

CYGNSS OSE Progress Update

based on v2.1 data release

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September 25, 2018

Outline

QC Review

- VAM o-b stats from global GFS backgrounds

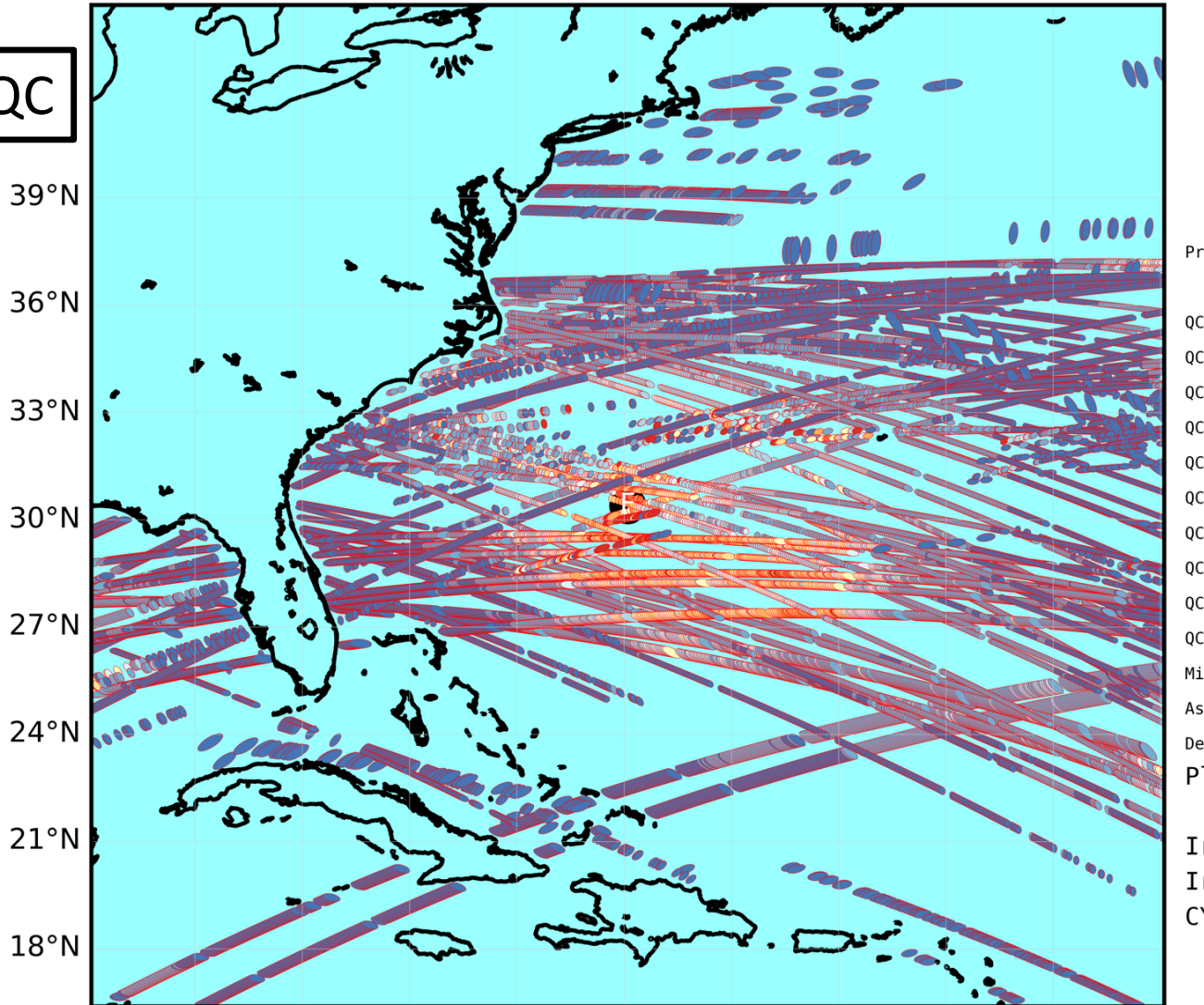
Comparison with SFMR

Preliminary OSE results

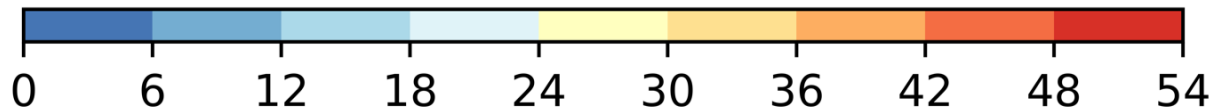
Future plans

23317 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 No QC; No thinning; SP circles scaled by IFOV [km²]

No QC



84°W 81°W 78°W 75°W 72°W 69°W 66°W 63°W 60°W 57°W

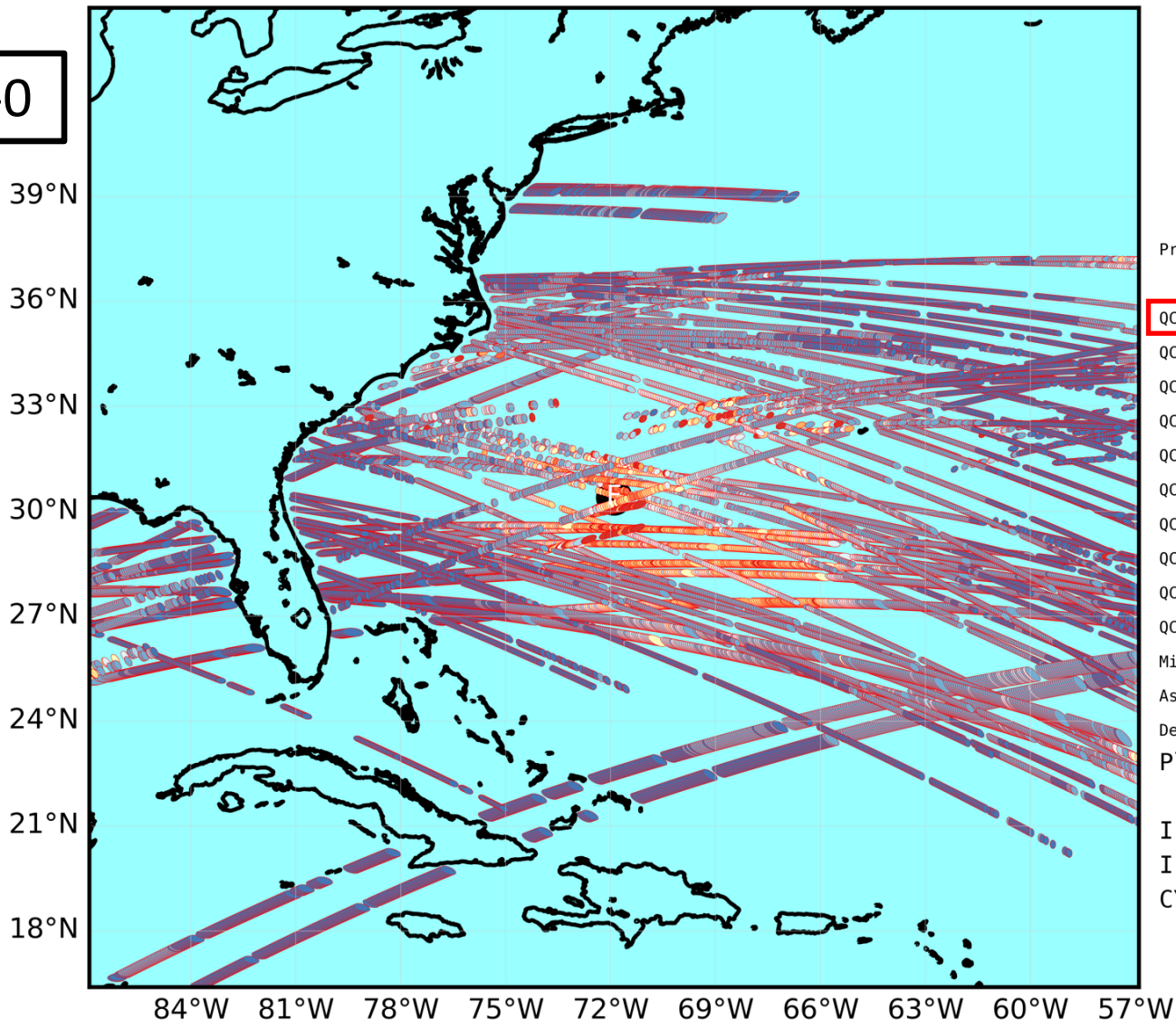


QC_OK wind speed (m/s)

Processed:	23317
QC-0: non-zero QC:	0
QC-1: GPS Bl. IIF:	0
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	0
QC-7: star track fail:	0
Missing (^):	0
Ascending:	7633
Descending:	15684
Plotted (QC OK):	23317
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	86.1

20457 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
QC-0; No thinning; SP circles scaled by IFOV [km²]

QC-0



Processed: 23317

QC-0: non-zero QC: 2860

QC-1: GPS Bl. IIF: 0

QC-2: Wspd_err > 3.0: 0

QC-2.5: Wspd_err > 4.0: 0

QC-3: DDMA ave. fail: 0

QC-4: RCG < 10.0: 0

QC-5: inc Ang < 15.0: 0

QC-5.5: inc Ang > 35.0: 0

QC-6: Pitch/roll > 1/5: 0

QC-7: star track fail: 0

Missing (^): 0

Ascending: 5209

Descending: 15248

Plotted (QC OK): 20457

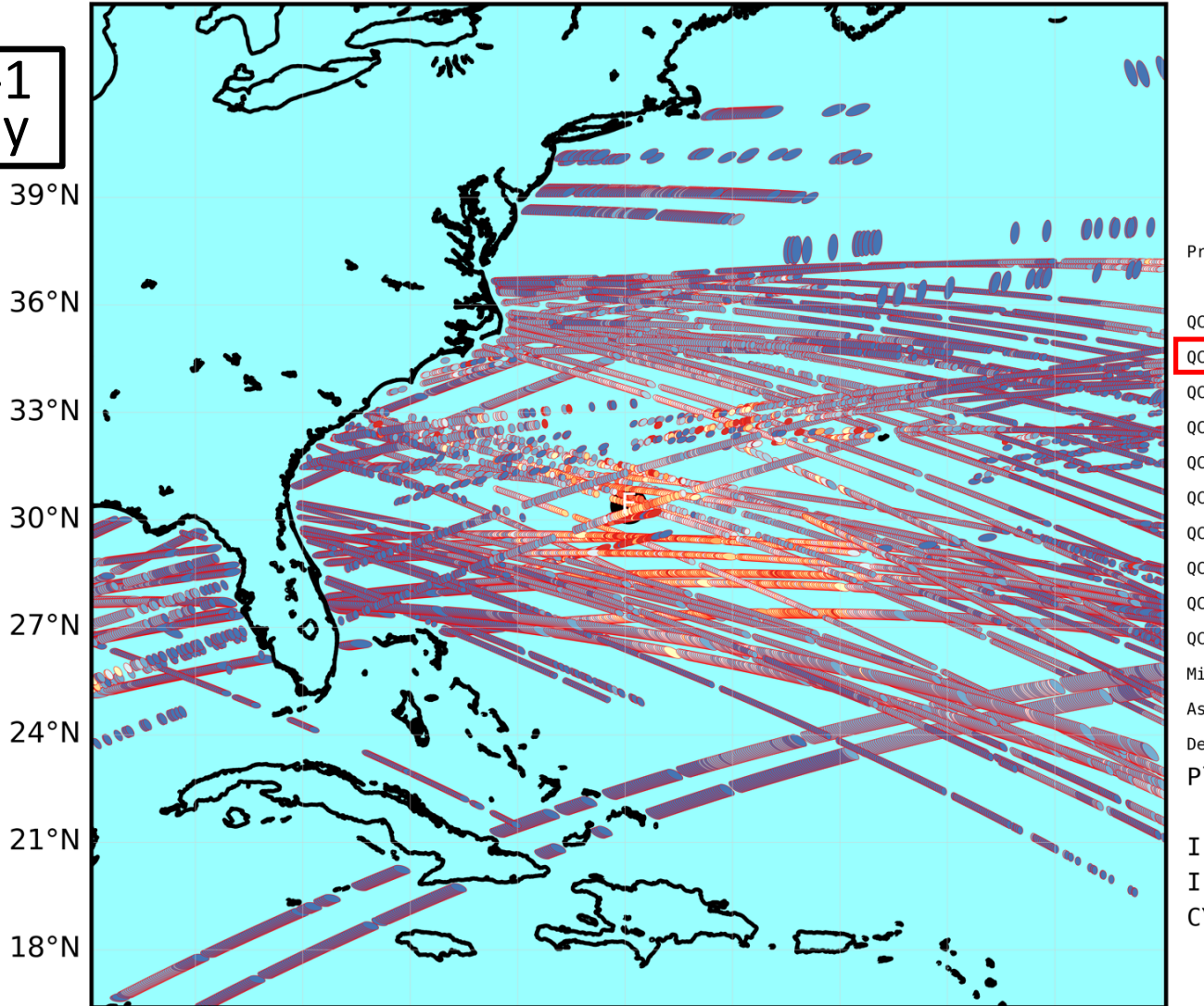
Irma mslp [hPa]: 948

Irma mxwnd, m/s: 69.0

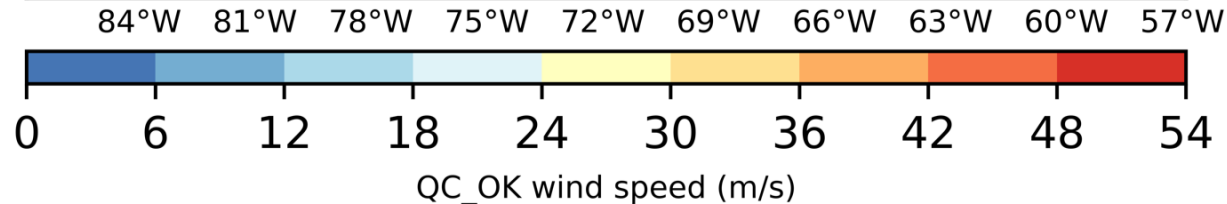
CYG maxwnd, m/s: 86.1

20835 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 QC-1 only; No thinning; SP circles scaled by IFOV [km²]

QC-1
only

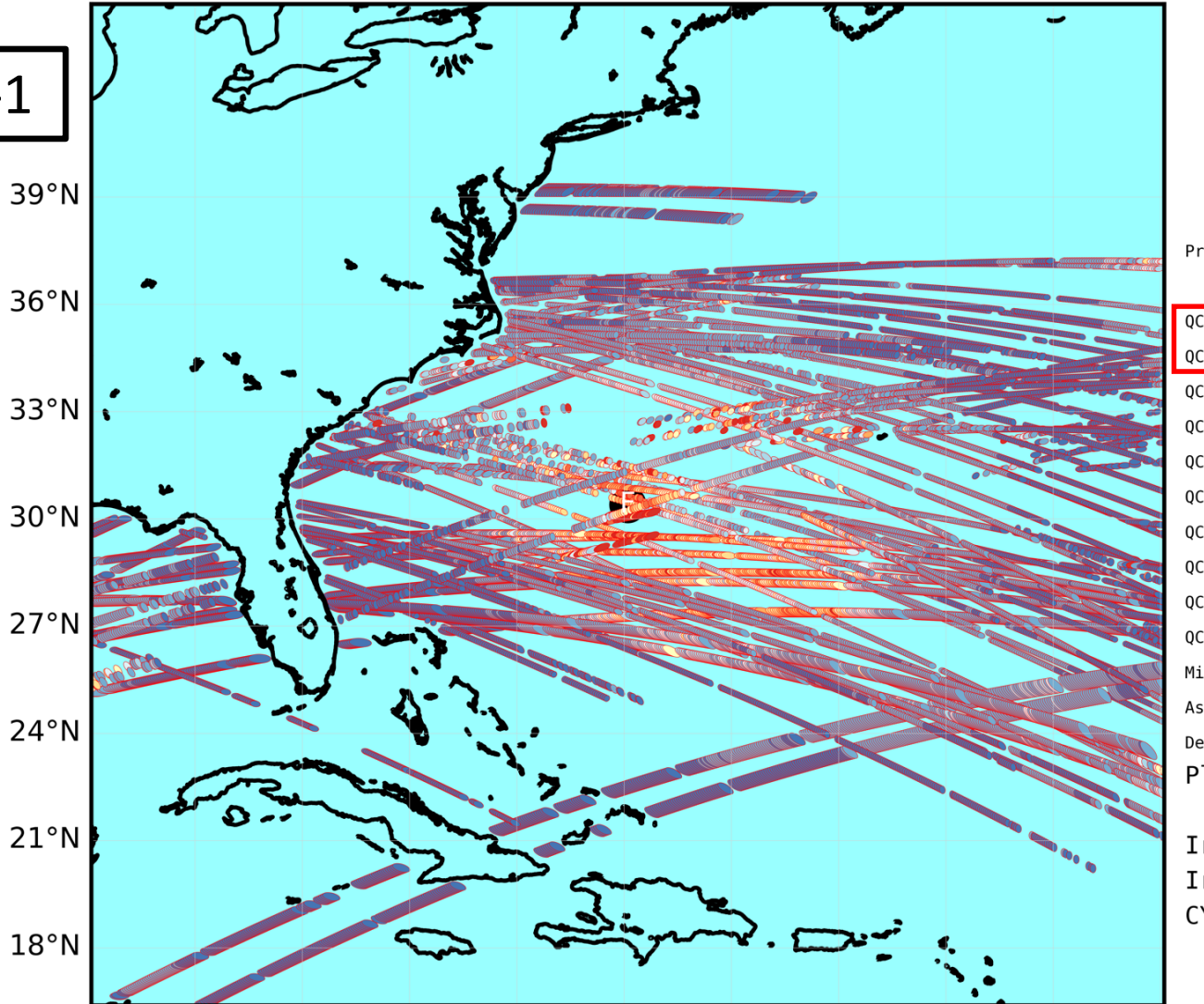


Processed:	23317
QC-0: non-zero QC:	0
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	0
QC-7: star track fail:	0
Missing (^):	0
Ascending:	5475
Descending:	15360
Plotted (QC OK):	20835
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	86.1

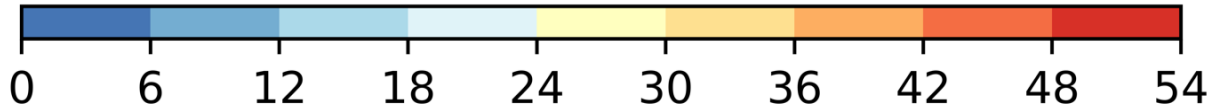


20457 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 QC-1; No thinning; SP circles scaled by IFOV [km²]

QC-1



84°W 81°W 78°W 75°W 72°W 69°W 66°W 63°W 60°W 57°W

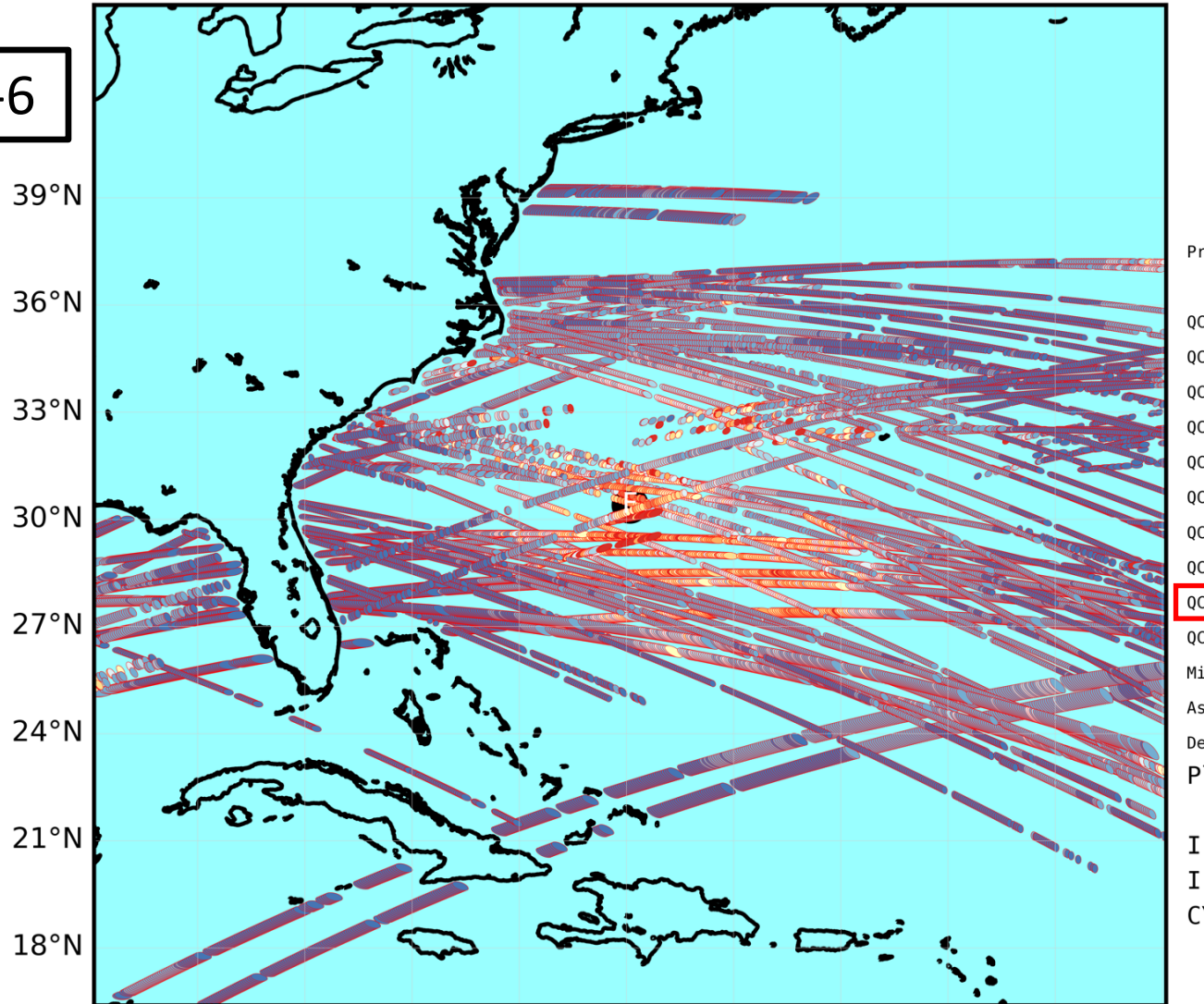


QC_OK wind speed (m/s)

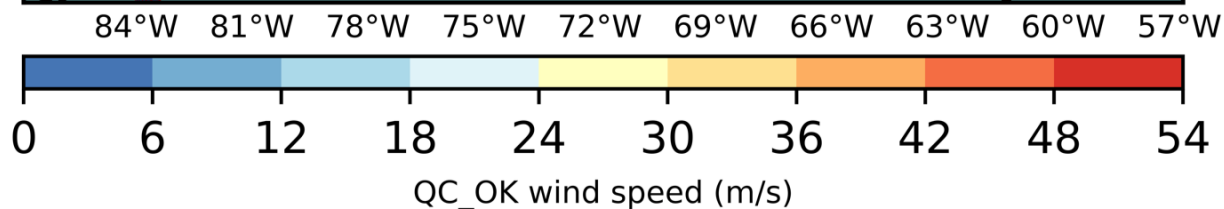
Processed:	23317
QC-0: non-zero QC:	2860
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	0
QC-7: star track fail:	0
Missing (^):	0
Ascending:	5209
Descending:	15248
Plotted (QC OK):	20457
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	86.1

20450 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 QC-6, no IncAng ; No thinning; SP circles scaled by IFOV [km²]

QC-6

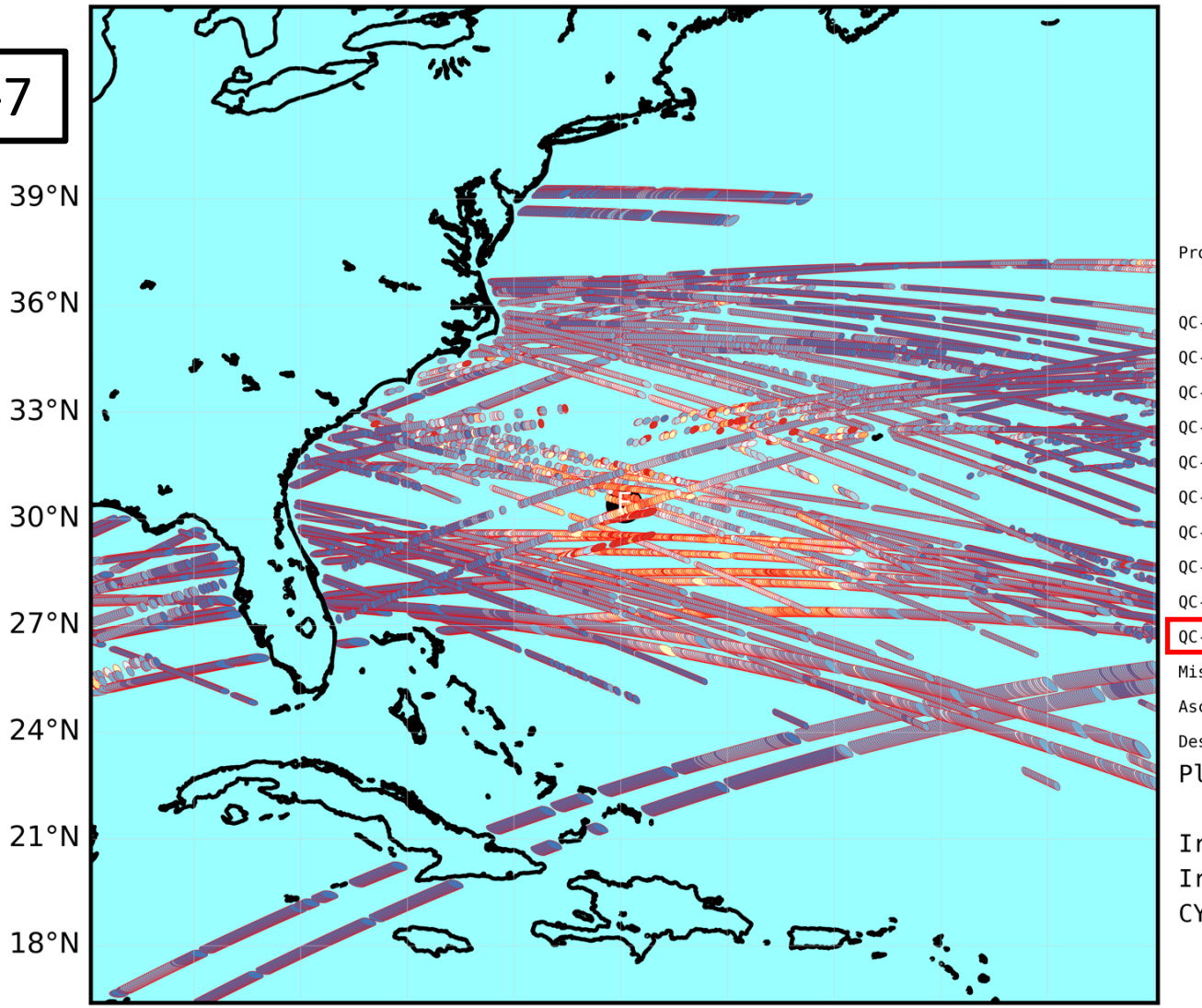


Processed:	23317
QC-0: non-zero QC:	2860
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	7
QC-7: star track fail:	0
Missing (^):	0
Ascending:	5209
Descending:	15241
Plotted (QC OK):	20450
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	86.1

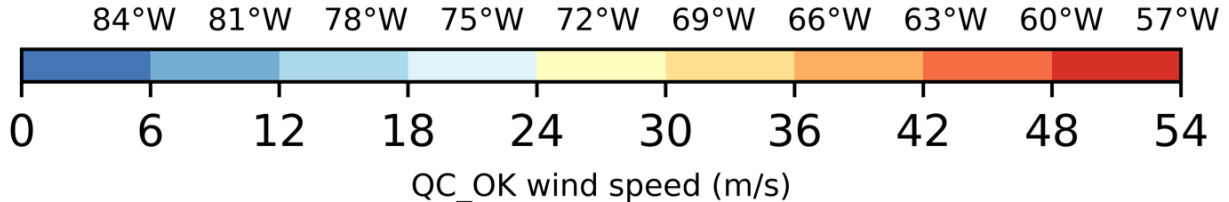


18089 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 QC-7, no IncAng ; No thinning; SP circles scaled by IFOV [km²]

QC-7

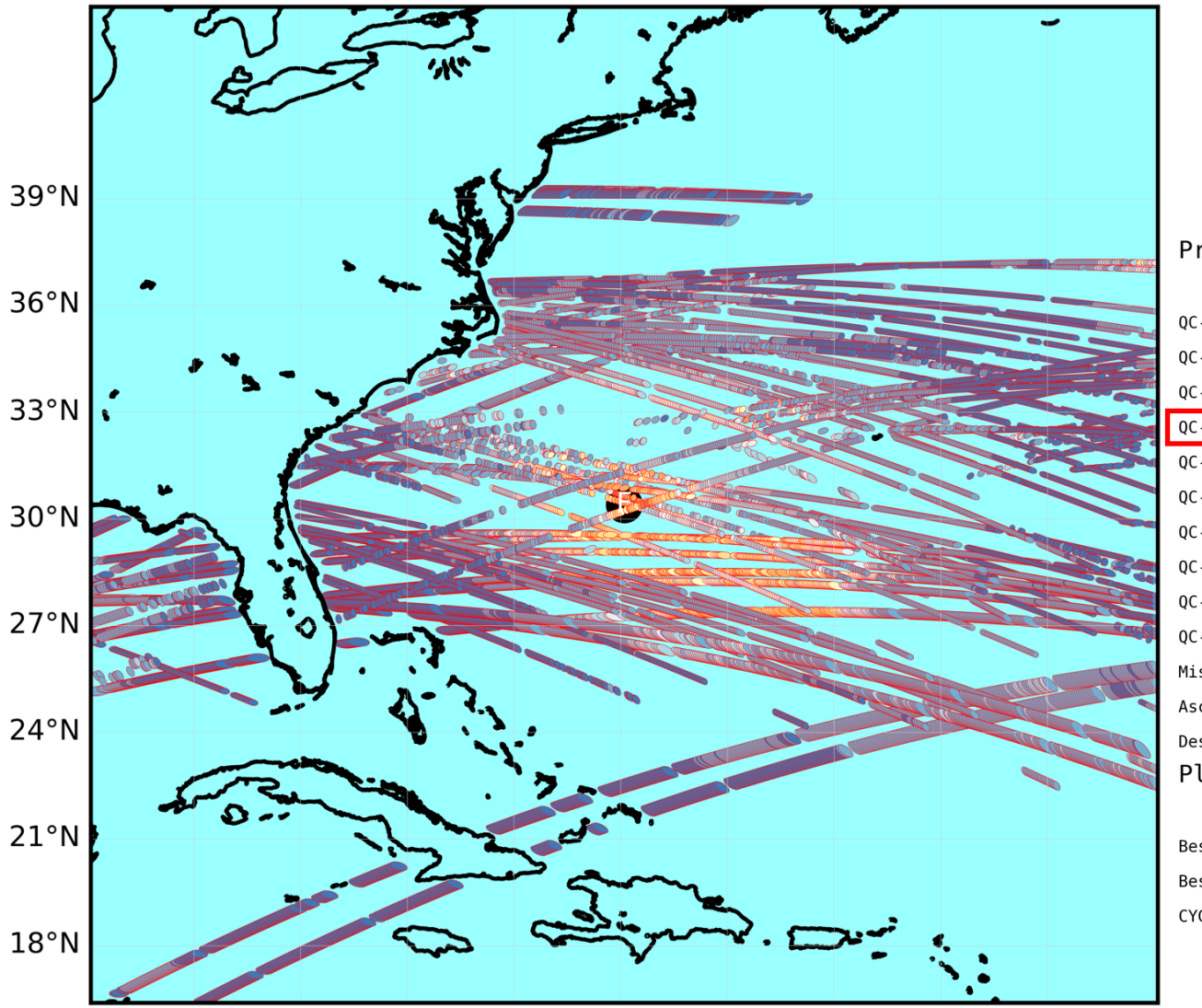


Processed:	23317
QC-0: non-zero QC:	2860
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	7
QC-7: star track fail:	2557
Missing (^):	0
Ascending:	5209
Descending:	12880
Plotted (QC OK):	18089
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	86.1

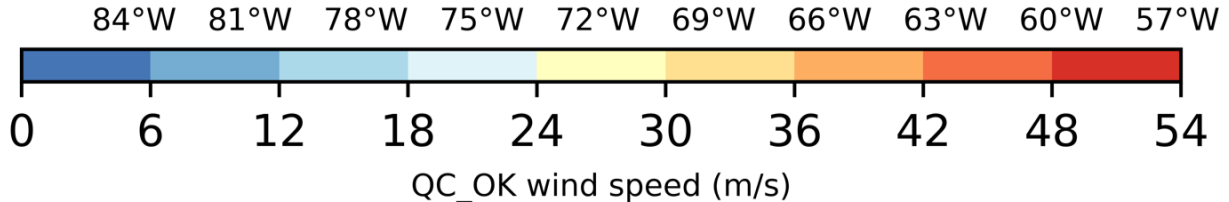


17702 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 QC-7 WspdErr4; No thinning; SP circles scaled by IFOV [km²]

wspd
 err
 > 4.0
 m/s

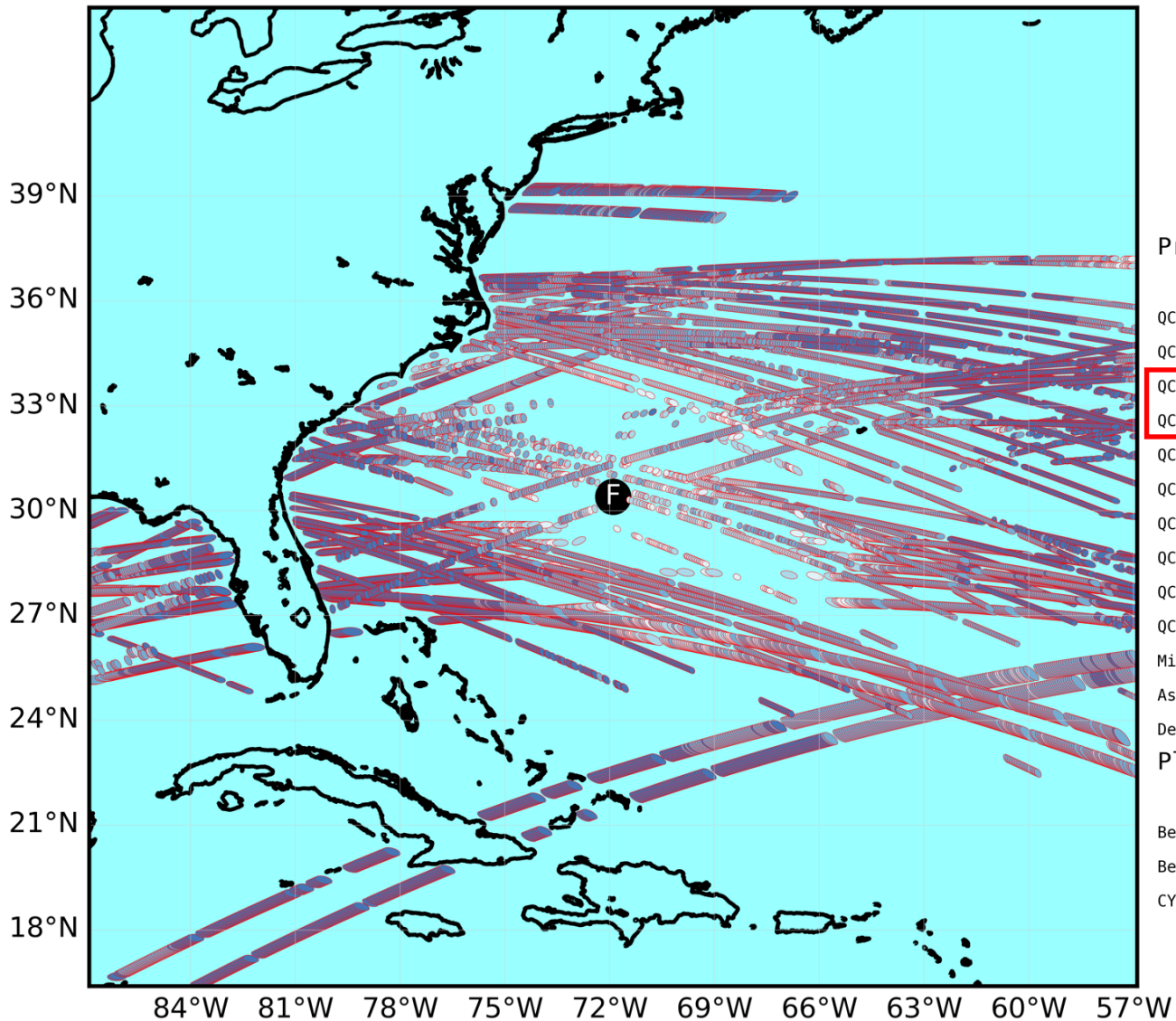


Processed:	23317
QC-0: non-zero QC:	2860
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	394
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	7
QC-7: star track fail:	2557
Missing (^):	0
Ascending:	5039
Descending:	12663
Plotted (QC OK):	17702
Best Tr. mslp [hPa]:	948
Best Tr. mxwnd, m/s:	69.0
CYG maxwnd, m/s:	49.2



16637 CYGNSS L2 YSLF wspd v2.1, 18utcSep12 +/- 3 hours
 QC-7 WspdErr3 WspdErr4; No thinning; SP circles scaled by IFOV [km²]

wspd
 err
 > 3.0
 m/s



Processed: **23317**

QC-0: non-zero QC: 2860

QC-1: GPS Bl. IIF: 2482

QC-2: Wspd_err > 3.0: 1466

QC-2.5: Wspd_err > 4.0: 394

QC-3: DDMA ave. fail: 0

QC-4: RCG < 10.0: 0

QC-5: inc Ang < 15.0: 0

QC-5.5: inc Ang > 35.0: 0

QC-6: Pitch/roll > 1/5: 7

QC-7: star track fail: 2557

Missing (^): 0

Ascending: 4927

Descending: 11710

Plotted (QC OK): **16637**

Best Tr. mslp [hPa]: 948

Best Tr. mxwnd, m/s: 69.0

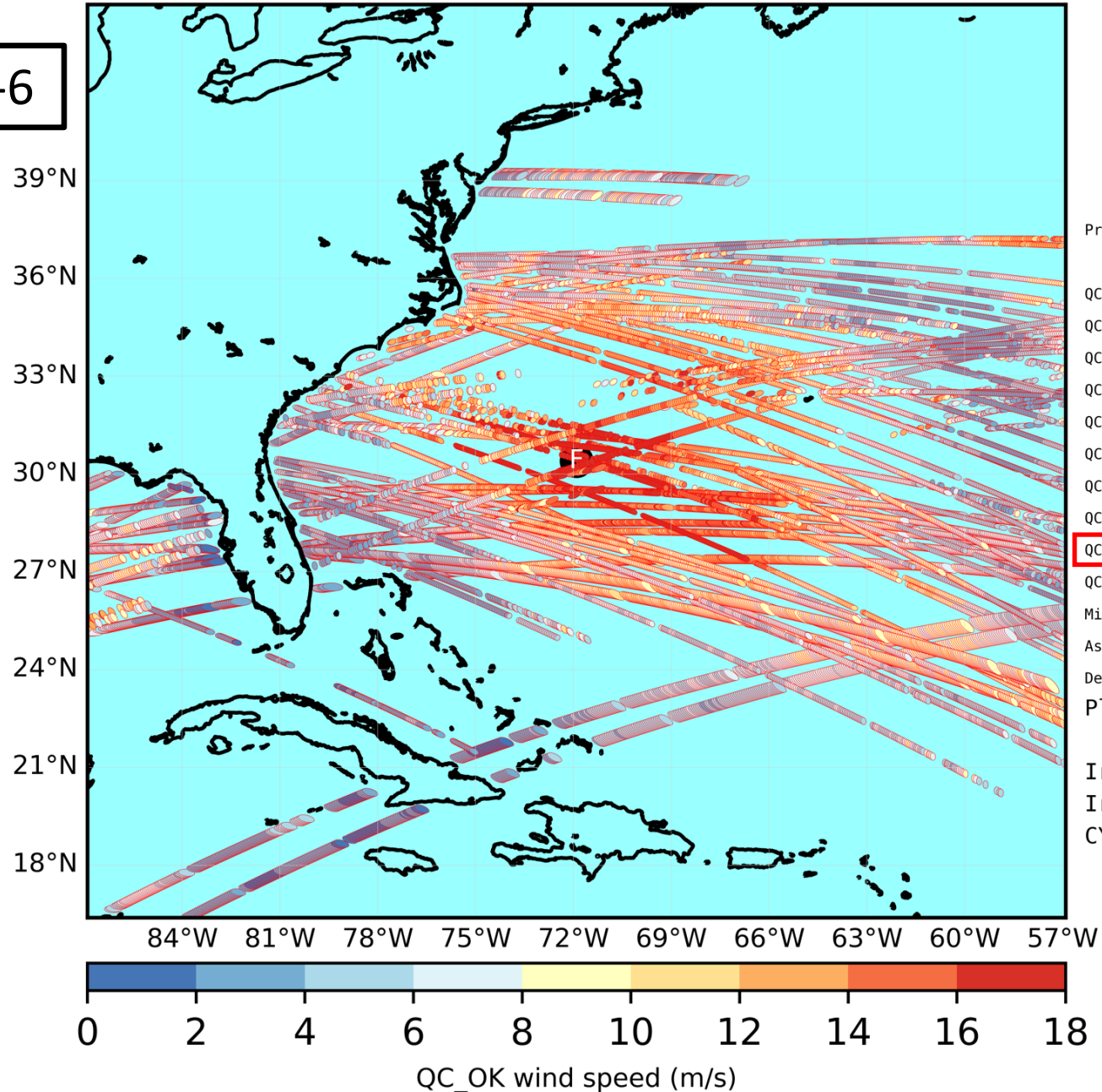
CYG maxwnd, m/s: 19.9

0 6 12 18 24 30 36 42 48 54

QC_OK wind speed (m/s)

20256 CYGNSS L2 FDS wspd v2.1, 18utcSep12 +/-3 hrs
QC-6; No thinning, SP ellipses scaled by IFOV [km²]

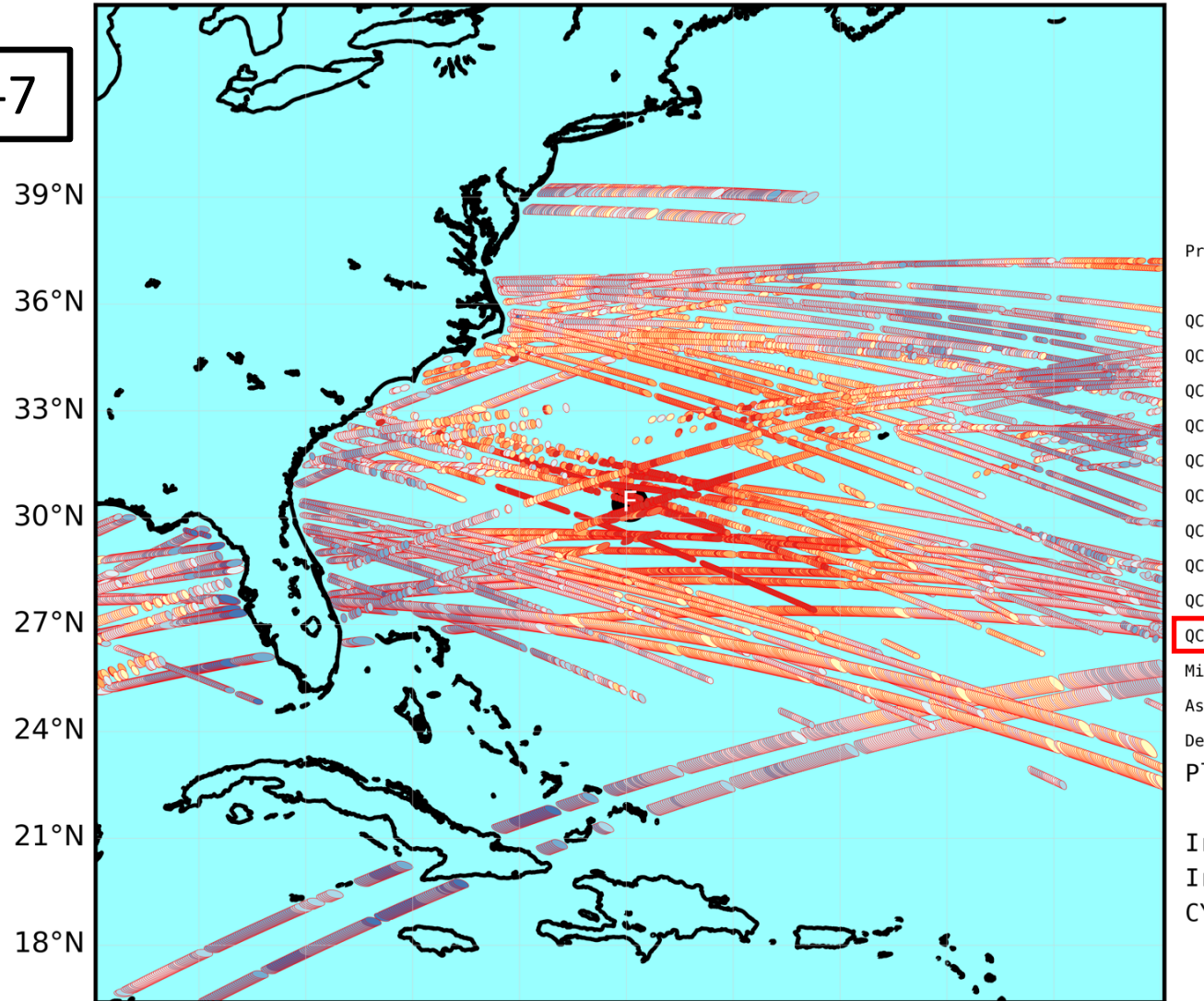
QC-6



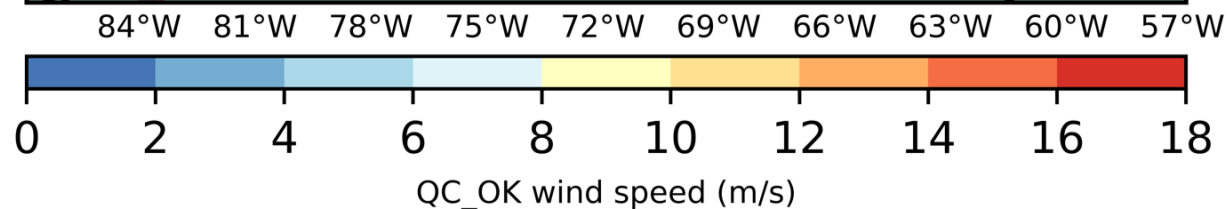
Processed:	23317
QC-0: non-zero QC:	3054
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	7
QC-7: star track fail:	0
Missing (^):	0
Ascending:	5102
Descending:	15154
Plotted (QC OK):	20256
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	21.5

17897 CYGNSS L2 FDS wspd v2.1, 18utcSep12 +/-3 hrs
 QC-7; No thinning, SP ellipses scaled by IFOV [km²]

QC-7

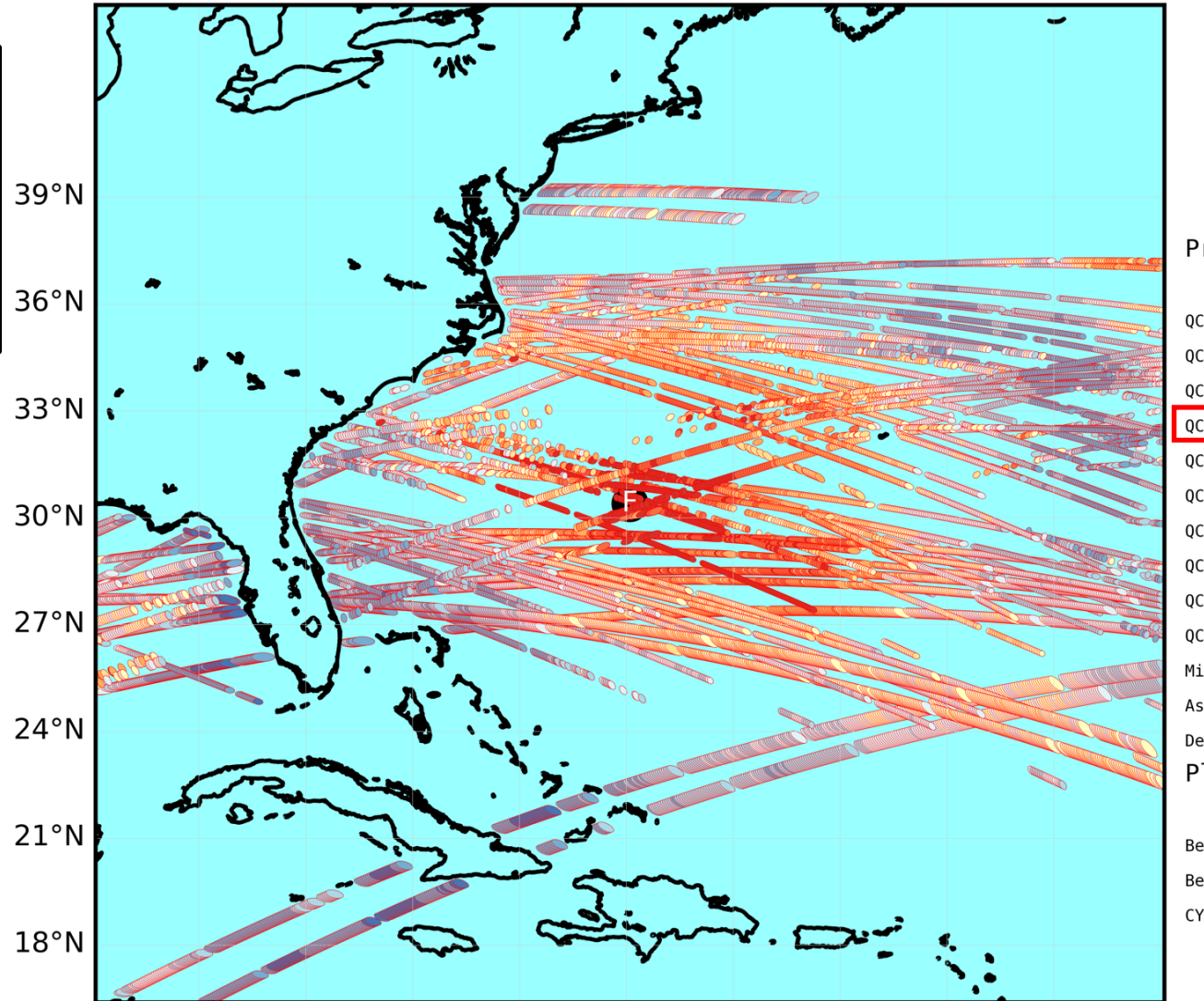


Processed:	23317
QC-0: non-zero QC:	3054
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	0
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	7
QC-7: star track fail:	2557
Missing (^):	0
Ascending:	5102
Descending:	12795
Plotted (QC OK):	17897
Irma mslp [hPa]:	948
Irma mxwnd, m/s:	69.0
CYG maxwnd, m/s:	21.5

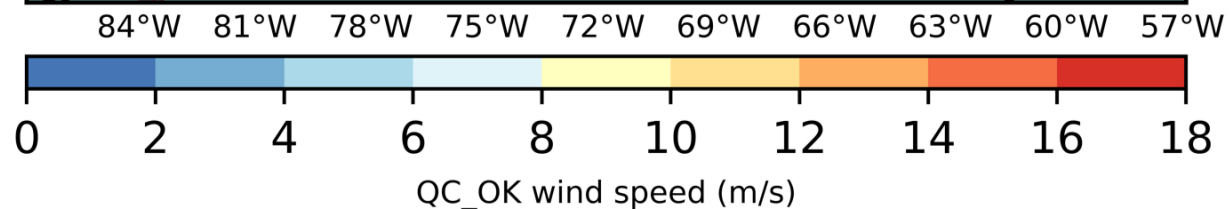


17822 CYGNSS L2 FDS wspd v2.1, 18utcSep12 +/-3 hrs
 QC-7 WspdErr4; No thinning, SP ellipses scaled by IFOV [km²]

wspd
 err
 > 4.0
 m/s

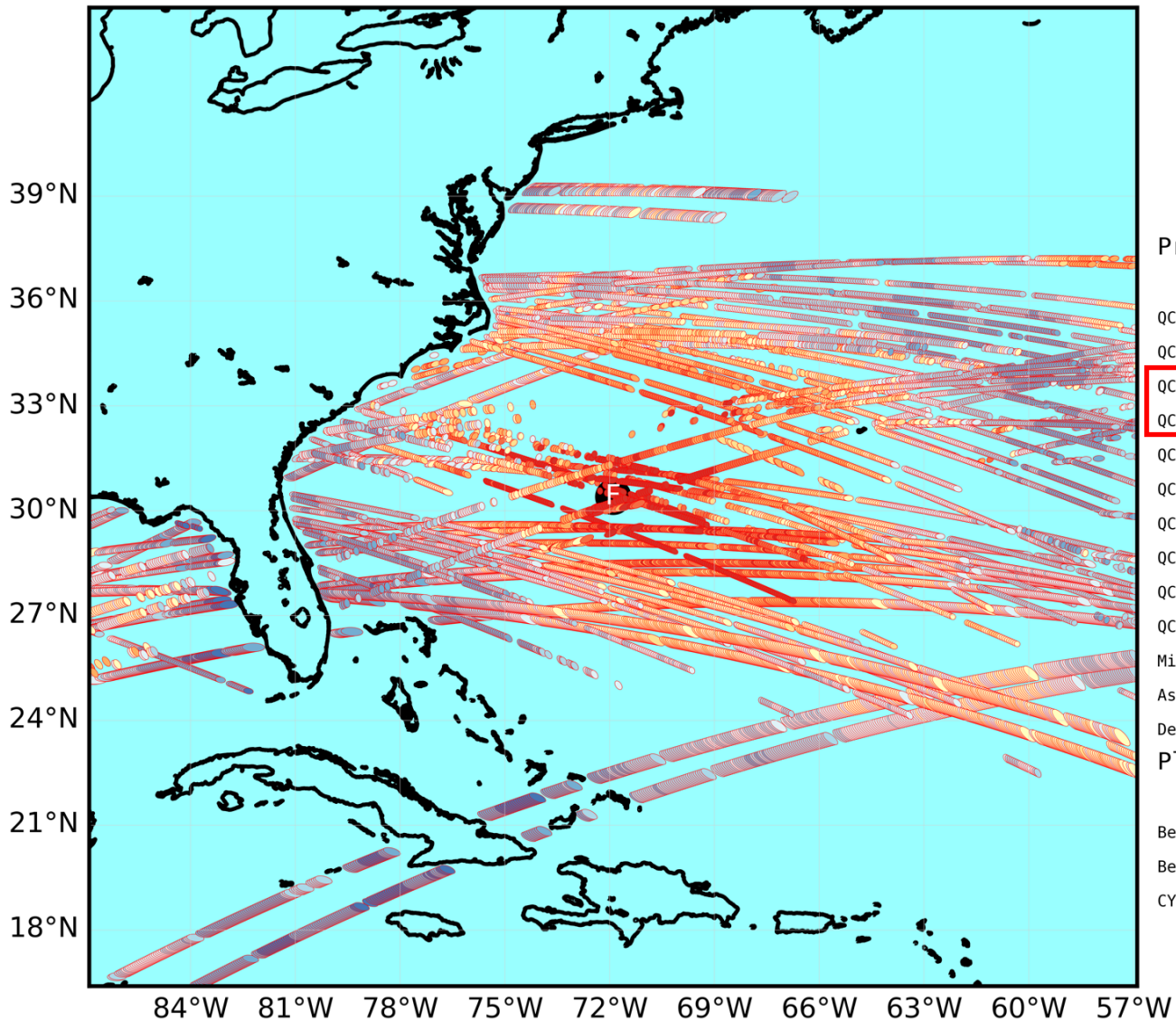


Processed:	23317
QC-0: non-zero QC:	3054
QC-1: GPS Bl. IIF:	2482
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	87
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	7
QC-7: star track fail:	2557
Missing (^):	0
Ascending:	5071
Descending:	12751
Plotted (QC OK):	17822
Best Tr. mslp [hPa]:	948
Best Tr. mxwnd, m/s:	69.0
CYG maxwnd, m/s:	21.5



17361 CYGNSS L2 FDS wspd v2.1, 18utcSep12 +/-3 hrs
 QC-7 WspdErr3 WspdErr4; No thinning, SP ellipses scaled by IFOV [km²]

wspd
 err
 > 3.0
 m/s



Processed: **23317**

QC-0: non-zero QC: 3054

QC-1: GPS Bl. IIF: 2482

QC-2: Wspd_err > 3.0: 585

QC-2.5: Wspd_err > 4.0: 87

QC-3: DDMA ave. fail: 0

QC-4: RCG < 10.0: 0

QC-5: inc Ang < 15.0: 0

QC-5.5: inc Ang > 35.0: 0

QC-6: Pitch/roll > 1/5: 7

QC-7: star track fail: 2557

Missing (^): 0

Ascending: 4844

Descending: 12517

Plotted (QC OK): **17361**

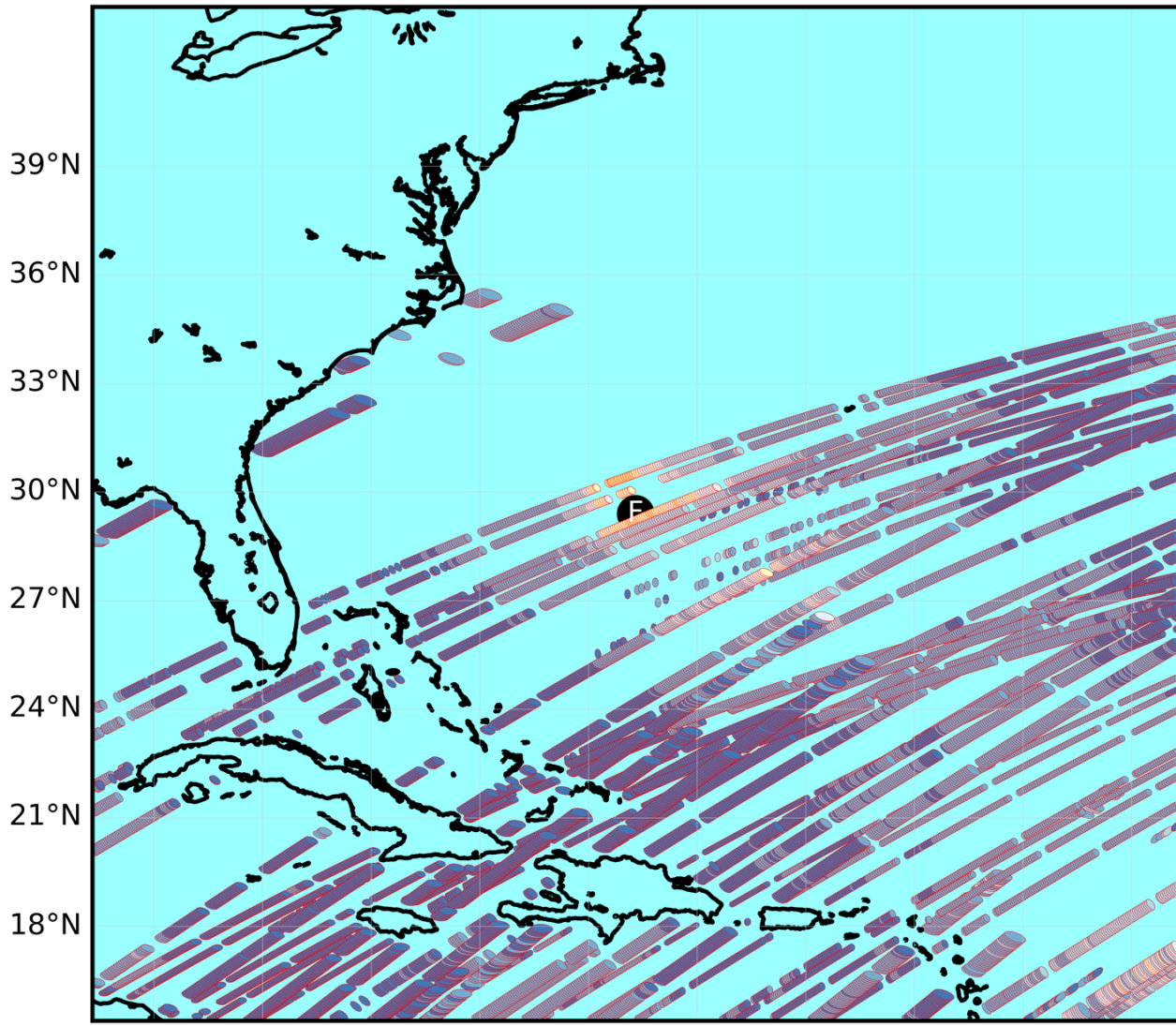
Best Tr. mslp [hPa]: 948

Best Tr. mxwnd, m/s: 69.0

CYG maxwnd, m/s: 21.5

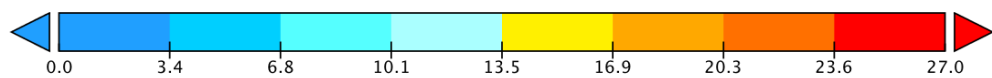
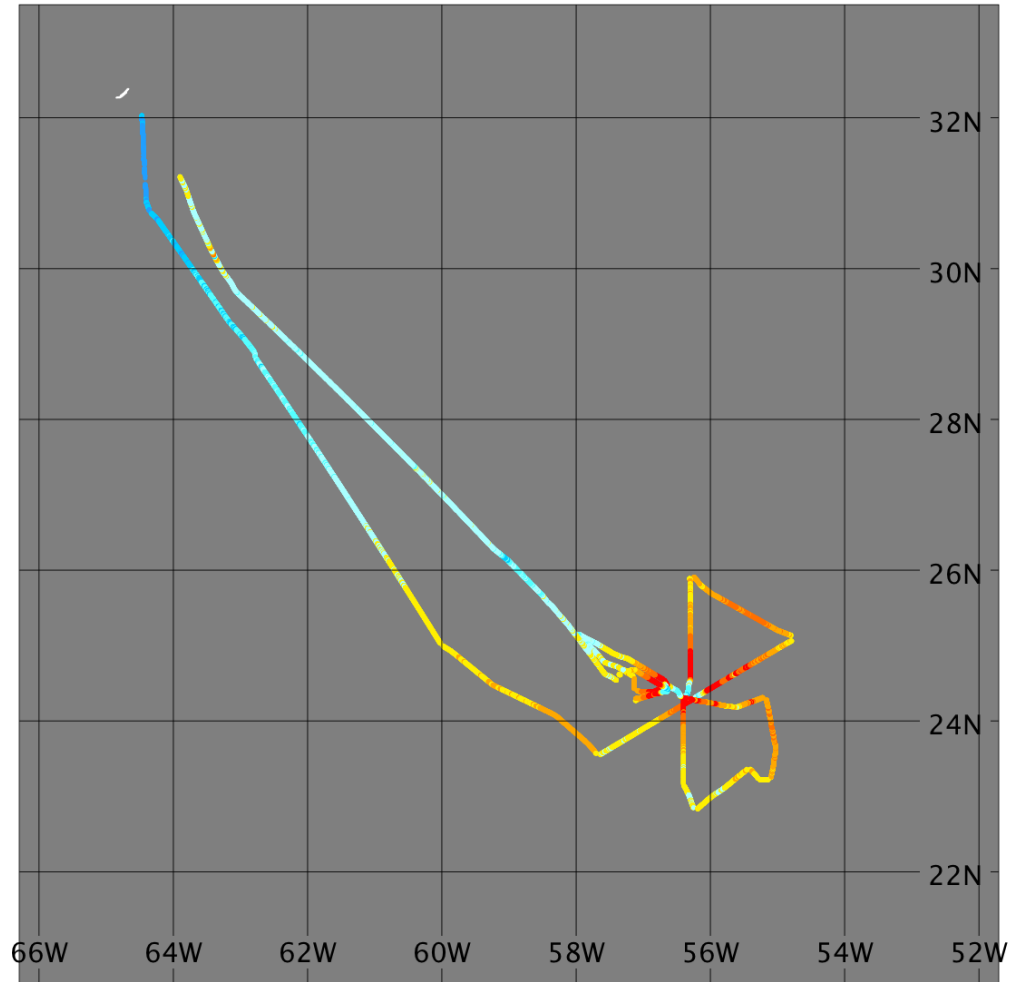
12569 CYGNSS L2 YSLF wspd v2.1, 12utcSep12 +/- 3 hours
 QC-7 WspdErr4; No thinning; SP circles scaled by IFOV [km²]

wspd
 err
 > 4.0
 m/s



Processed:	15244
QC-0: non-zero QC:	2659
QC-1: GPS Bl. IIF:	2325
QC-2: Wspd_err > 3.0:	0
QC-2.5: Wspd_err > 4.0:	16
QC-3: DDMA ave. fail:	0
QC-4: RCG < 10.0:	0
QC-5: inc Ang < 15.0:	0
QC-5.5: inc Ang > 35.0:	0
QC-6: Pitch/roll > 1/5:	0
QC-7: star track fail:	0
Missing (^):	0
Ascending:	12569
Descending:	0
Plotted (QC OK):	12569
Best Tr. mslp [hPa]:	944
Best Tr. mxwnd, m/s:	72.0
CYG maxwnd, m/s:	34.4

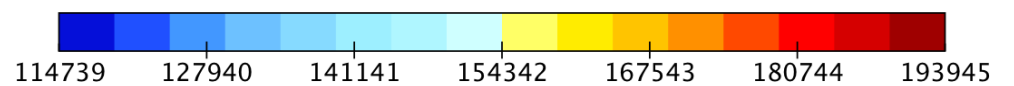
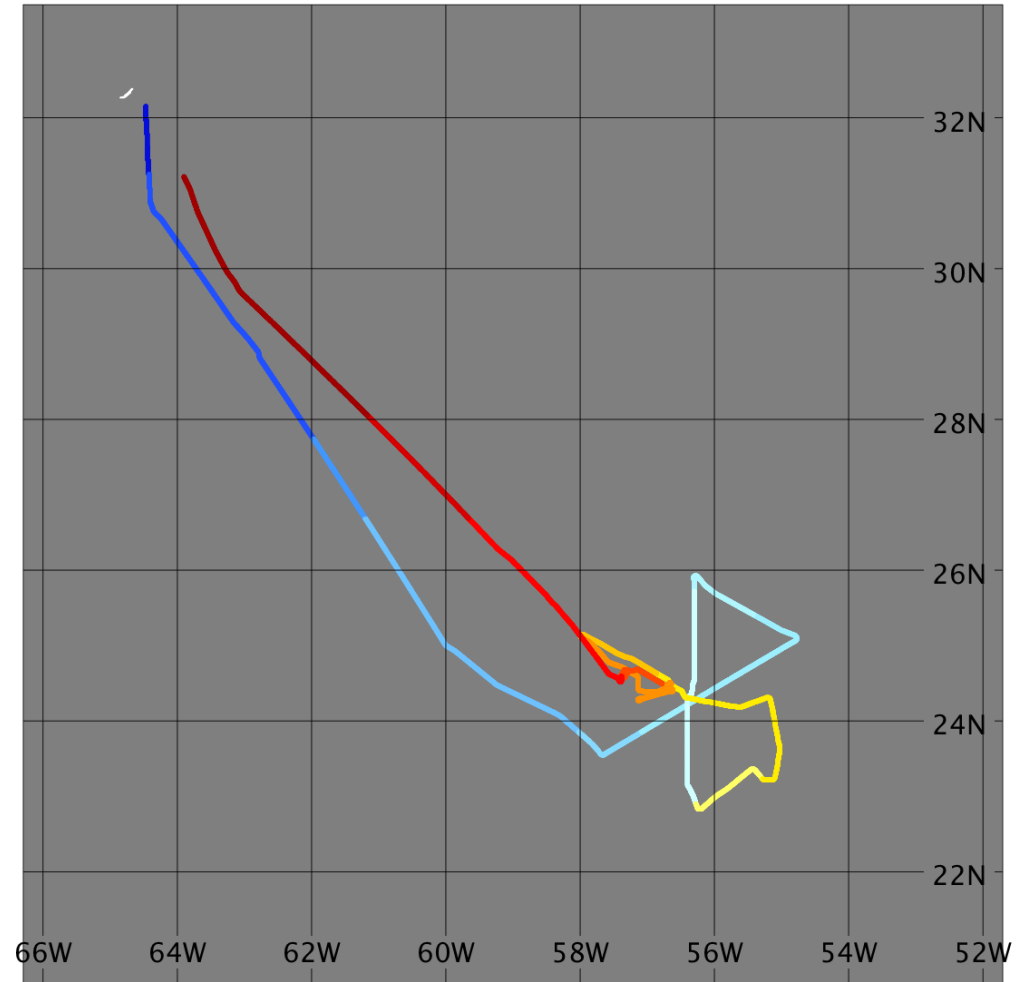
SFMR Wind Speed
Florence, Sep 9, 2018, 11:48 – 19:40 UTC



SFMR wind speed (m/s)

Data Min = -0.0, Max = 35.9

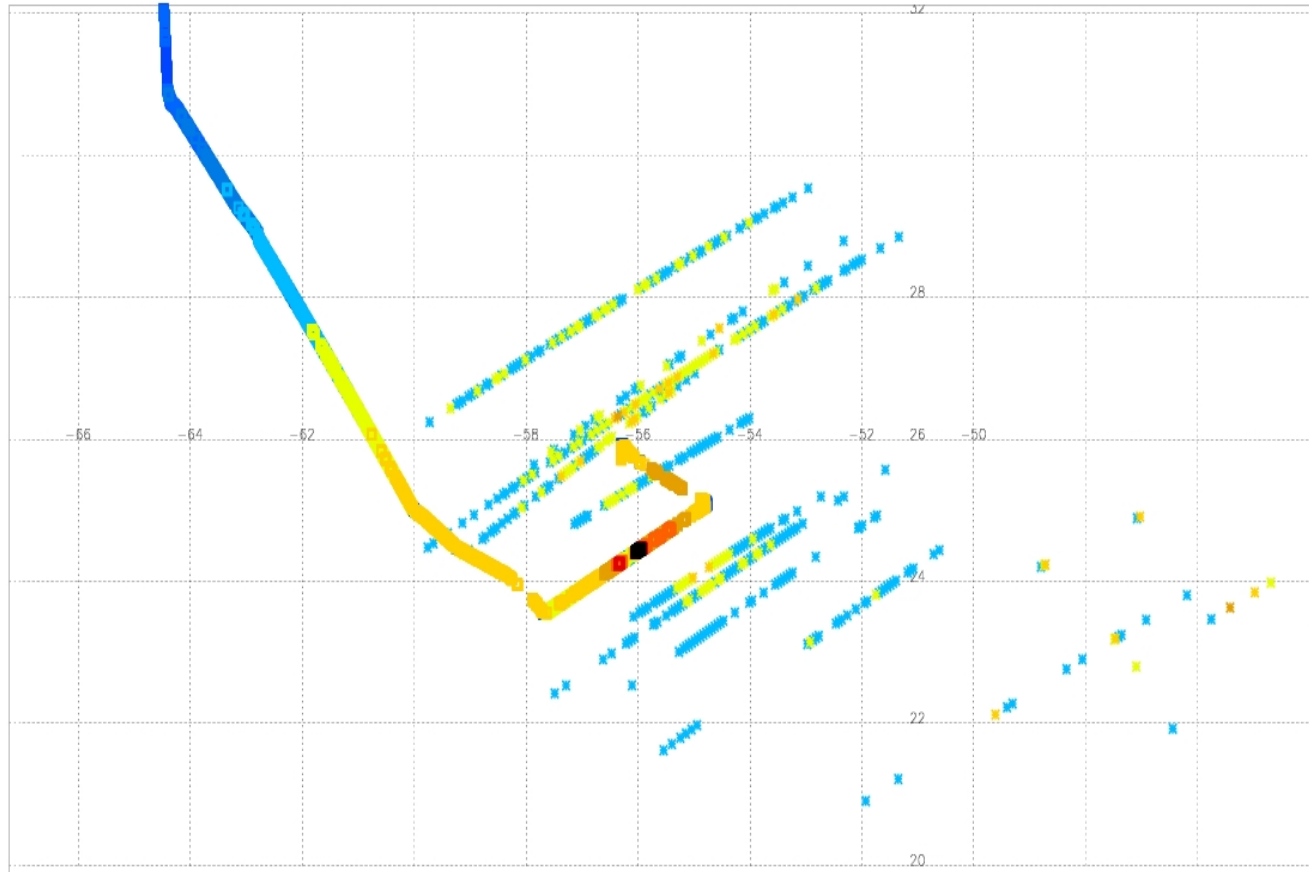
SFMR Observation Time
Florence, Sep 9, 2018, 11:48 – 19:40 UTC



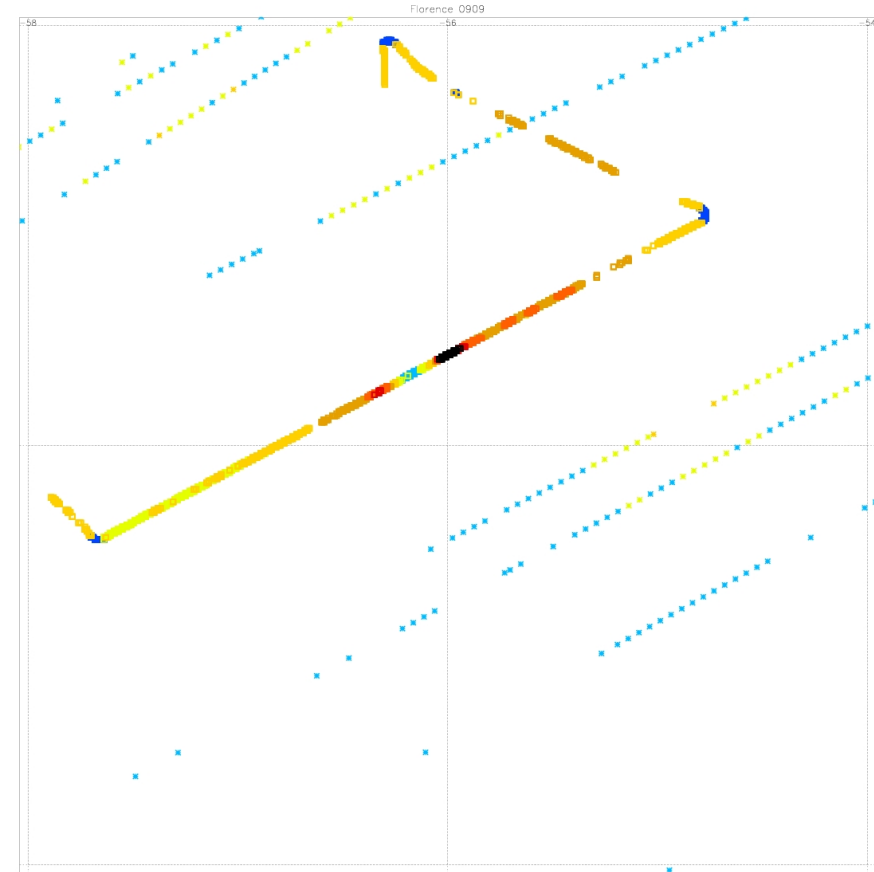
Time (HHMMSS UTC)

Data Min = 114739, Max = 193945

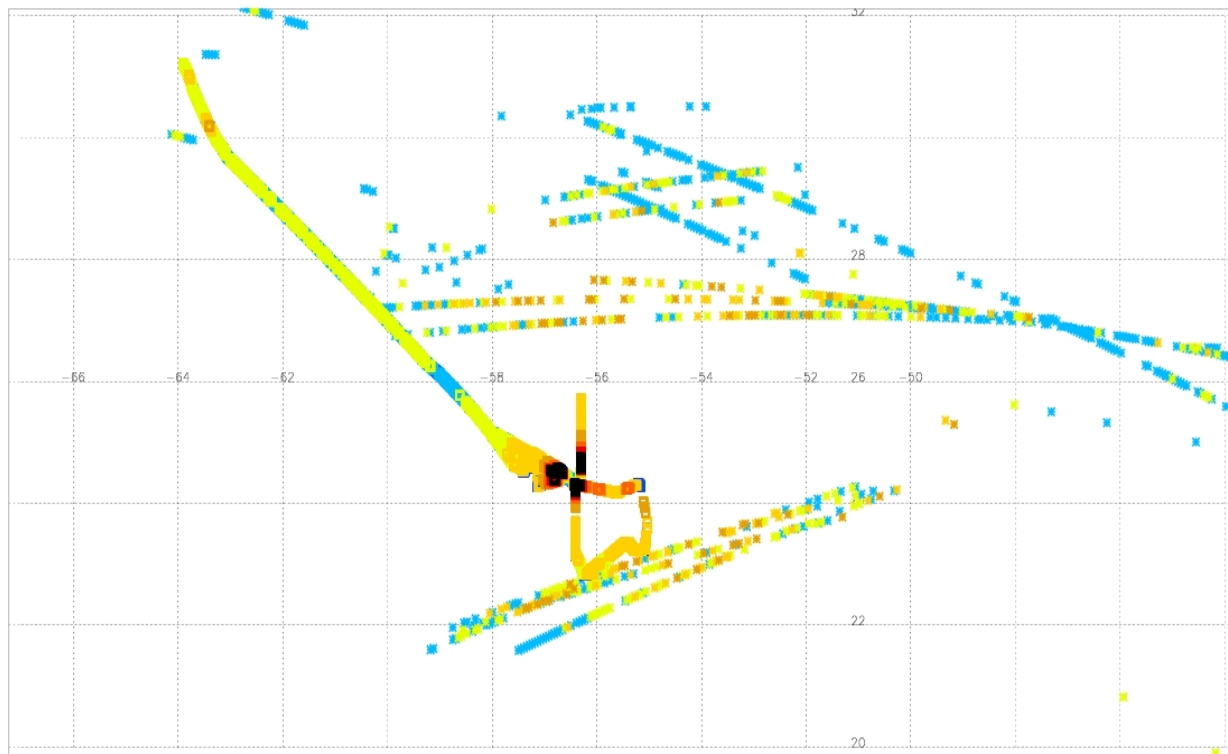
QC'd CYGNSS Data (YSLF), v2.1 & SFMR Underflight Florence, Sep 9, 2018, 1200 UTC +/- 3 hrs



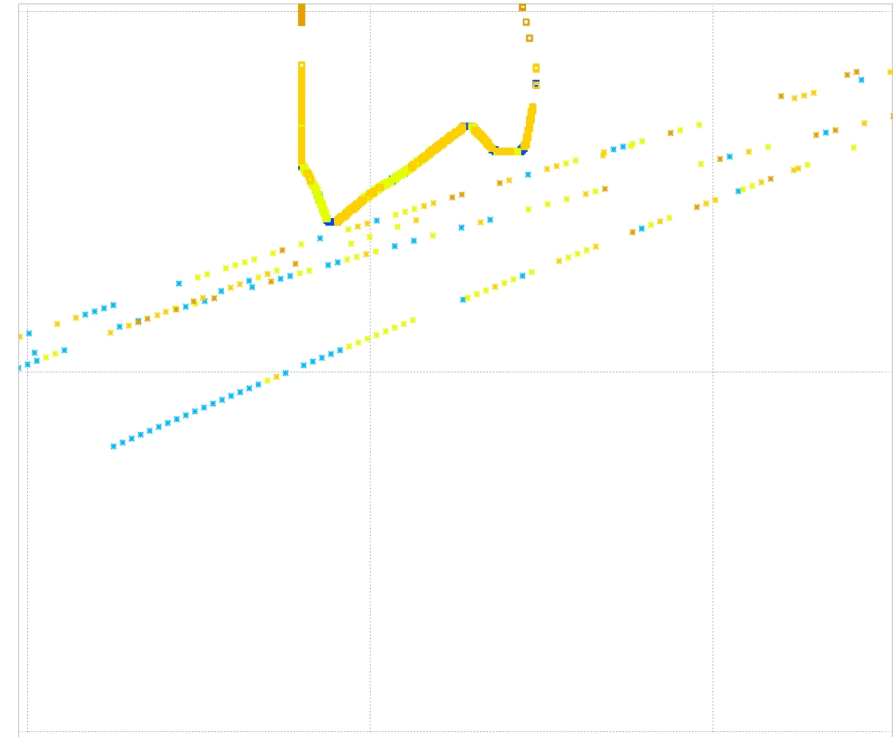
- 27<WND
- 24<WND<27
- 21<WND<24
- 18<WND<21
- 15<WND<18
- 12<WND<15
- 9<WND<12
- 6<WND<9
- 3<WND<6
- WND<3



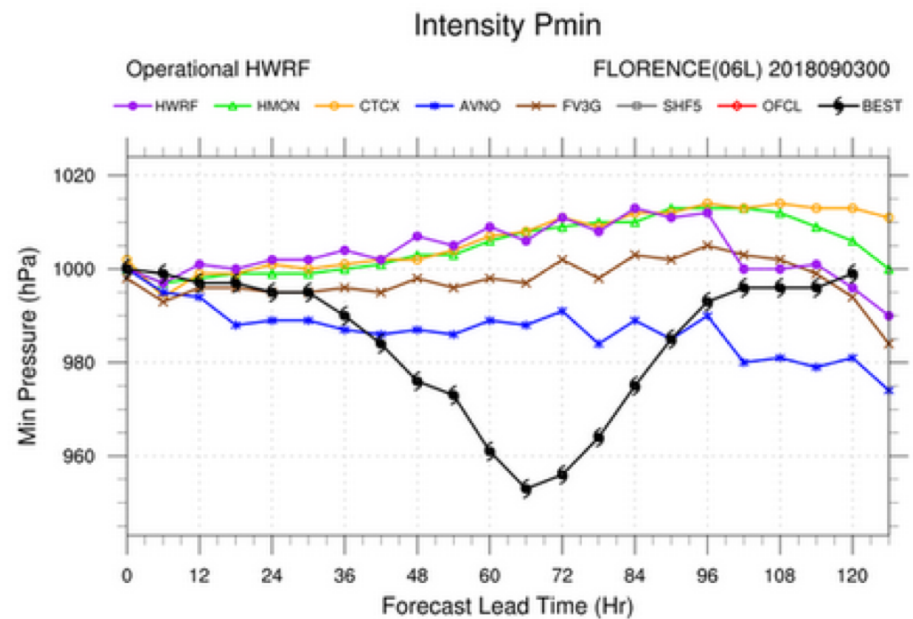
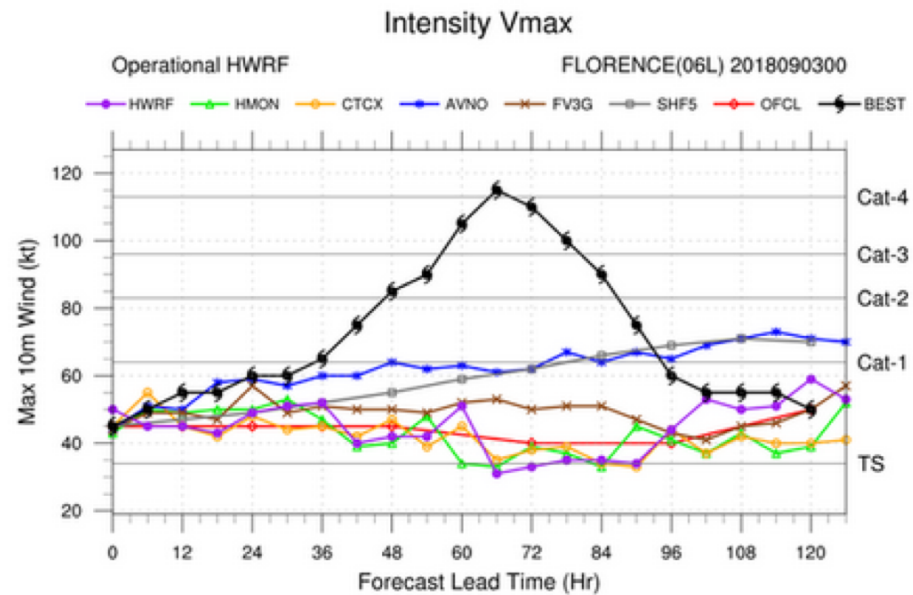
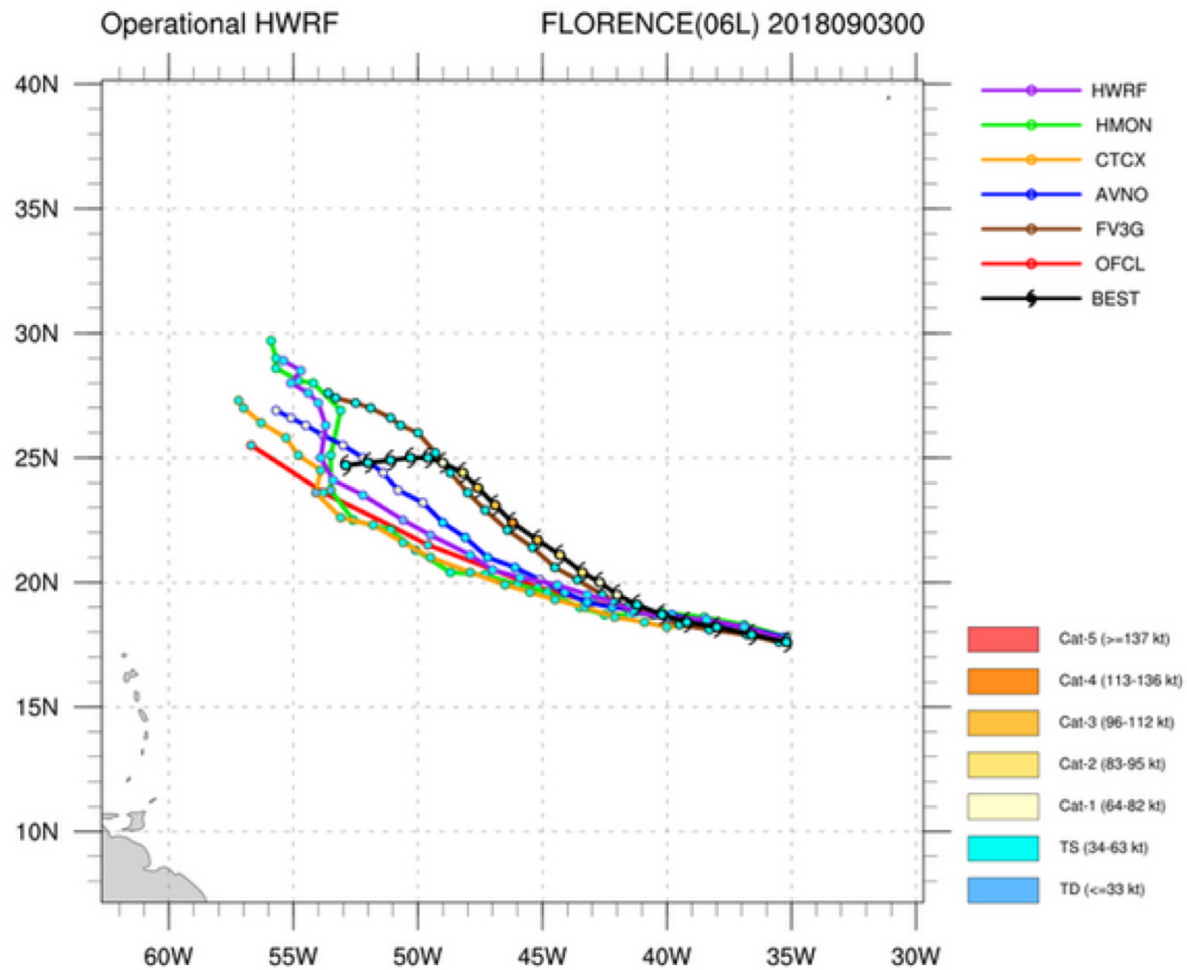
QC'd CYGNSS Data (YSLF), v2.1 & SFMR Underflight Florence, Sep 9, 2018, 1800 UTC +/- 3 hrs



- 27<WND
- 24<WND<27
- 21<WND<24
- 18<WND<21
- 15<WND<18
- 12<WND<15
- 9<WND<12
- 6<WND<9
- 3<WND<6
- WND<3

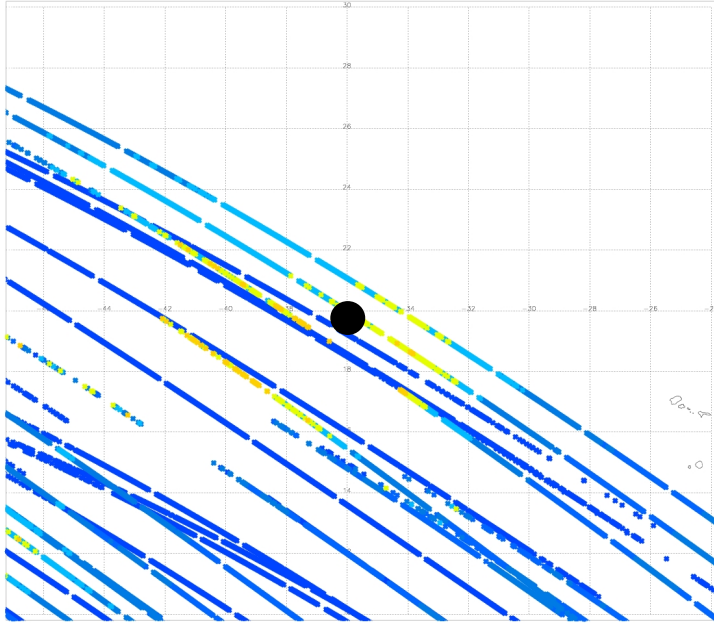


TC Tracks

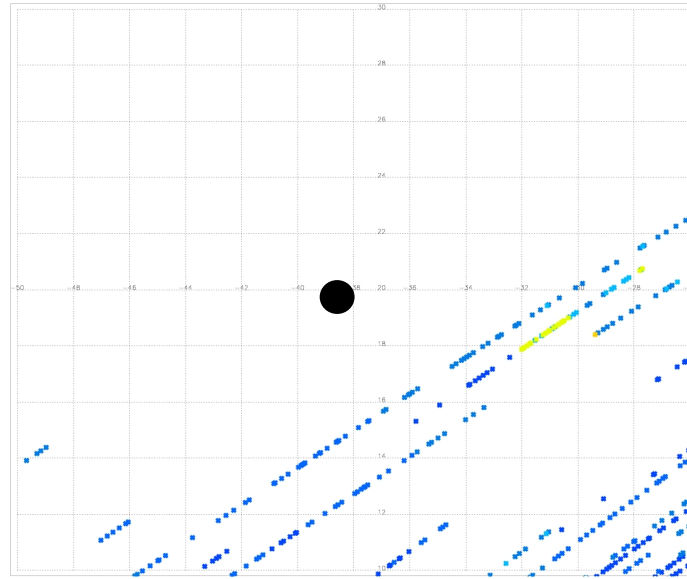


No QC: CYGNSS Data (YSLF), v2.1, Florence

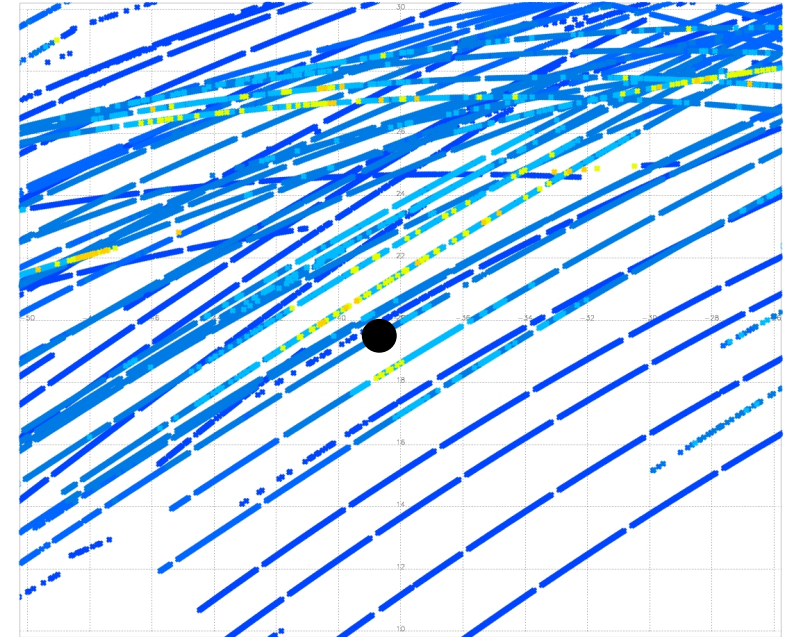
09/03 00Z +/-3



09/03 12Z +/-3



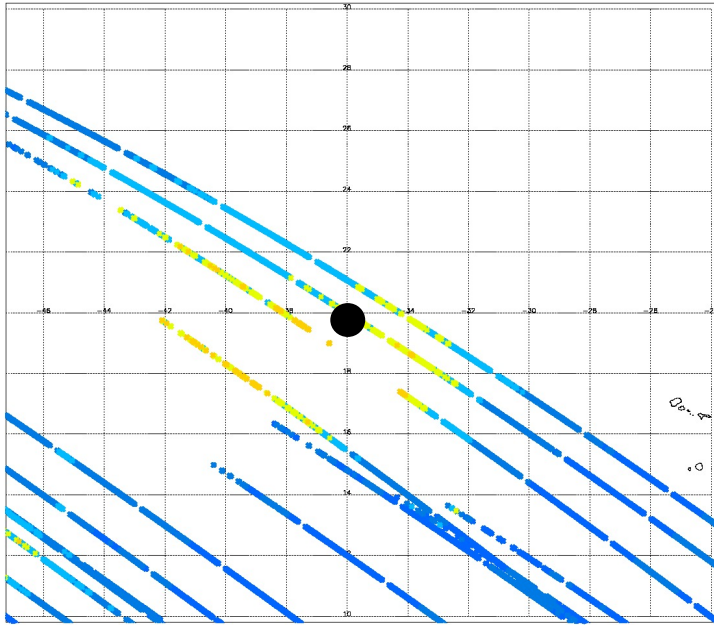
Florence 090318
09/03 18Z +/-3



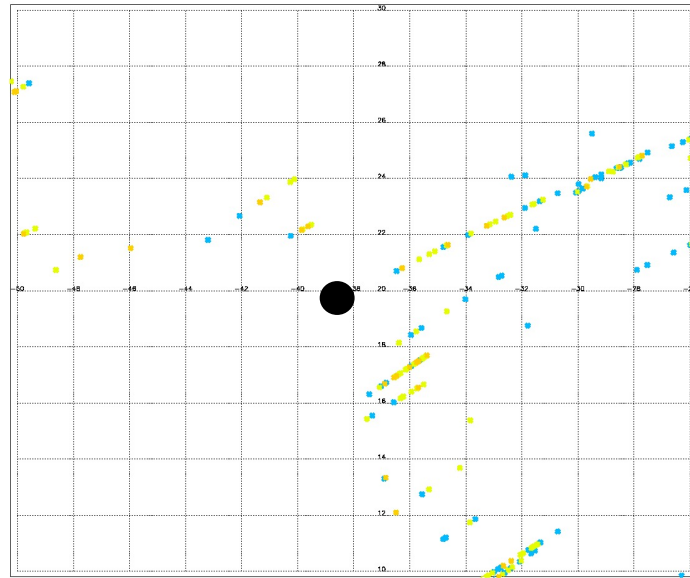
- 27<WND
- 24<WND<27
- 21<WND<24
- 18<WND<21
- 15<WND<18
- 12<WND<15
- 9<WND<12
- 6<WND<9
- 3<WND<6
- WND<3

QC'd: CYGNSS Data (YSLF), v2.1, Florence

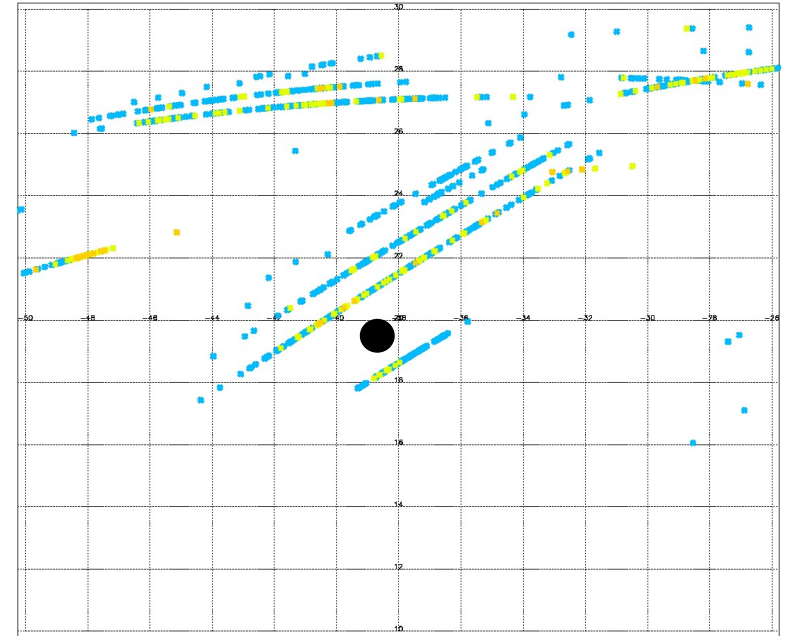
09/03 00Z +/-3



09/03 12Z +/-3



Florence 090318
09/03 18Z +/-3



- 27<WND
- 24<WND<27
- 21<WND<24
- 18<WND<21
- 15<WND<18
- 12<WND<15
- 9<WND<12
- 6<WND<9
- 3<WND<6
- WND<3

Preliminary CYGNSS OSE innovation statistics

Storm	Cycle	Number of points (CYGNSS)	O-B(mean)	O-B(rms)	O-A(mean)	O-A(rms)
Florence	9/3/00	5516	0.56	1.47	0.05	0.53
	9/3/06	n/a	n/a	n/a	n/a	n/a
	9/3/12	83	2.44	2.60	0.59	0.95
	9/3/18	554	1.18	3.24	0.26	0.86

ASCAT OSE innovation statistics

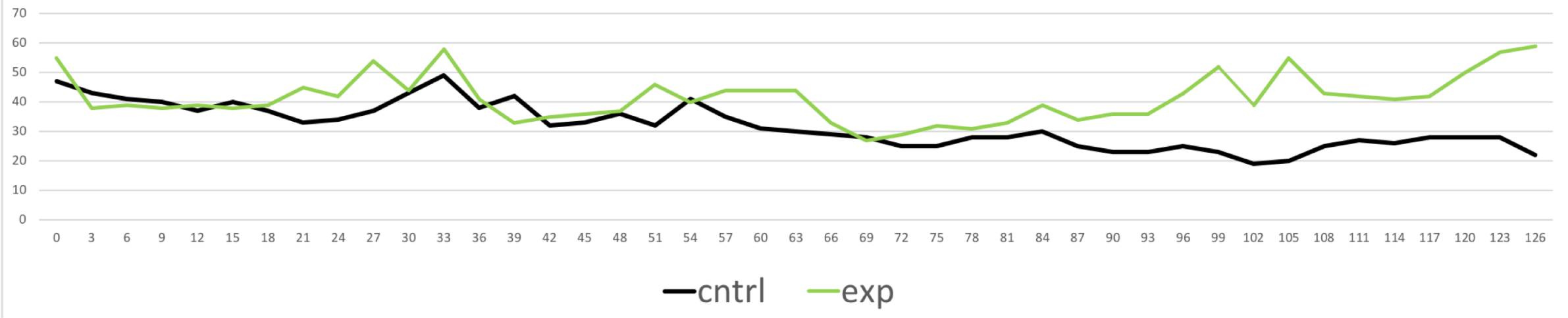
Experiment

Storm	Cycle	Number of points (ASCAT)	O-B(mean)	O-B(rms)	O-A(mean)	O-A(rms)
Florence	9/3/00	488	0.13	1.35	-0.20	1.43
	9/3/06	n/a	n/a	n/a	n/a	n/a
	9/3/12	225	0.08	1.59	-0.20	1.48
	9/3/18	n/a	n/a	n/a	n/a	n/a

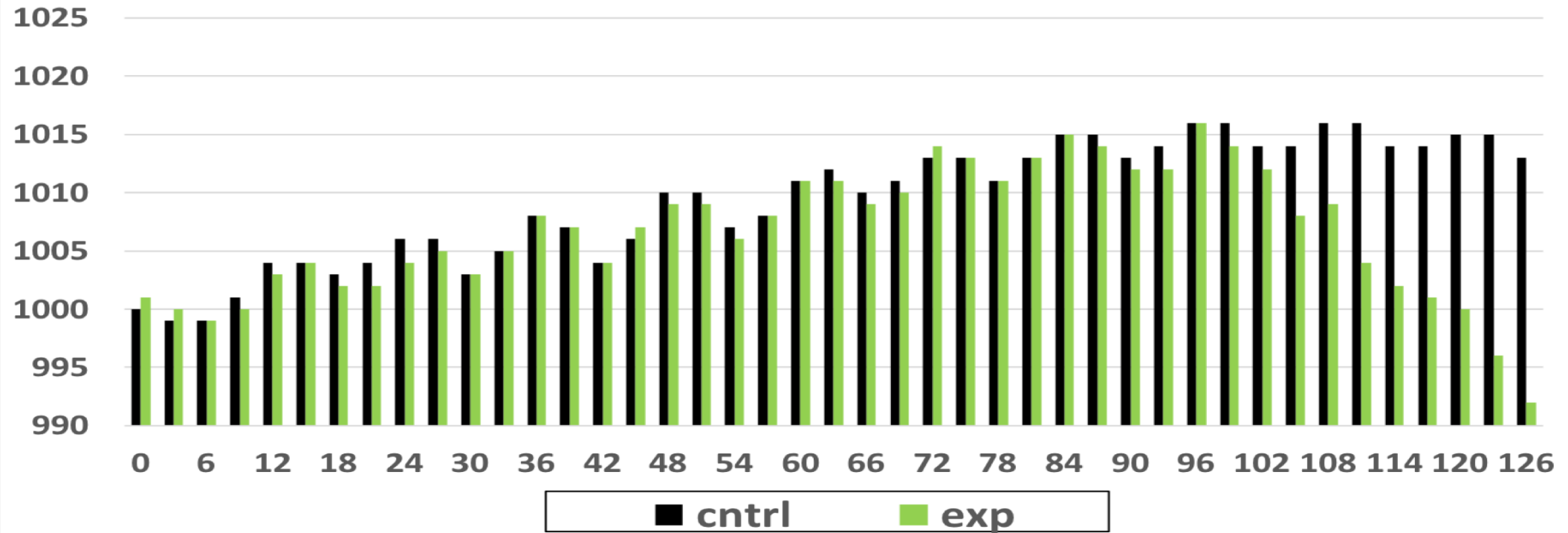
Control

Storm	Cycle	Number of points (ASCAT)	O-B(mean)	O-B(rms)	O-A(mean)	O-A(rms)
Florence	9/3/00	488	0.13	1.35	0.09	1.15
	9/3/06	n/a	n/a	n/a	n/a	n/a
	9/3/12	225	0.08	1.59	-0.04	1.43
	9/3/18	n/a	n/a	n/a	n/a	n/a

Florence
0903 at 00Z
Max Wnd



**CP
FLORENCE
0903 at 00z**



Future plans

- -- longer assimilation experiments, more storms
- -- H217 versus H218
- -- more comparisons with ASCAT
- -- thinning to
 - ≥ 50 km along-track thinning, and
 - ≥ 90 min. separation in time