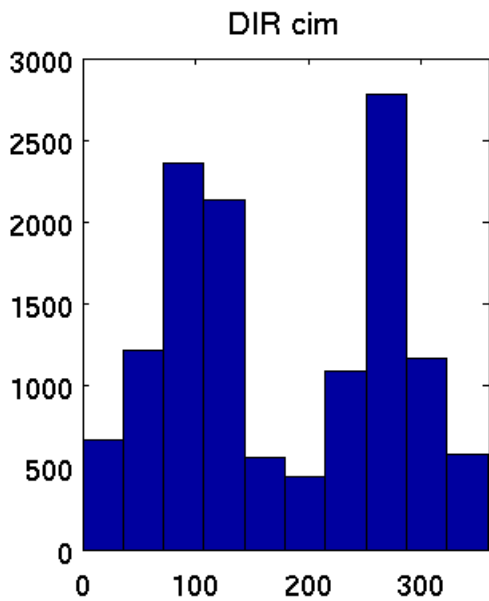
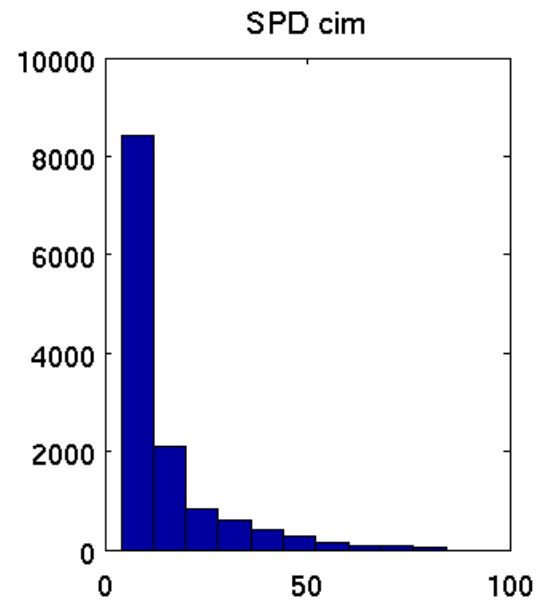
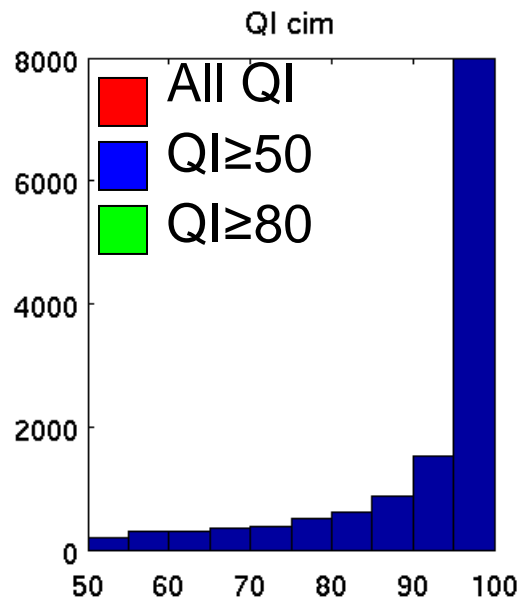
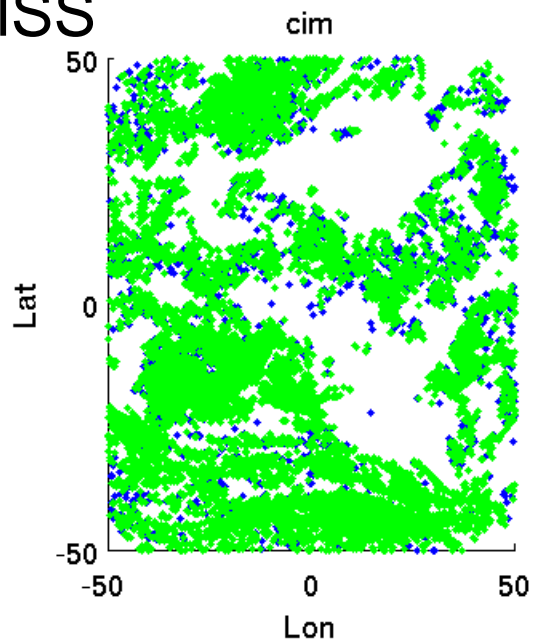
## AMV Retrievals - specifics

Producer	EUM	CIM	BRZ	KMA	JMA
Steps 1)	Target	Target	Target	Target	Target
2)	Track	Height	Track	Track	Track
3)	Height	Track	Height	Height	Height
Target	24x24	15x15	32x32	32x32	32x32
Search	80x80	21x37	50x50	64x64	64x64
Height	Average coldest peak CTP	12:15 25%	Average 10%	Average 15%	Average most frequent peak CTP
QI	2 QI 1band	1 QI all bands	-----coldest BT-----		

# EUMETSAT eum

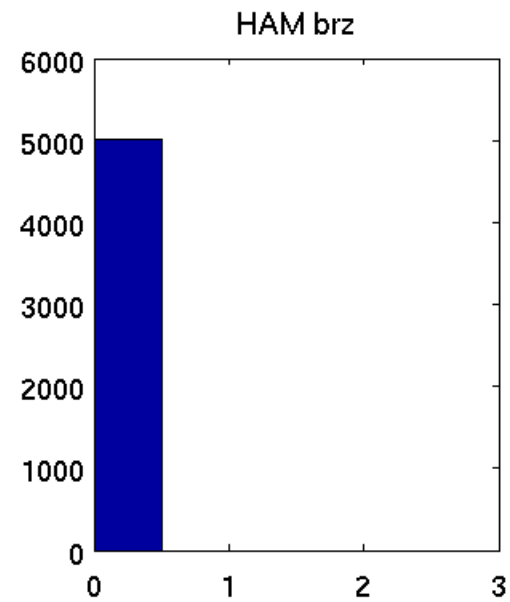
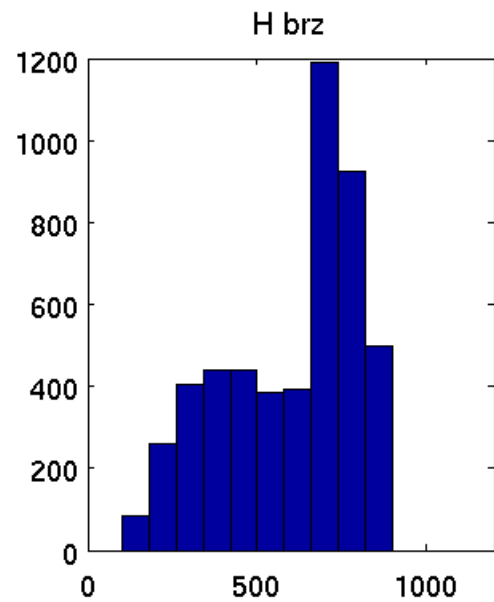
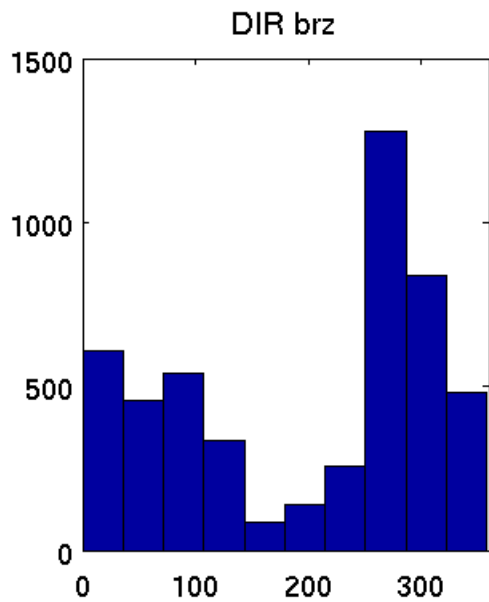
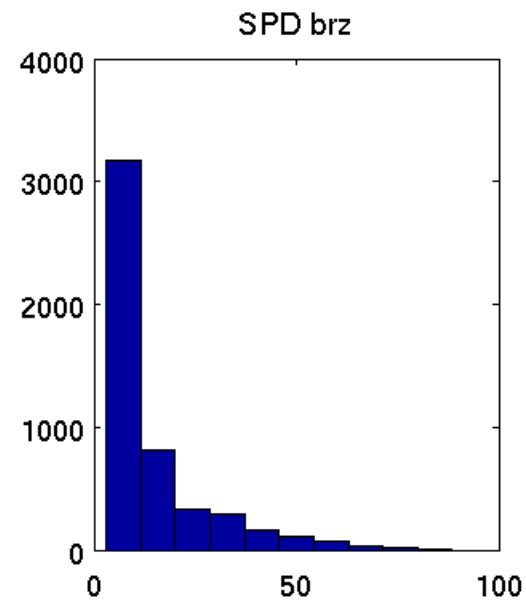
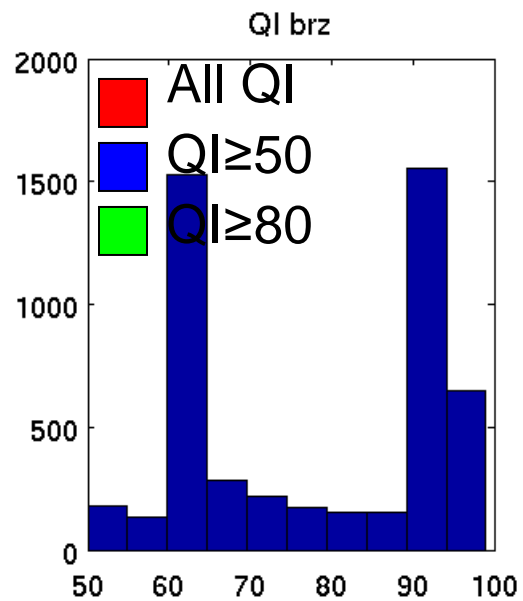
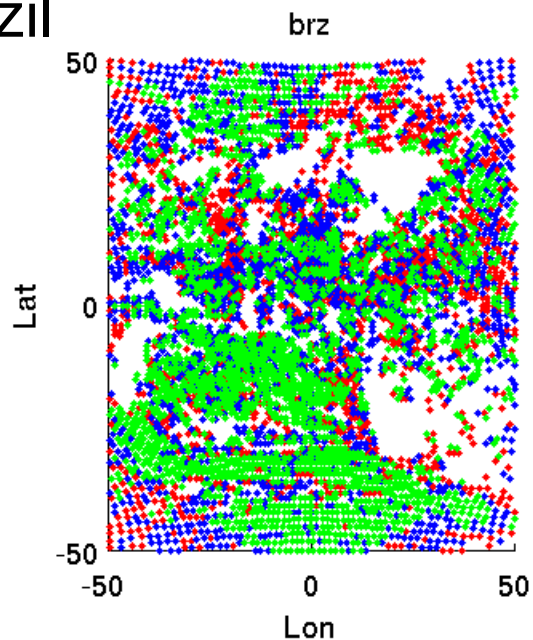


# CIMSS

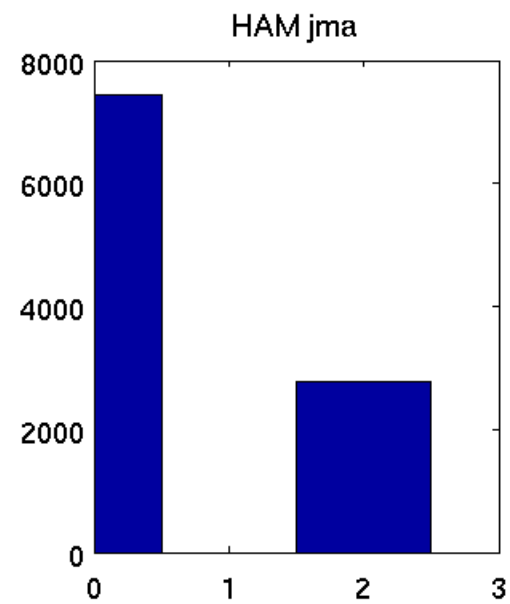
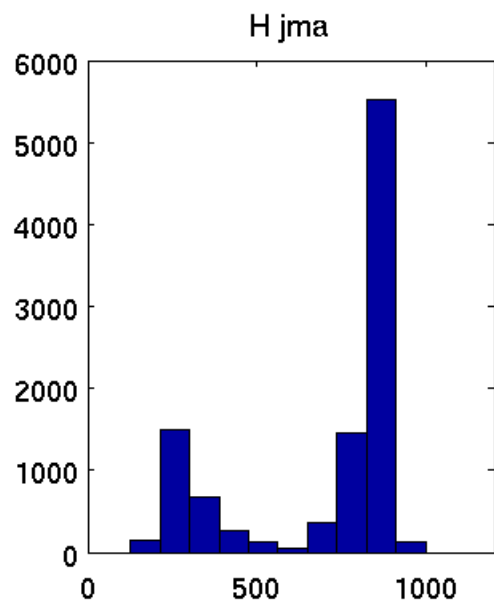
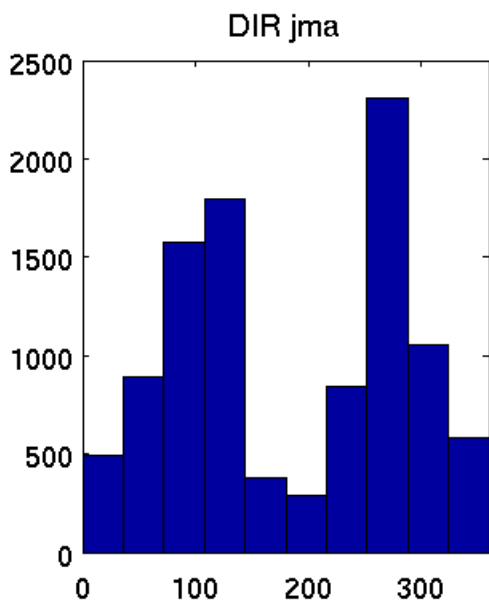
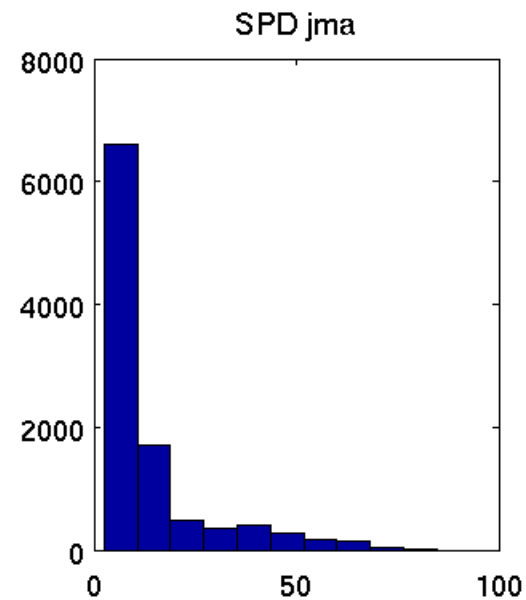
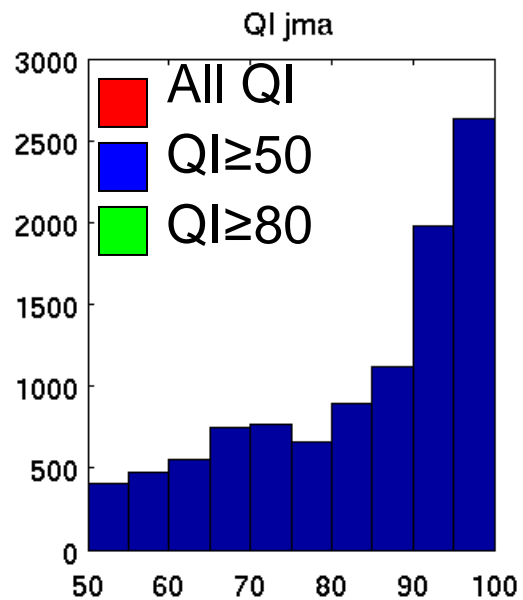
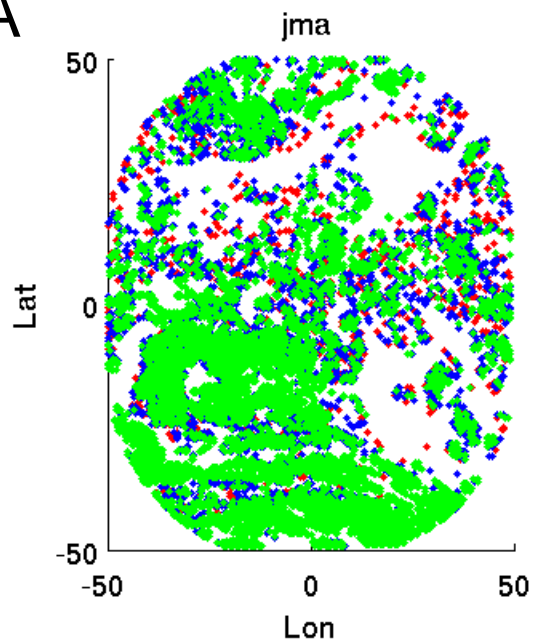




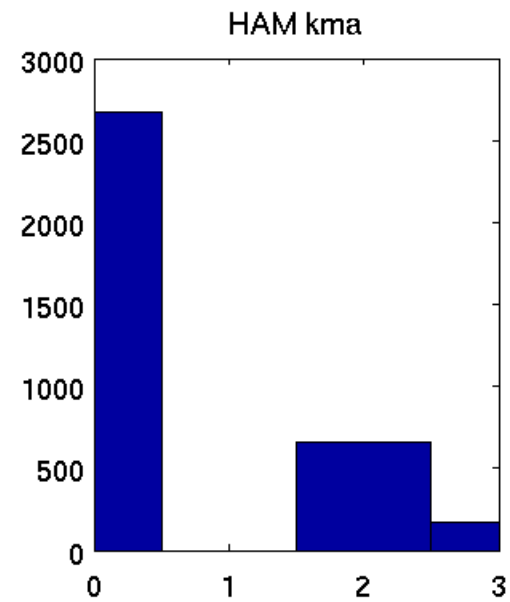
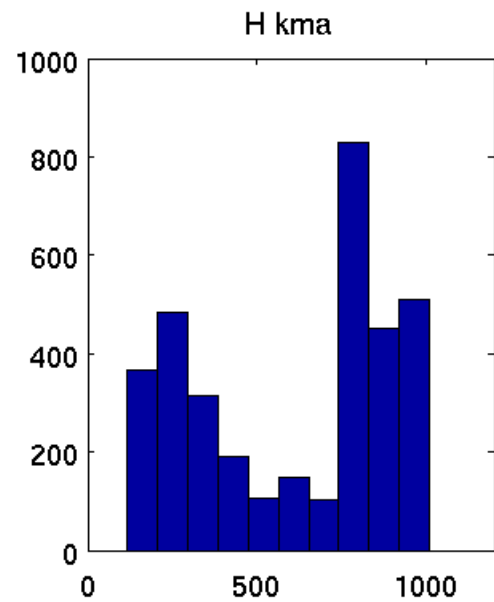
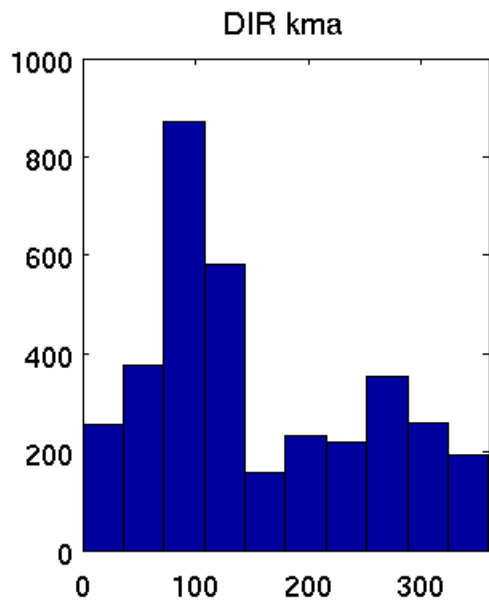
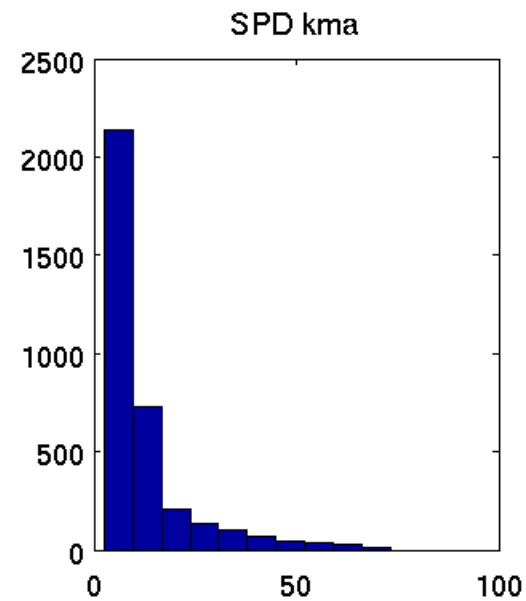
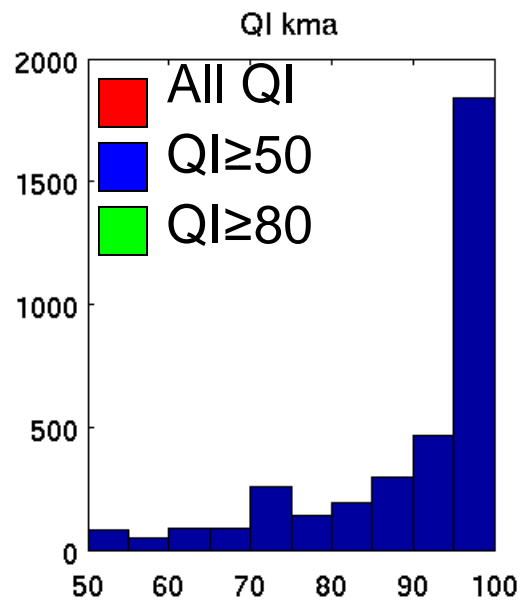
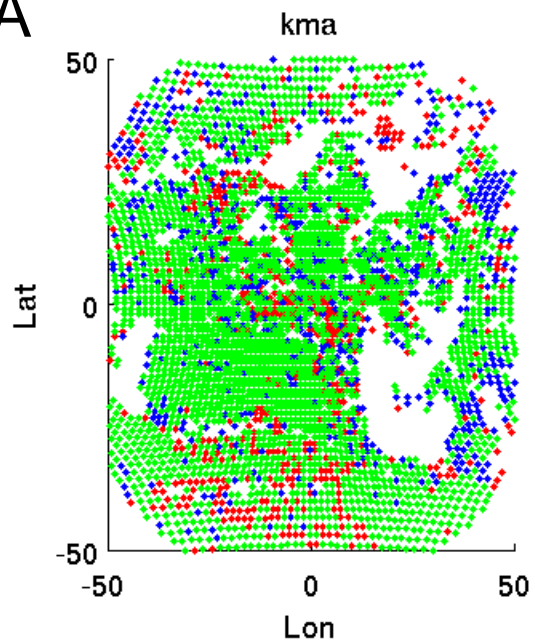
# Brazil



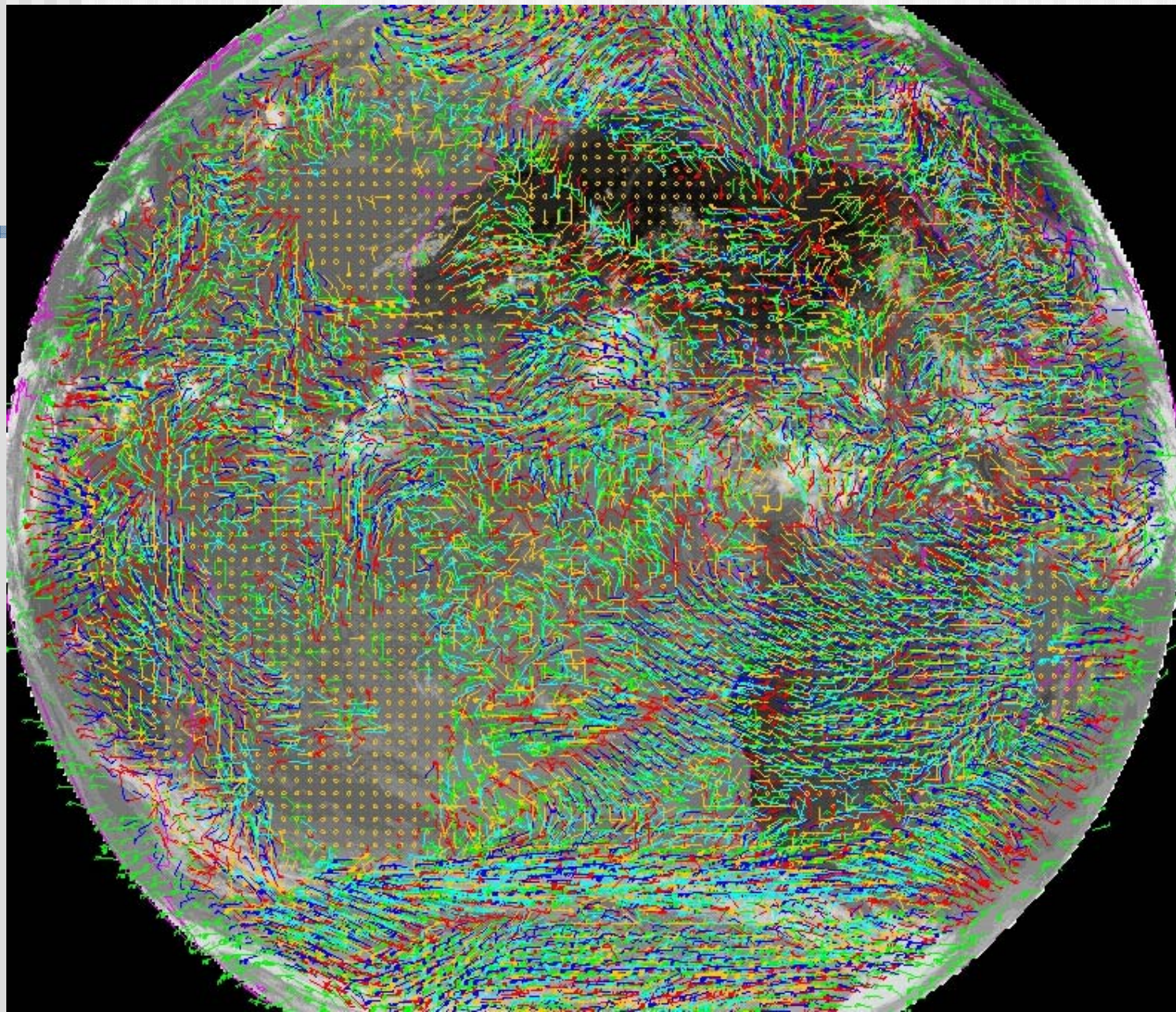
# JMA



# KMA




IR-10.8	EUMETSAT	CIMSS	Brazil	JMA	KMA
Total num winds	10775	13003	7051	11006	4072
Winds QI>=50	7506	13003	5017	10216	3501
Winds QI>=80	5099	11081	2503	6805	2819
***** For AMV with QI>=50 *****					
SPD min	2.50	4.00	3.04	2.5	2.51
SPD max	81.60	84.20	88.50	84.66	73.30
SPD mean	13.18	14.41	14.19	13.79	12.08
P min	102.17	137.00	101.00	125.96	115.00
P max	1008.59	925.00	900.00	997.70	1009.98
P mean	669.27	566.49	598.04	704.34	609.20
Low winds%	57.73	45.87	42.58	72.18	53.61
Mid winds%	11.62	18.81	36.14	4.33	12.11
High winds%	30.66	35.32	21.29	23.49	34.28
Low SPD min	2.50	4.00	3.12	2.50	2.56
Low SPD max	50.59	43.40	88.50	82.78	70.16
Low SPD mean	8.09	9.10	8.78	8.73	9.39
Low P min	700.63	700.00	700.00	701.24	700.56
Low P max	1008.59	925.00	900.00	997.70	1009.98
Low P mean	906.65	801.76	777.30	850.93	859.94
Mid SPD min	2.50	4.00	3.04	2.54	2.51
Mid SPD max	81.60	59.40	87.54	62.55	63.66
Mid SPD mean	15.53	14.27	15.29	15.42	15.36
Mid P min	400.13	412.00	401.00	400.57	400.02
Mid P max	698.77	687.00	699.00	699.84	698.11
Mid P mean	495.49	574.75	567.38	515.72	521.88
High SPD min	2.52	4.00	3.48	2.53	2.61
High SPD max	81.19	84.20	83.70	84.66	73.30
High SPD mean	21.88	21.37	23.12	29.01	15.12
High P min	102.17	137.00	101.00	125.96	115.00
High P max	399.93	400.00	400.00	399.89	399.77
High P mean	288.11	256.58	291.54	288.69	247.85




18 Aug '06

12:15 UTC

**EUM** 

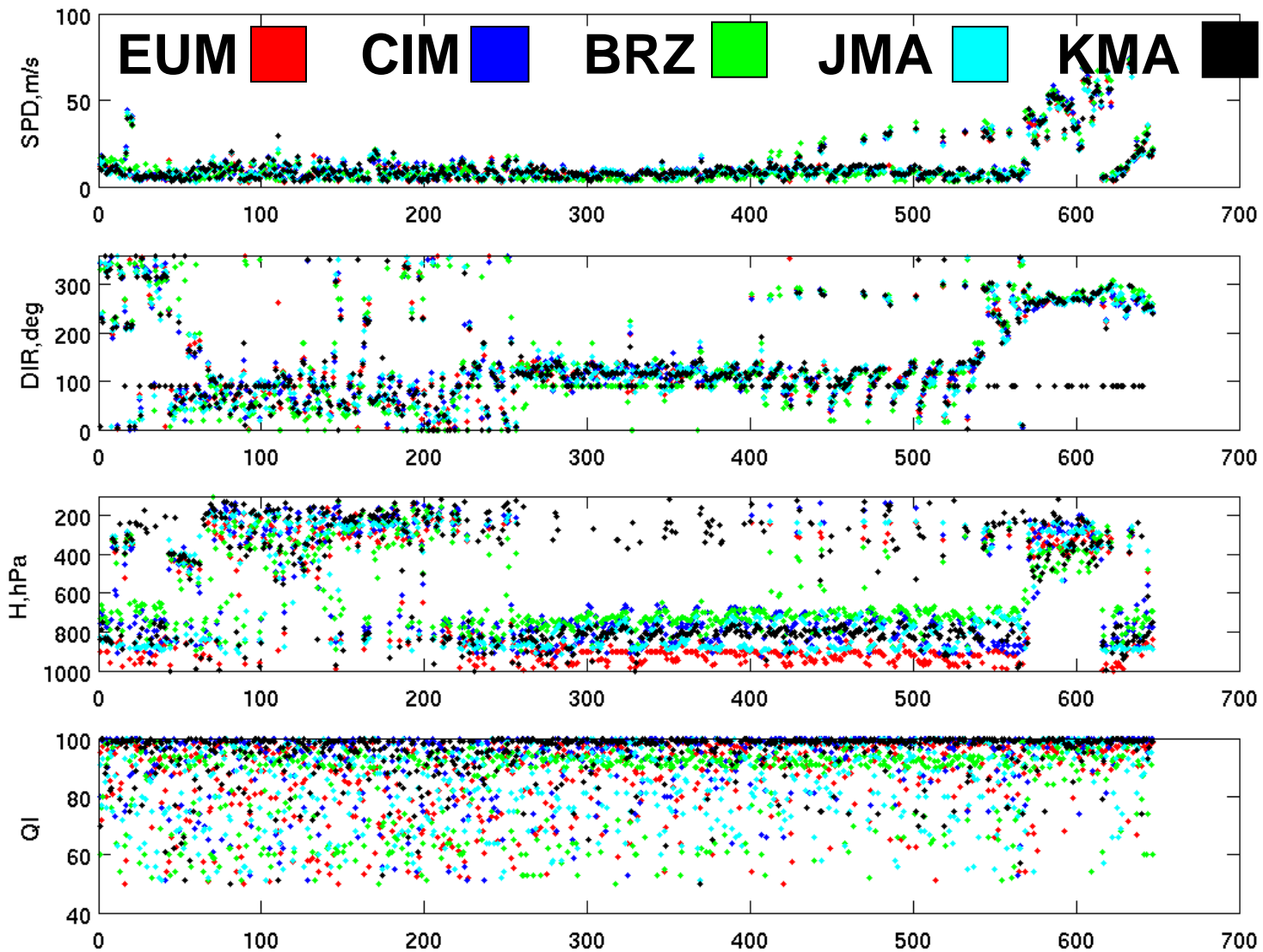
**CIM** 

**BRZ** 

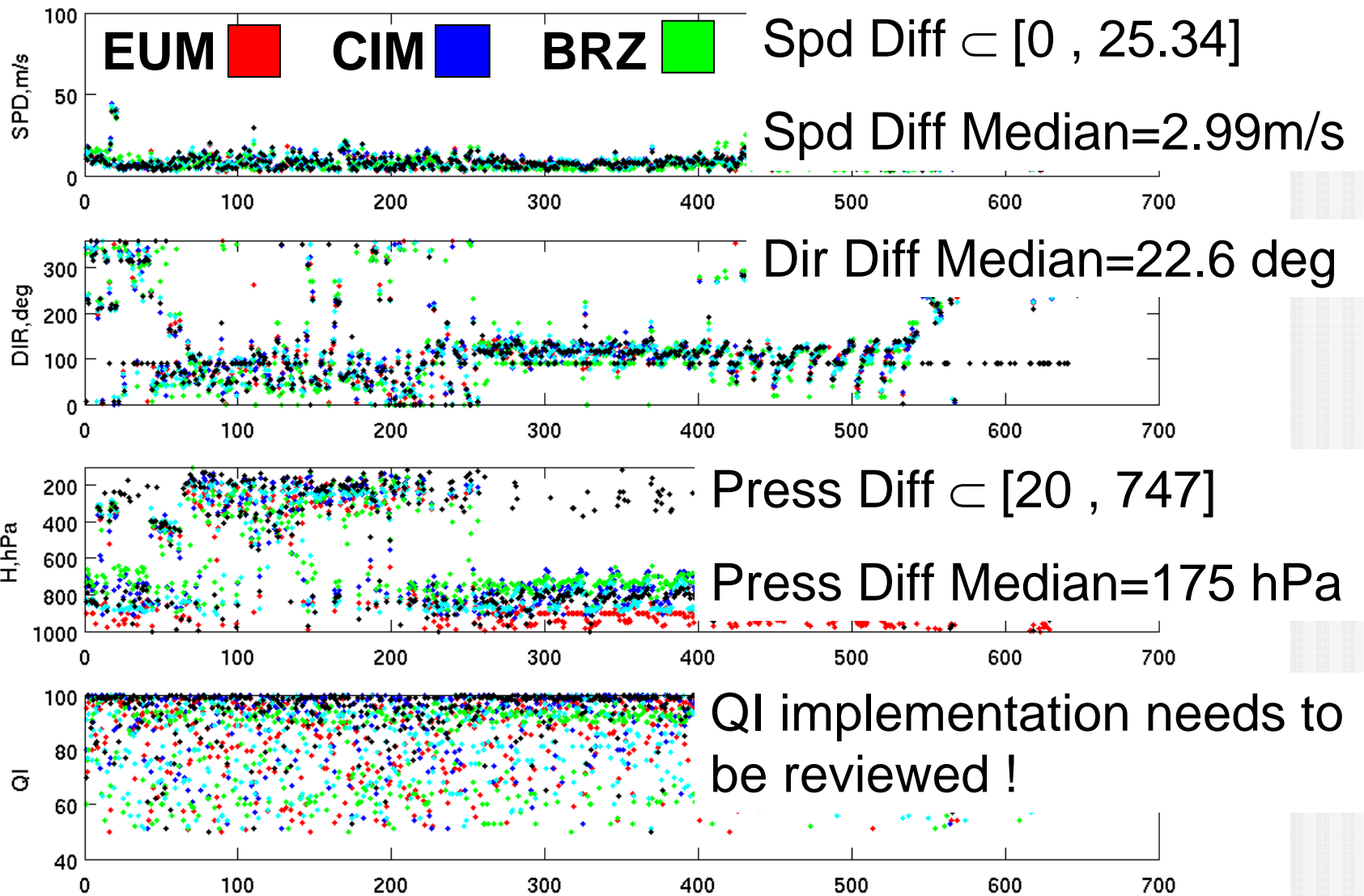
**JMA** 

**KMA** 

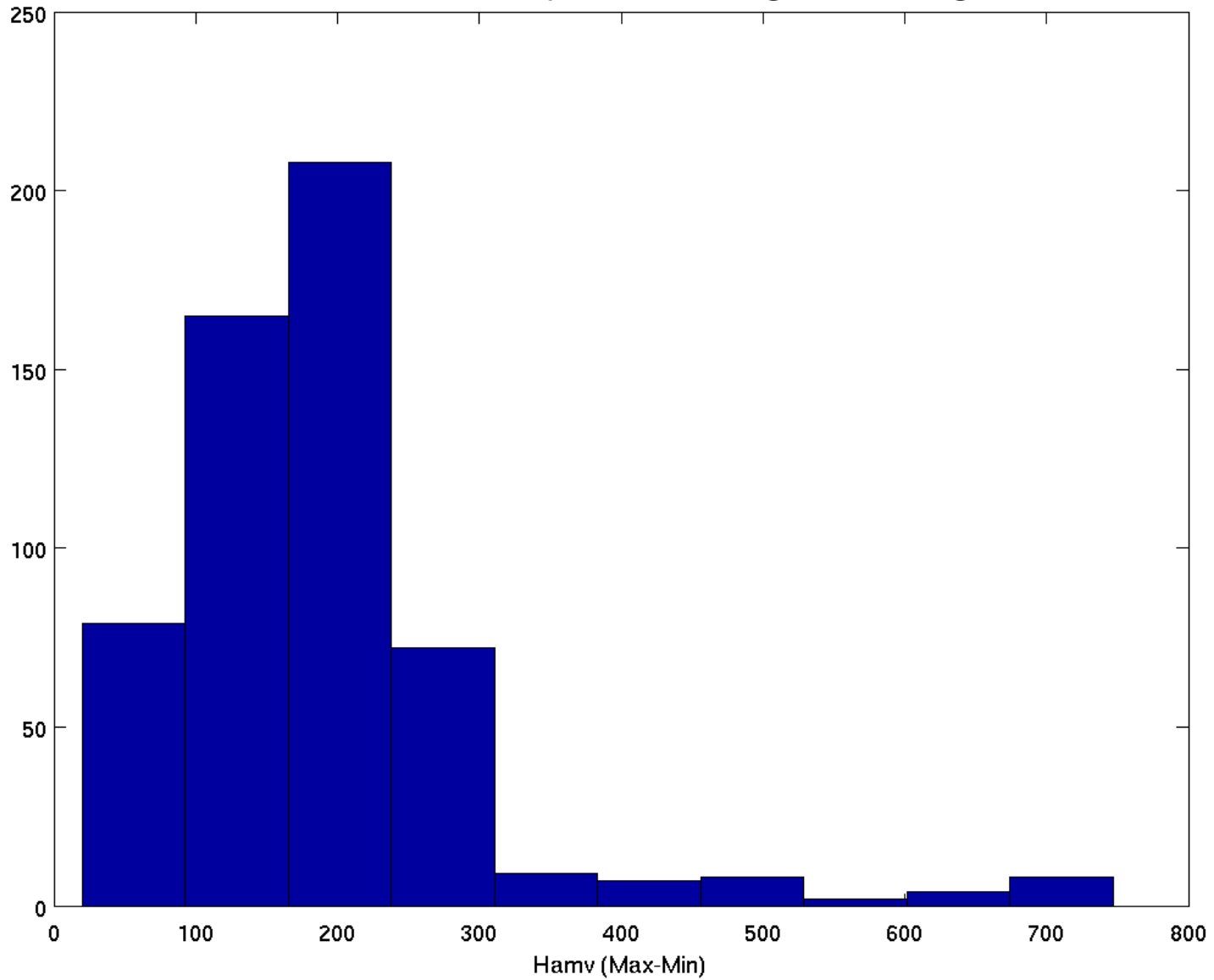
# Collocated data analysis - 647 AMVs, 0.5 deg



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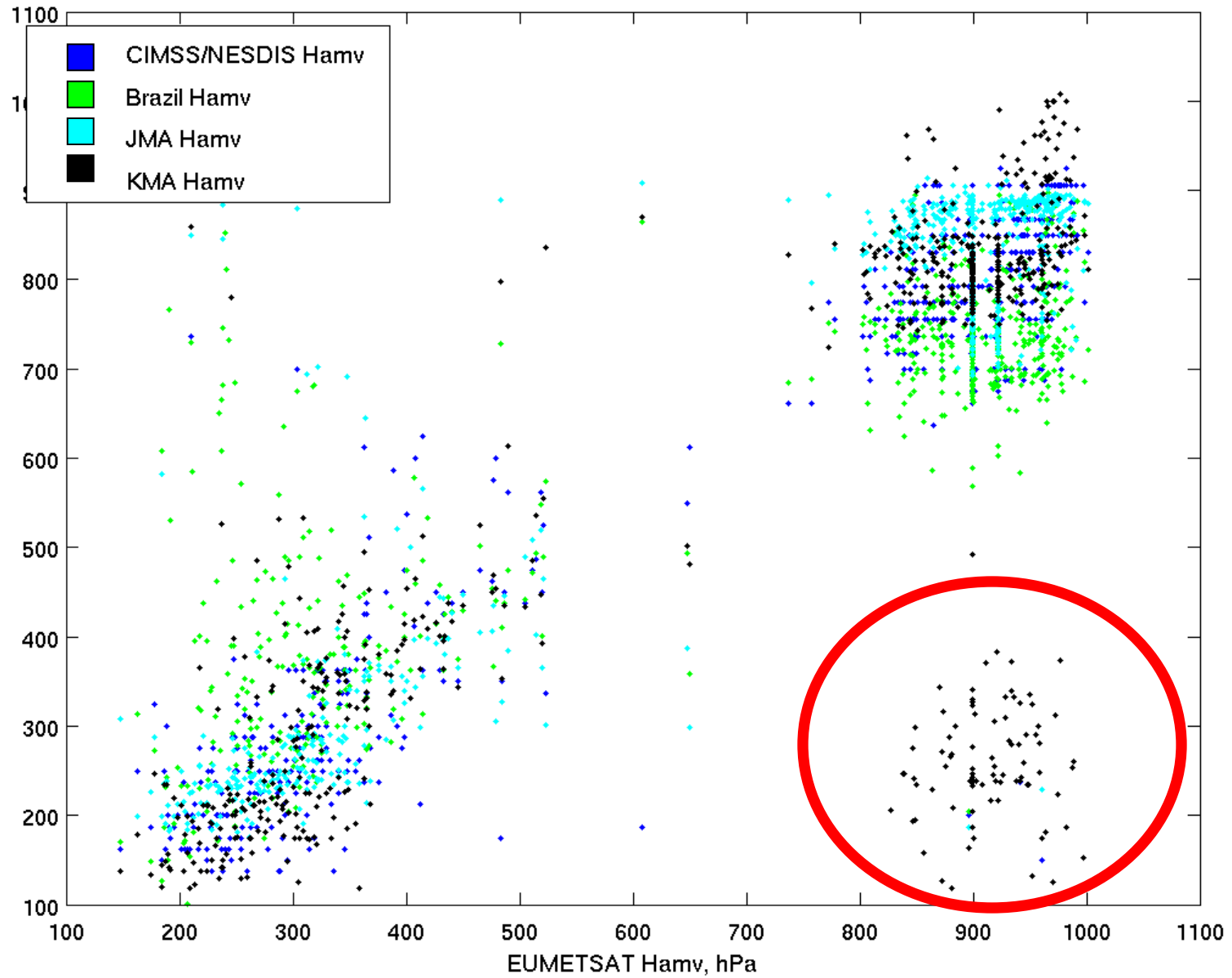


# Collocated data analysis - height assignment

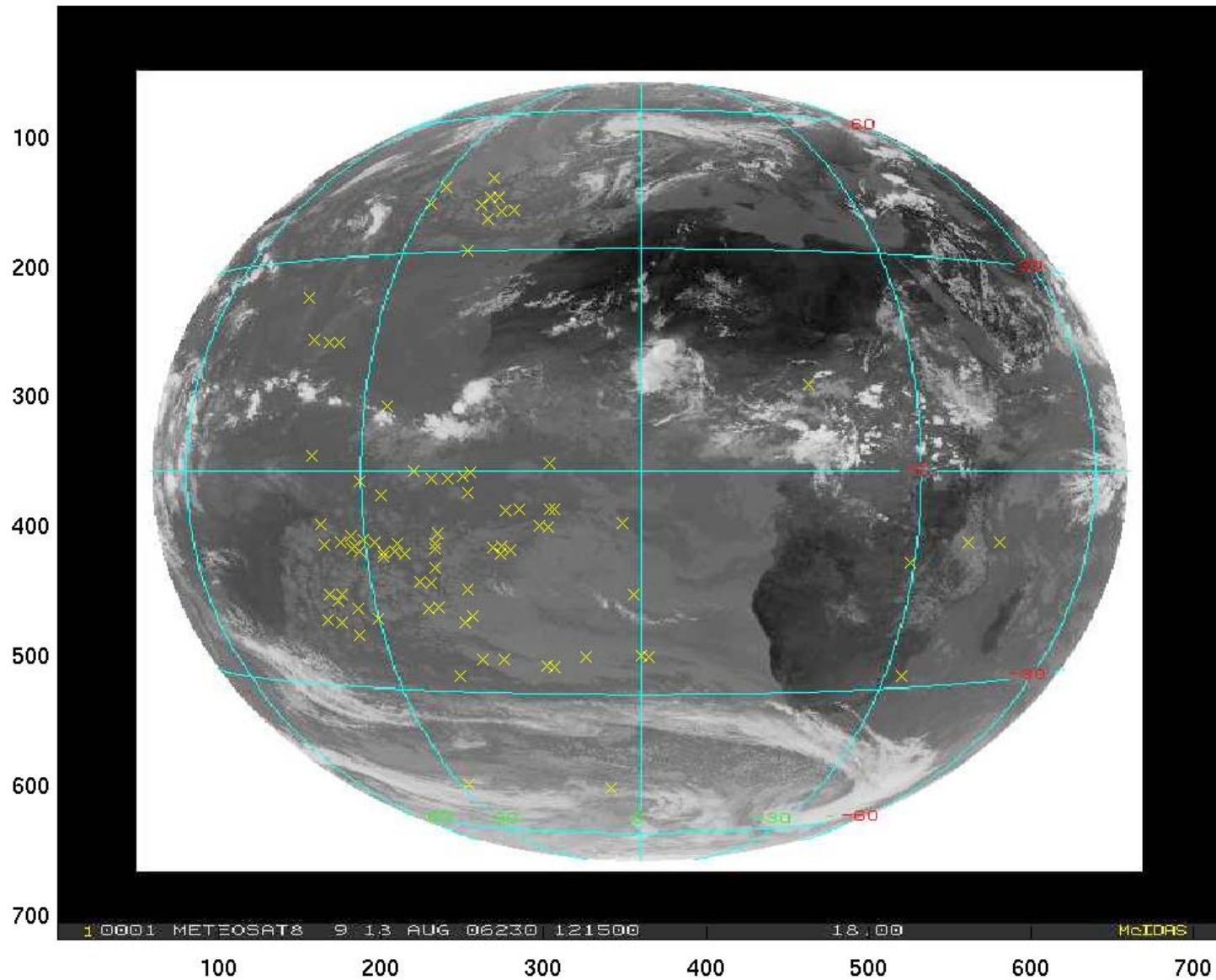




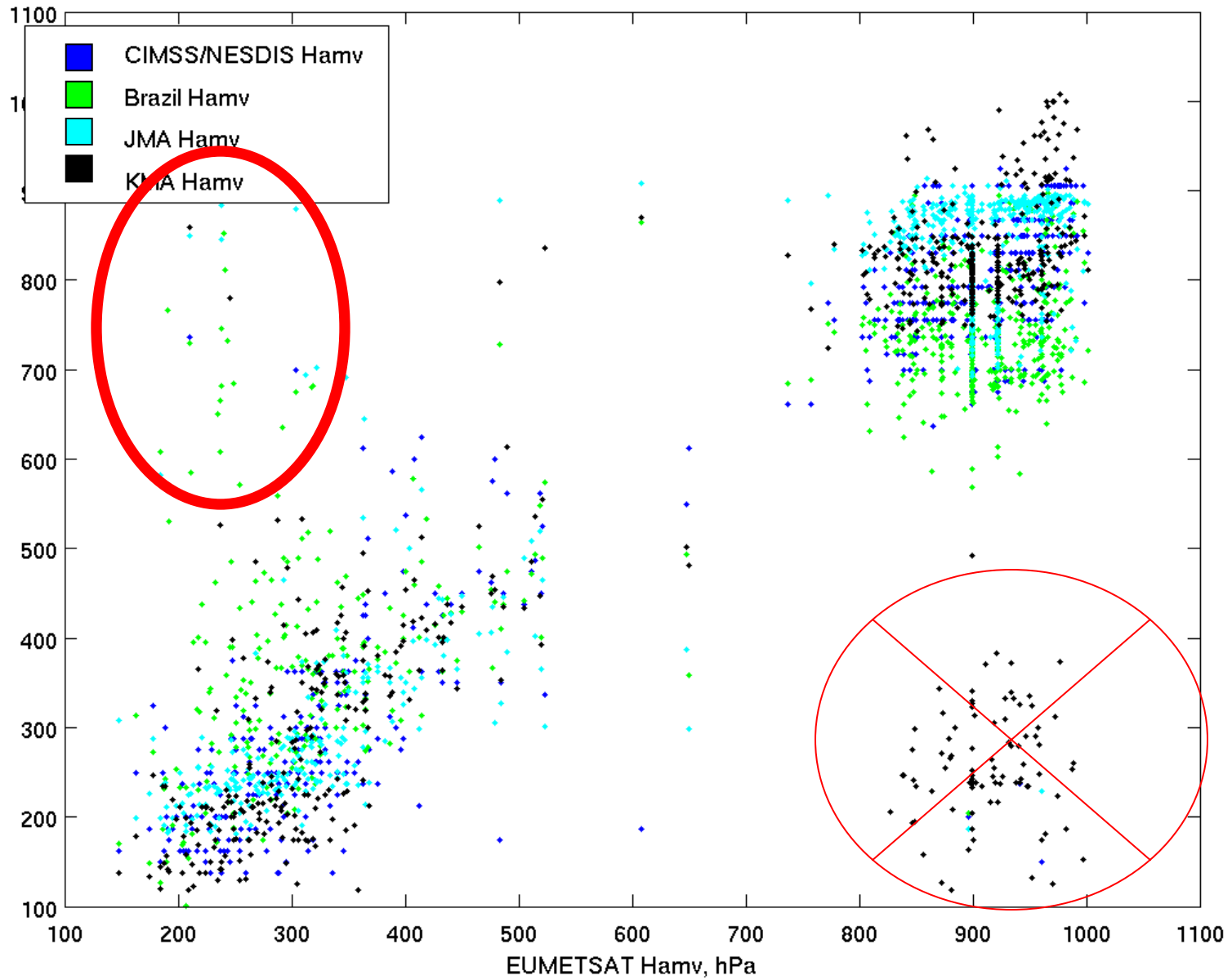
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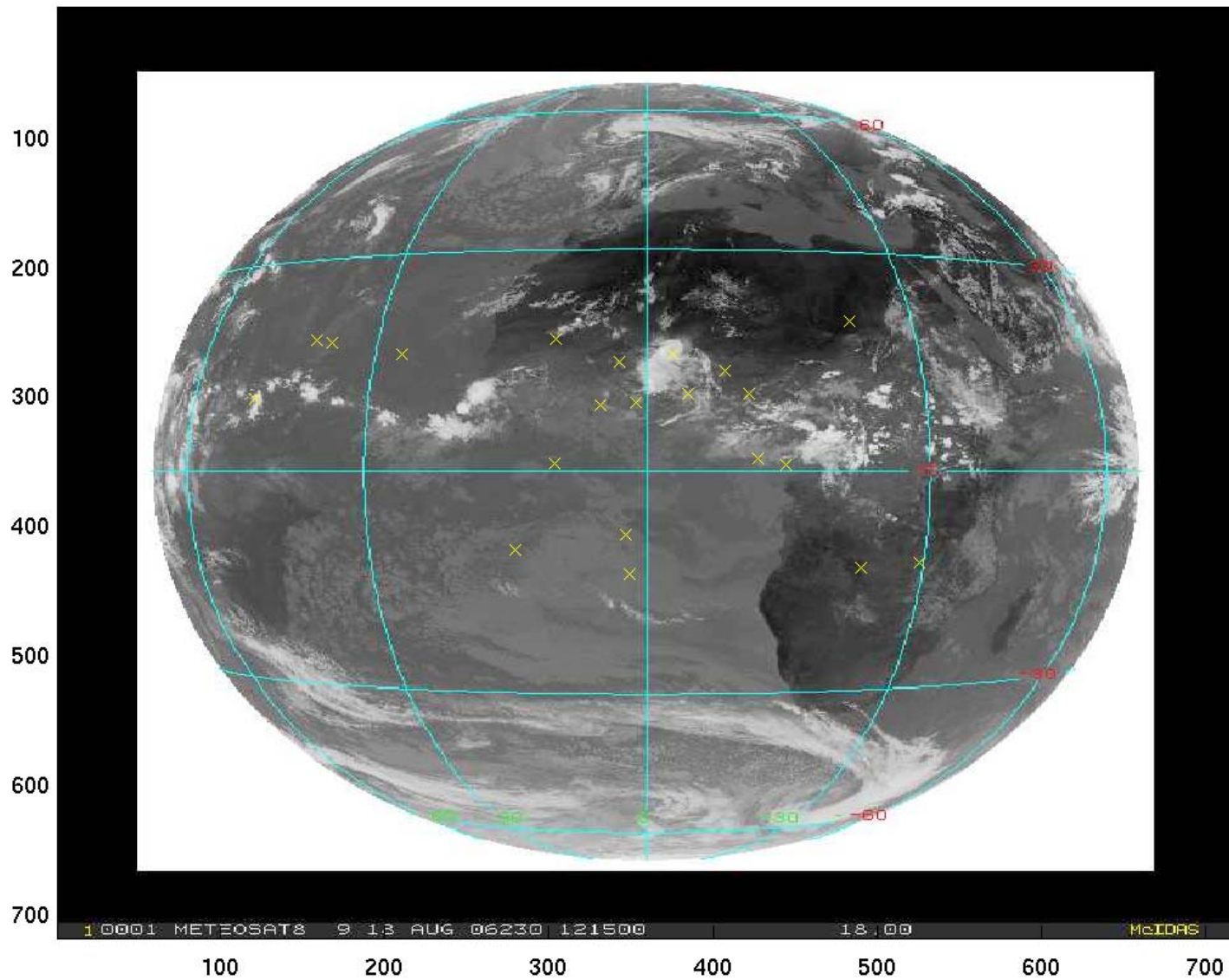
# Collocated data analysis - height assignment



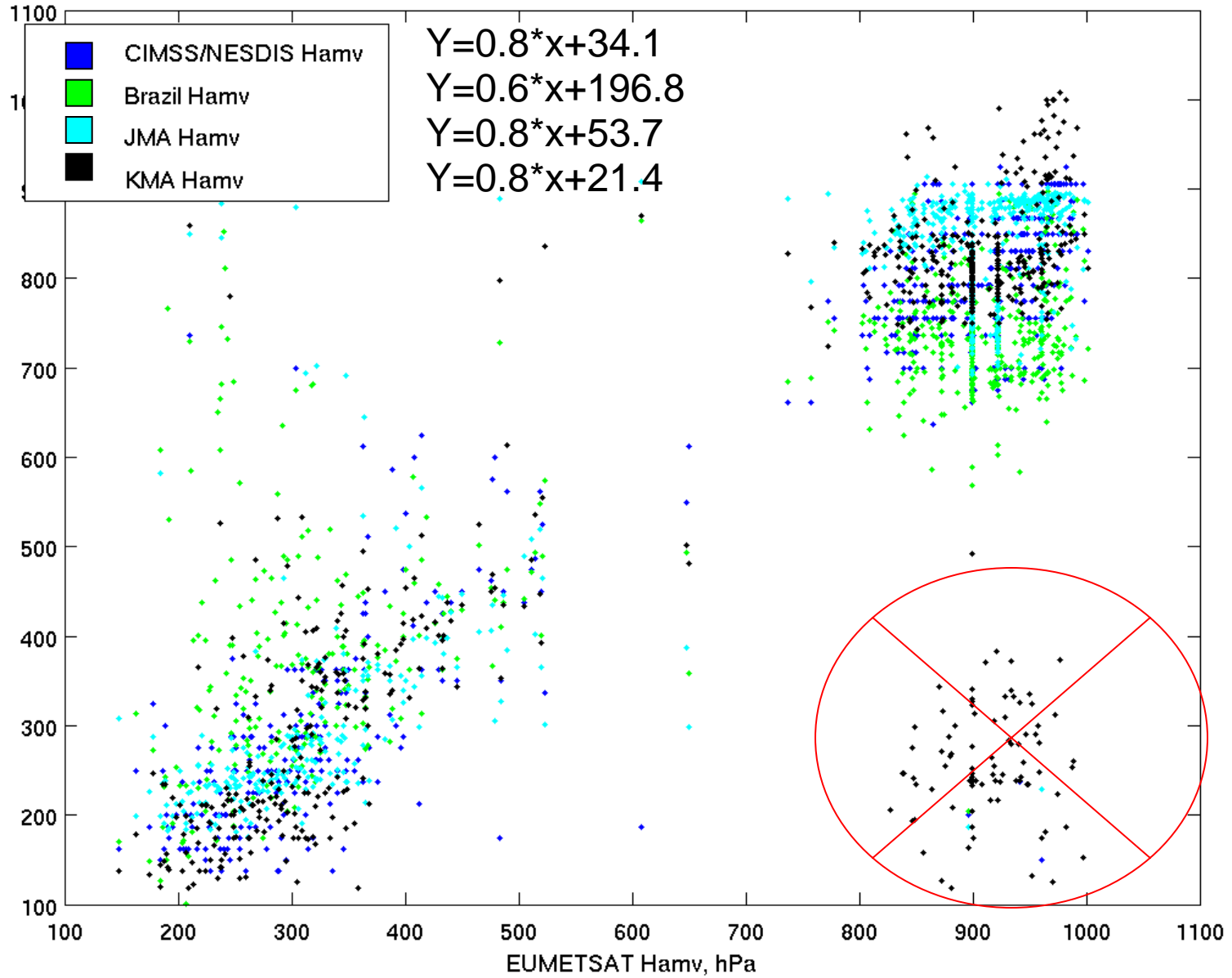
# Collocated data analysis - height assignment



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# Collocated data analysis - height assignment



## Summary

Investigation of the AMVs derived from one SEVIRI image triplet reports median values for the difference in Speed, Direction and Pressure to be 2.99m/s, 22 deg and 175 hPa

Targets selection remains important for the AMV quality

AMV height assignment differences are driven by numerous differences in algorithms - target box size, pixel selection, height assignment method, image used for the assignment

Quality Indicator implementation need to be unified across the AMV producing centers

## Recommended investigations (limited to the case study)

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JMA - the low number of mid-level AMVs

KMA - height assignment for low broken clouds over ocean; slower mean speeds;

Brazil / EUMETSAT - low level correction

CIMSS - slower mid-level AMV speed (larger search box)