

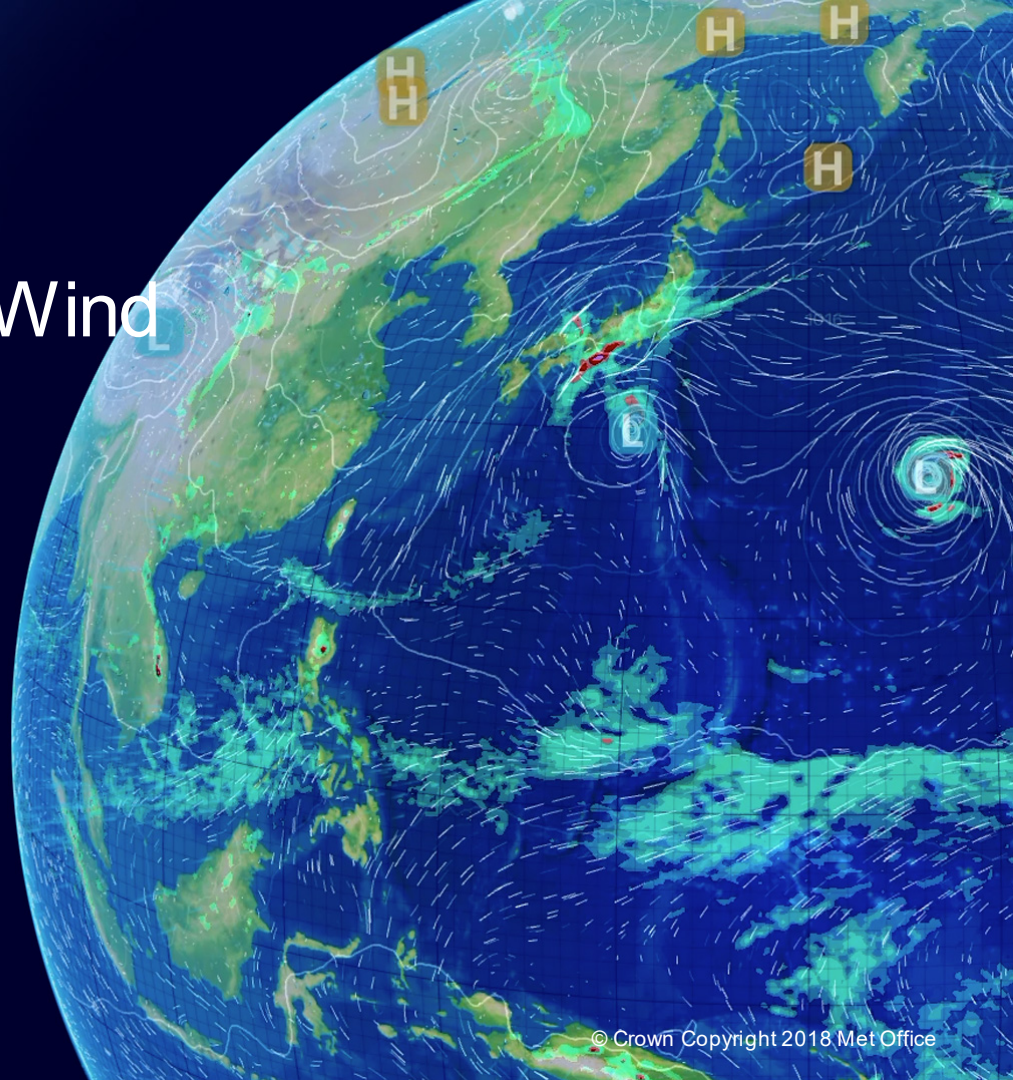
Assimilation of Aeolus Horizontal Line of Sight Wind Speed at the Met Office

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IWWW 15 2021

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Experiments with laser A

- 12th September – 16th October 2018
- N320/L70, N108/N216 4D-Var
- Rayleigh + Mie
- 3m/s, 8m/s cutoff
- 6m/s observation error
- Mie bias correction for ascending passes
- No observation cutoff time

Experiment	% RMSE against ECMWF analysis	Typical obs volume
Control - Sonde	-1.58	2623475
Control - GPSRO	-1.28	289319
Control - Aircraft	-0.95	34922
Control - AMV	-1.06	62626
Control + Aeolus	0.48	25755
Control - Scat	-0.51	34922

Experiments with laser B

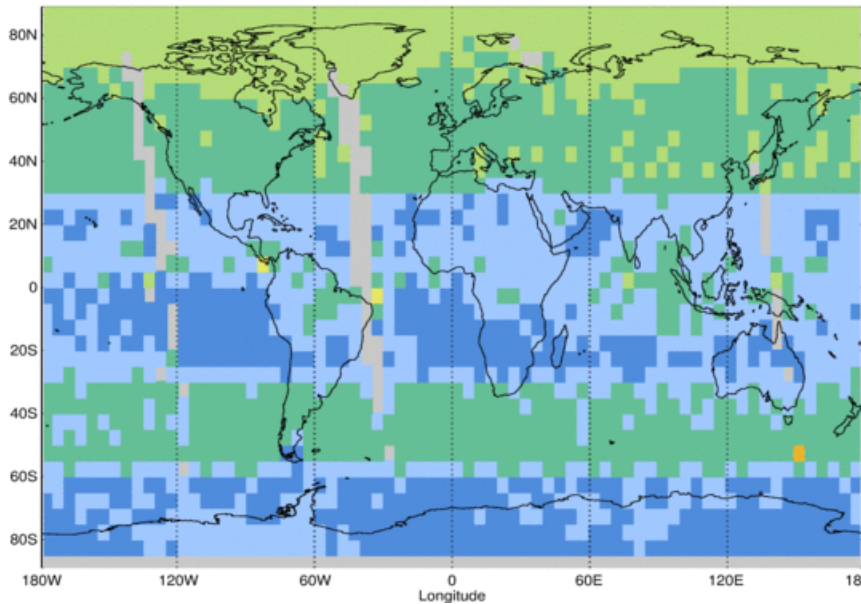
Experiment	1	2	3	4
Model Resolution	N320, L70		N640, L70	N320, L70
4D-VAR Resolution	N108/N216		N144/N320	N108/N216
Dates	4 July-15 Sept 2019	13 Sept - 8 Dec 2019	5 May - 19 July 2020	8 Sept – 8 Dec 2020
Channels	Mie	Mie	Rayleigh vs Mie control	Rayleigh vs Mie control
Thinning	80km	80km	80km	80km
L2B Error cutoff	4m/s	4m/s	4m/s + 8m/s	4m/s + 8m/s
Cutoff time	None	Operational	Operational	Operational



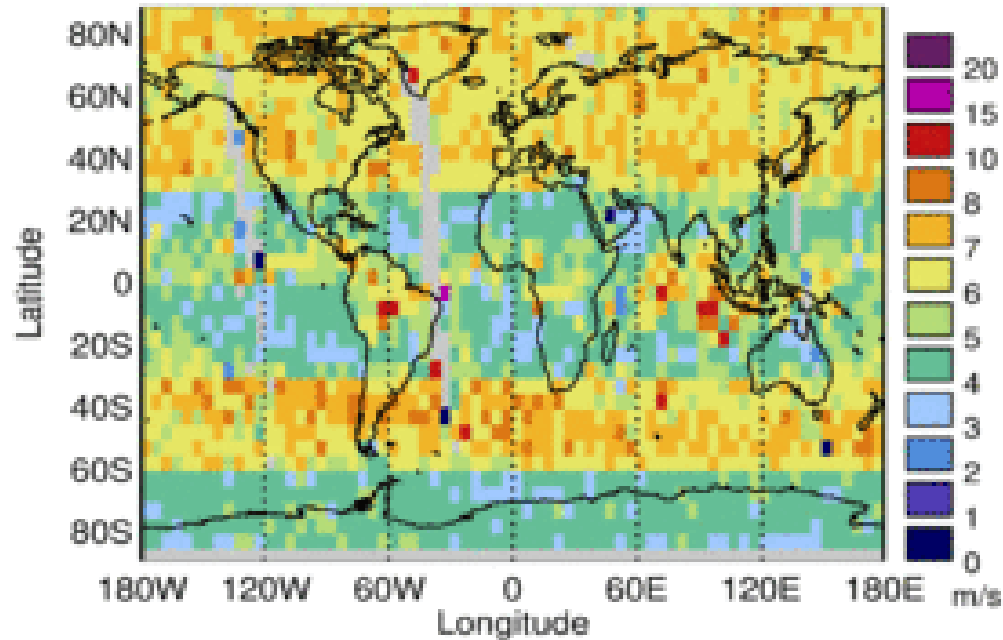


Monitoring

Level 2B Error



O-B Standard deviation





Error model

Mie: $0.7 * L2BErr + 2.9$

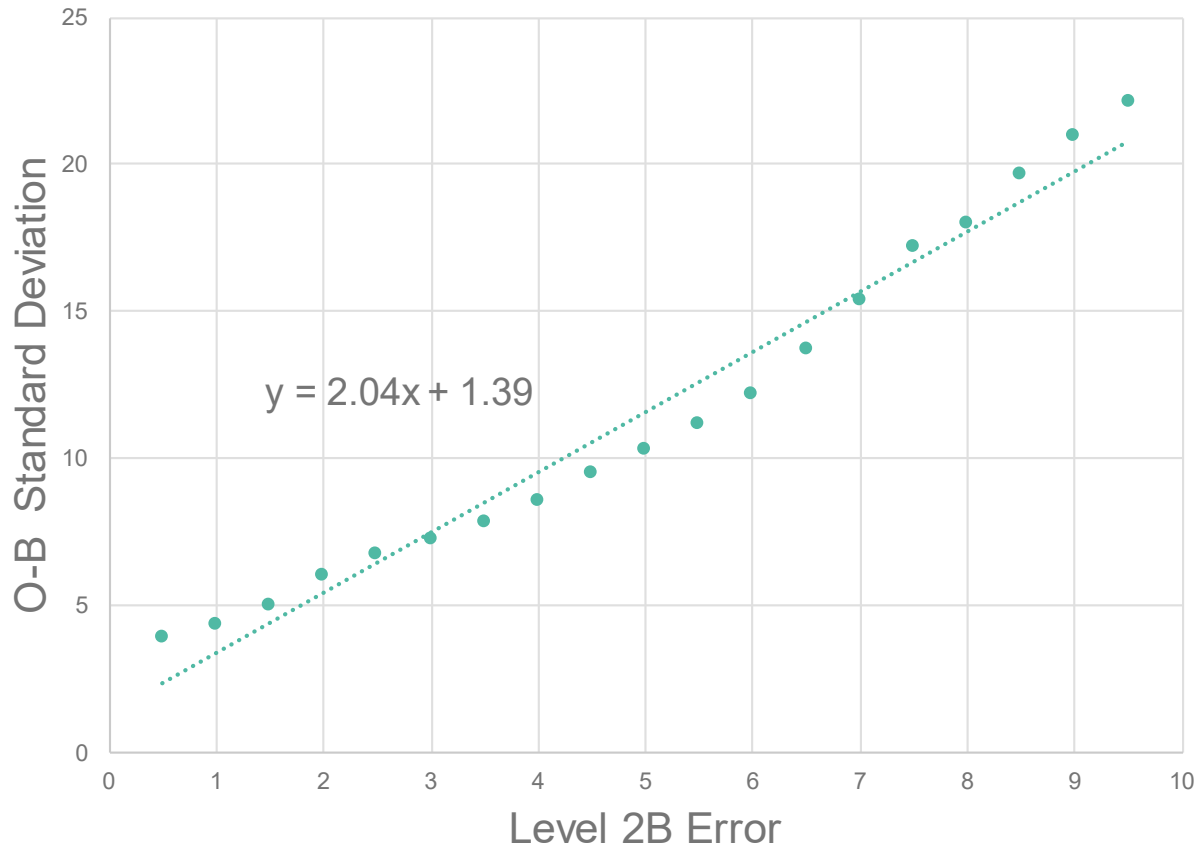




Error model

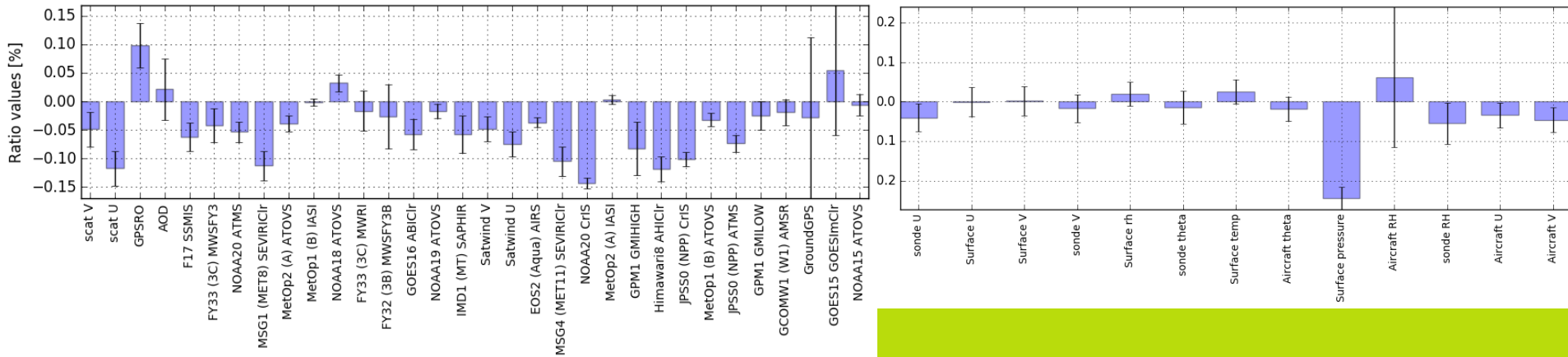
Rayl: $2.0 * L2BErr + 1.4$

Rayleigh



Mie only, 13th Sept – 8th Dec 2019

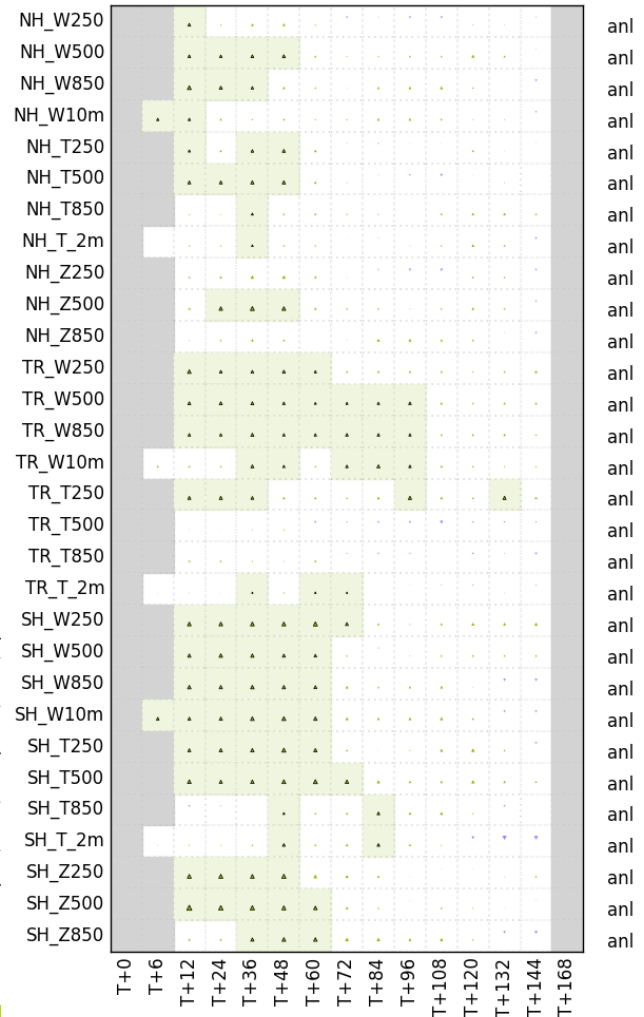
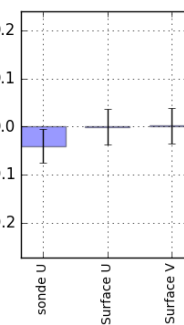
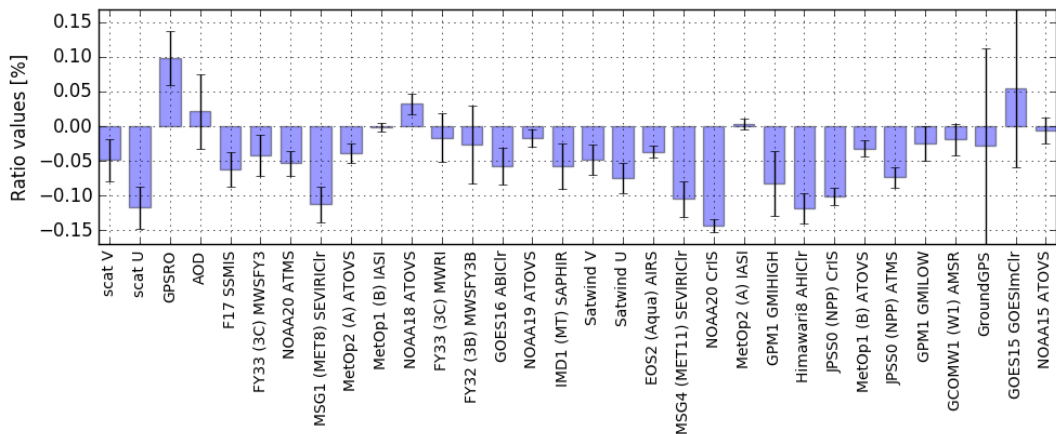
% change in O-B standard deviation between control and trial
(negative shows improved fit)





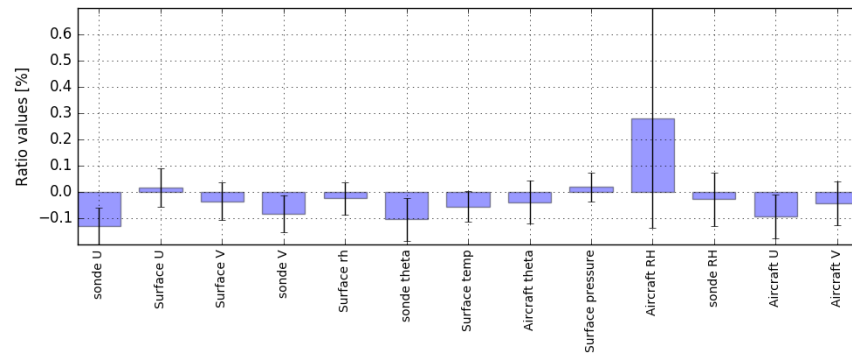
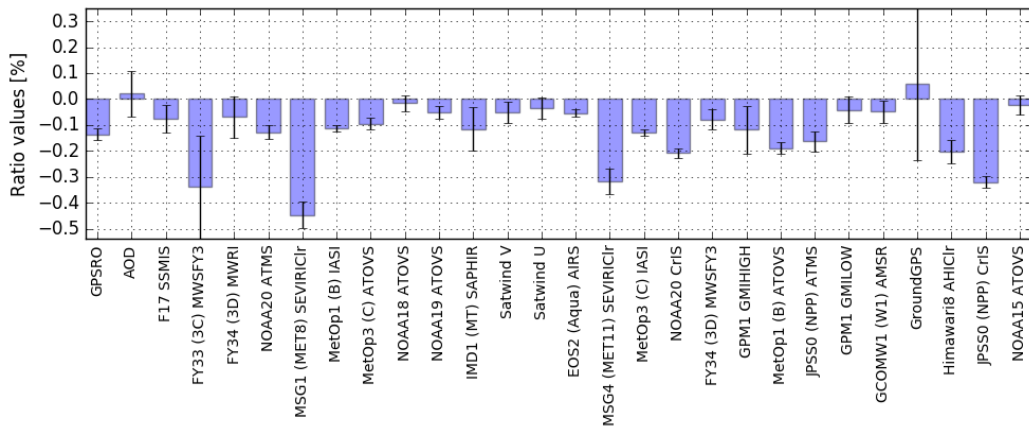
Mie only, 13th Sept – 8th Dec 2019

Change in RMS error compared to ECMWF Analysis



+Rayleigh, 8th Sept – 8th Dec 2020

% change in O-B standard deviation between control and trial
(negative shows improved fit)

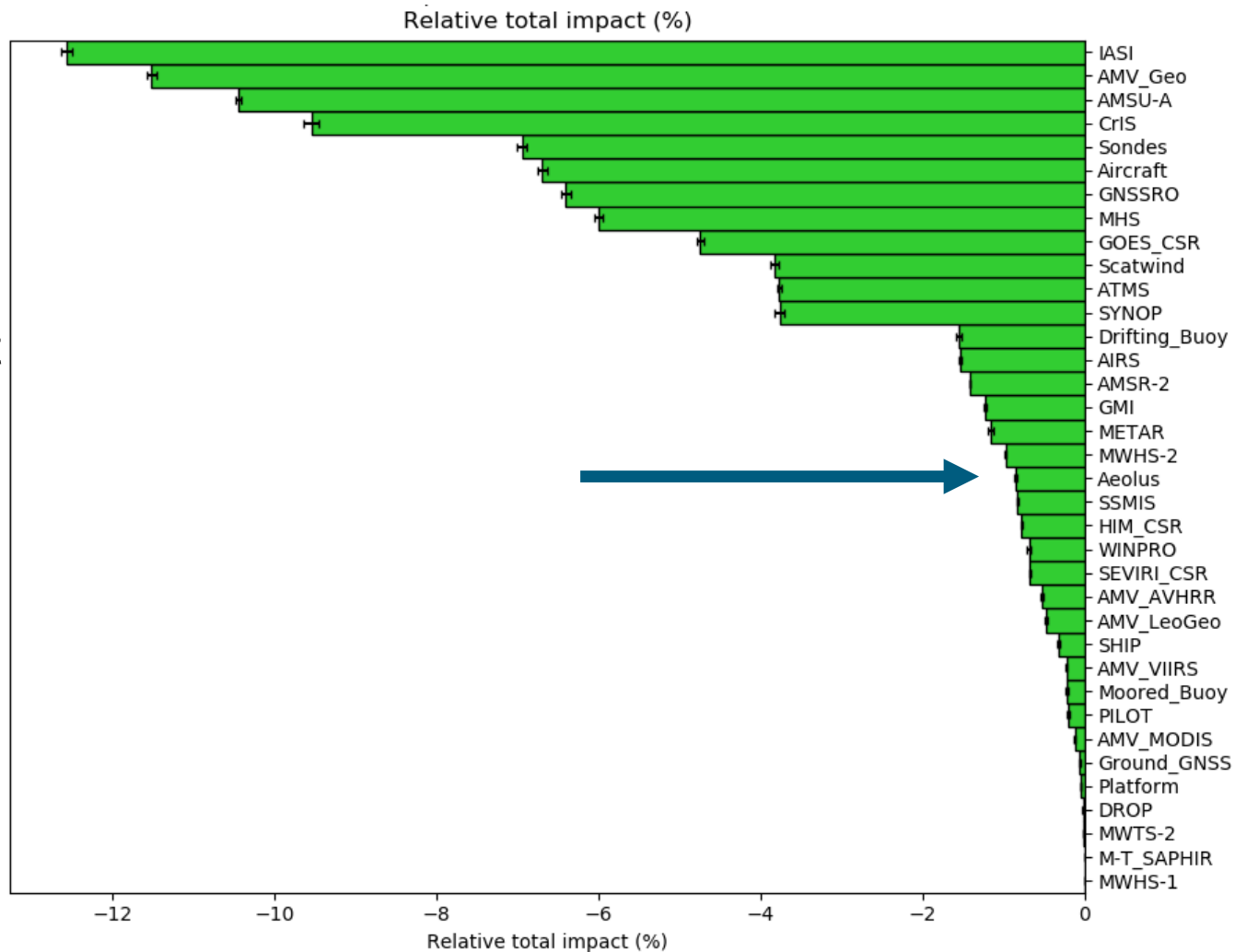




FSO

Relative Total Impact
(Mie only!)

12th Dec 2020 –
20th Jan 2021

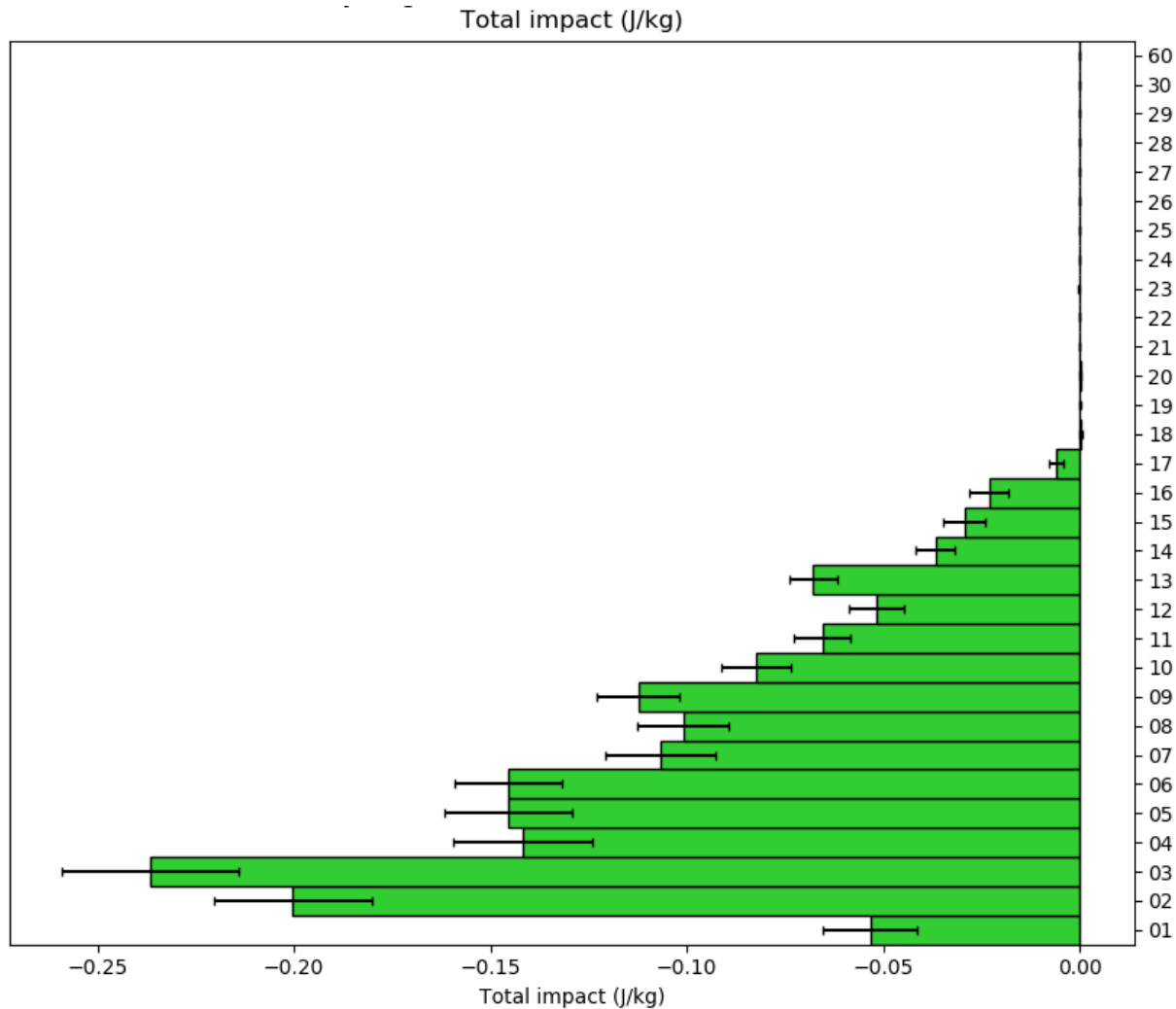




FSO

Total impact by model level
(Mie only)

December 2020

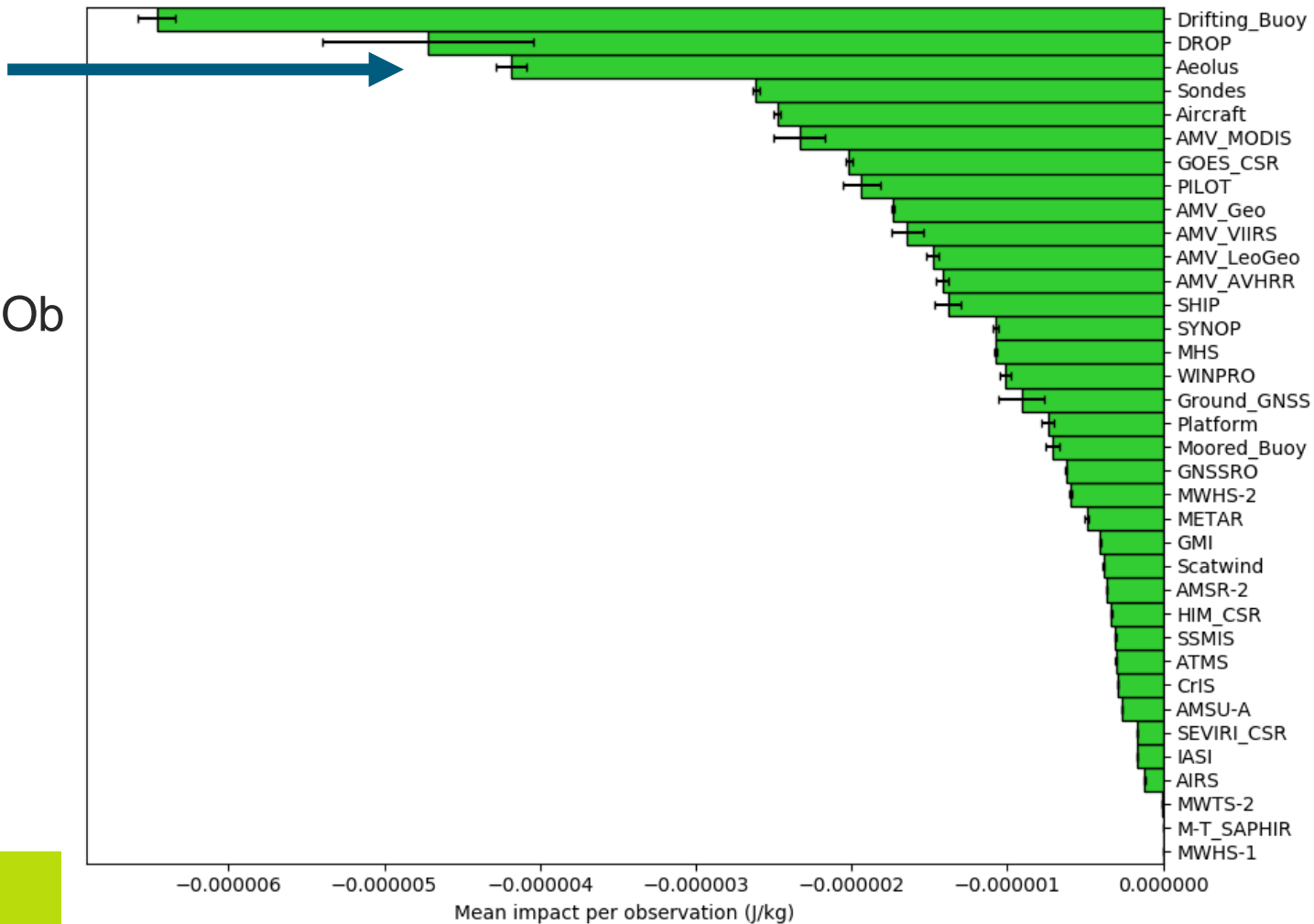


FSO

Mean Impact per Ob
(Mie only)

12th Dec 2020 –
20th Jan 2021

All observations / 20201209T0000Z-20210120T1800Z
Mean impact per observation (J/kg)



Current status

- Mie channel operationally assimilated since 9th December 2020
- Rayleigh channel in pre-parallel testing