Impact of drifting buoys observations on NWP at the Met Office

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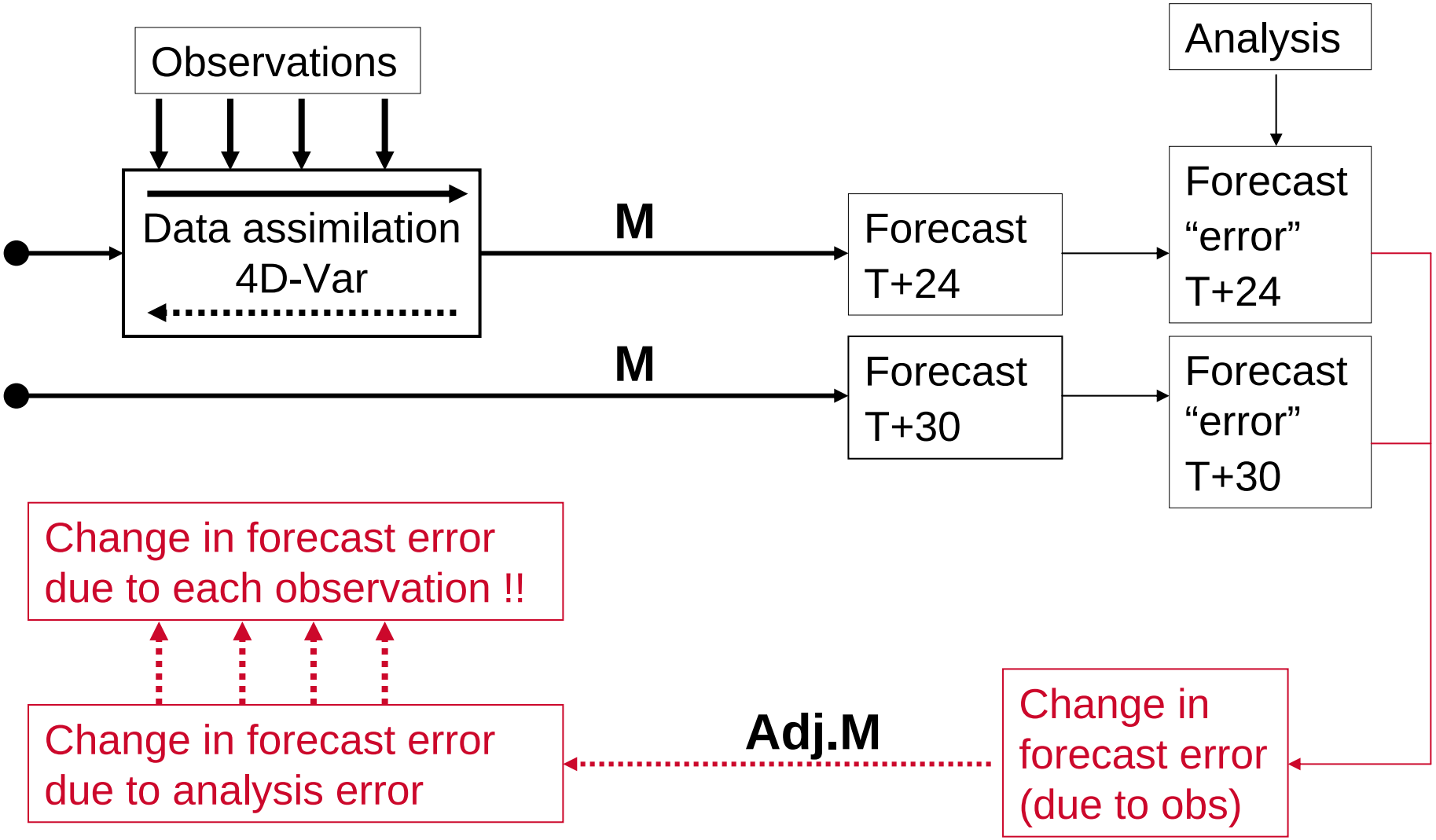
Impact of drafting buoy observations on NWP at the Met Office

- Forecast sensitivity to observations (FSO)
  - Met Office FSO system
  - Results for satellite observing systems
  - Results for drifting buoys

- Data denial experiments

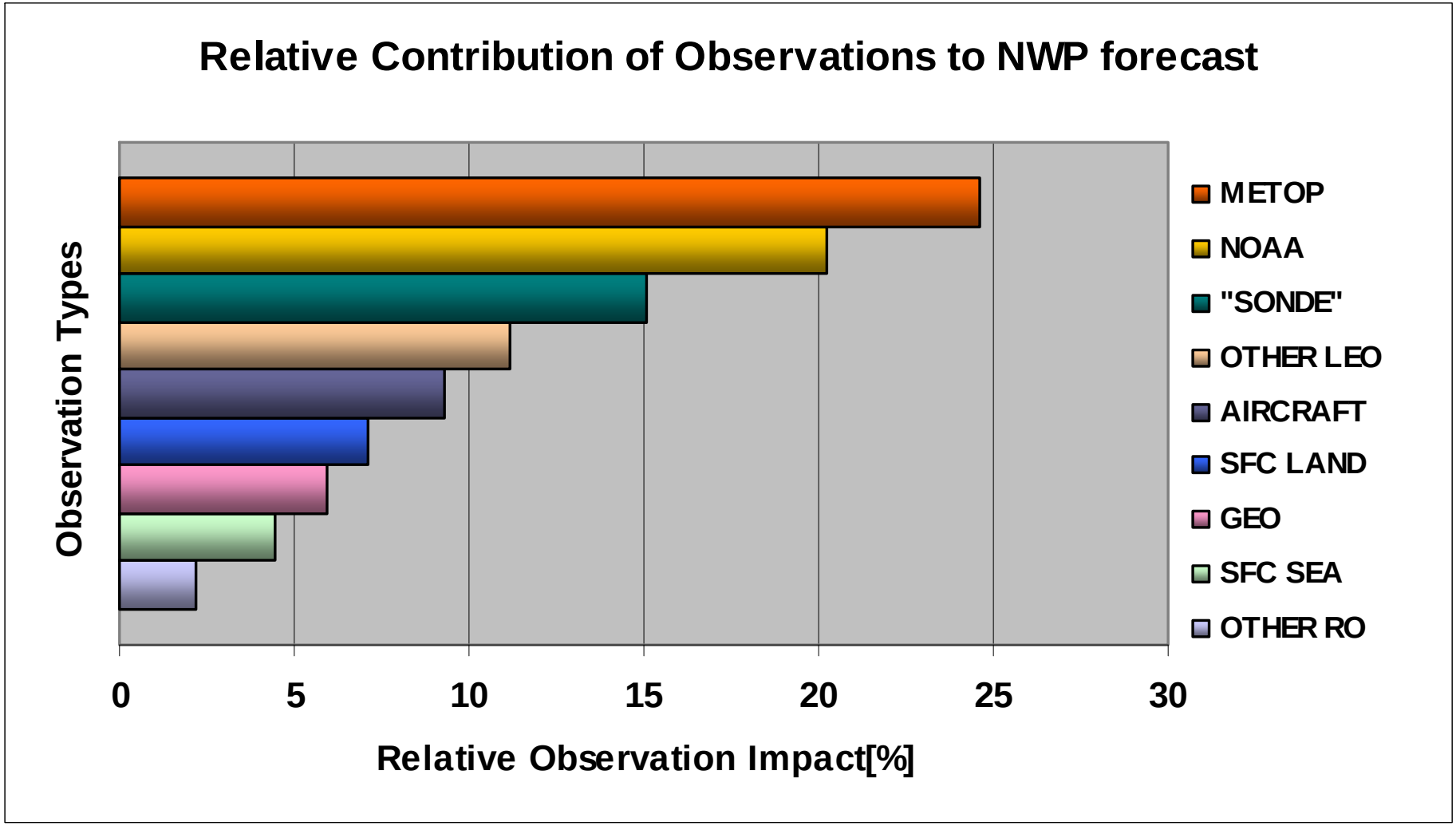
Observation impact in Met Office global NWP



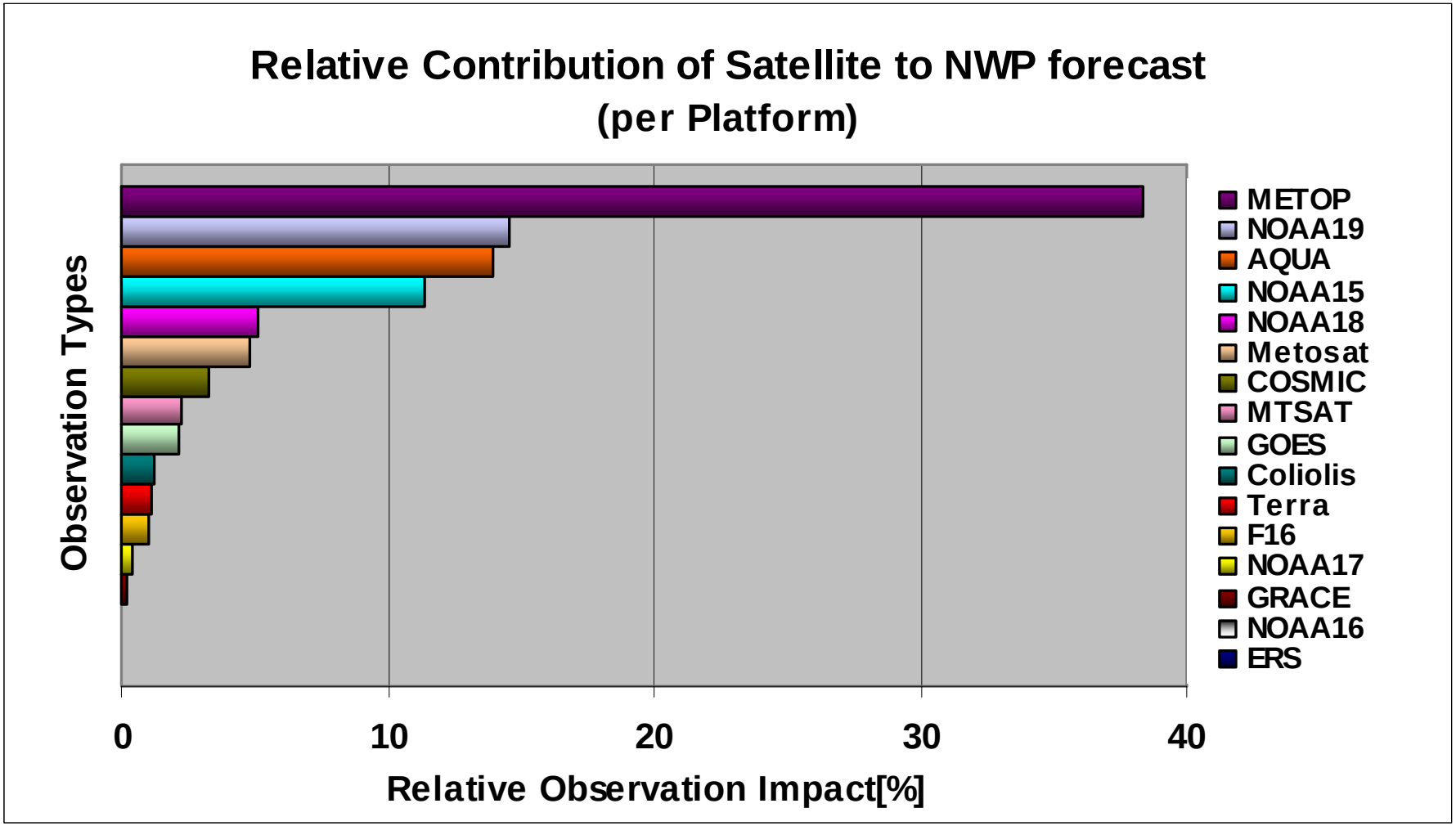
Observation impact in Met Office global NWP

Metop:	AMSU-A, MHS, HIRS, IASI, ASCAT, GRAS
NOAA:	AMSU-A: N-15, N-18, N-19 MHS: N-18 HIRS: N-17, N-19 AVHRR AMVs: N-15, N-16, N-17, N-18, N-19
Other LEO:	EOS-Aqua AIRS, MODIS AMVs EOS-Terra MODIS AMVs DMSP F-16 SSMIS ERS-2 AMI; Coriolis WINDSAT
GEO:	GOES AMVs; MTSAT AMVs; Meteosat AMVs, CLRs
Other RO:	CHAMP, GRACE
Aircraft:	AMDAR, AIREP
"SONDE":	PILOT, TEMP, Wind profiler, DROPSONDE
Surface land:	SYNOP, BOGUS
Surface sea:	BUOY, SHIP, TCBOGUS

Observation impact in Met Office global NWP



Satellite observation impact per platform

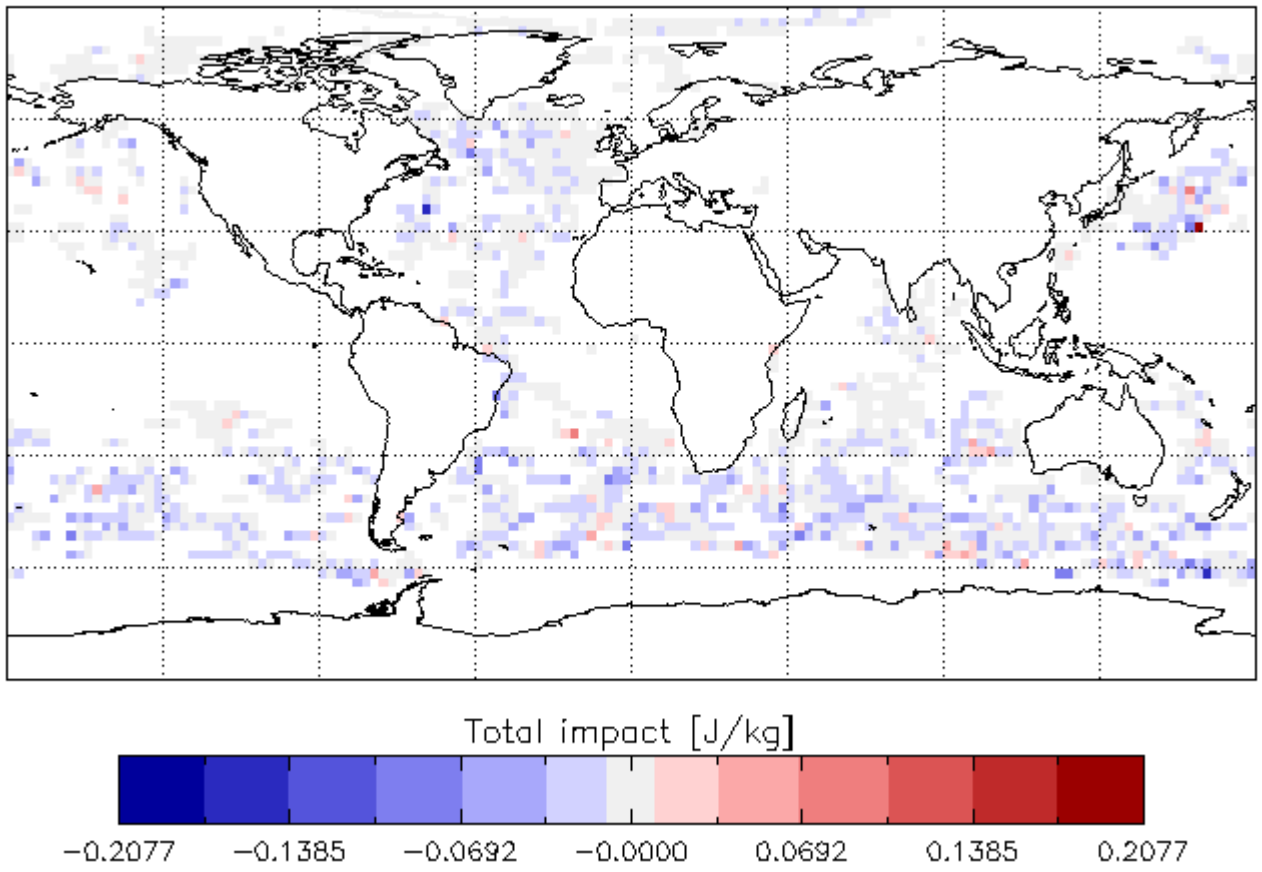


In situ surface observations

Forecast Sensitivity to Observations (FSO)

Period: 22 August – 29 Sept 2012 (39 days)

Drifting buoy – surface pressure – coverage and impact



Impact

blue: positive

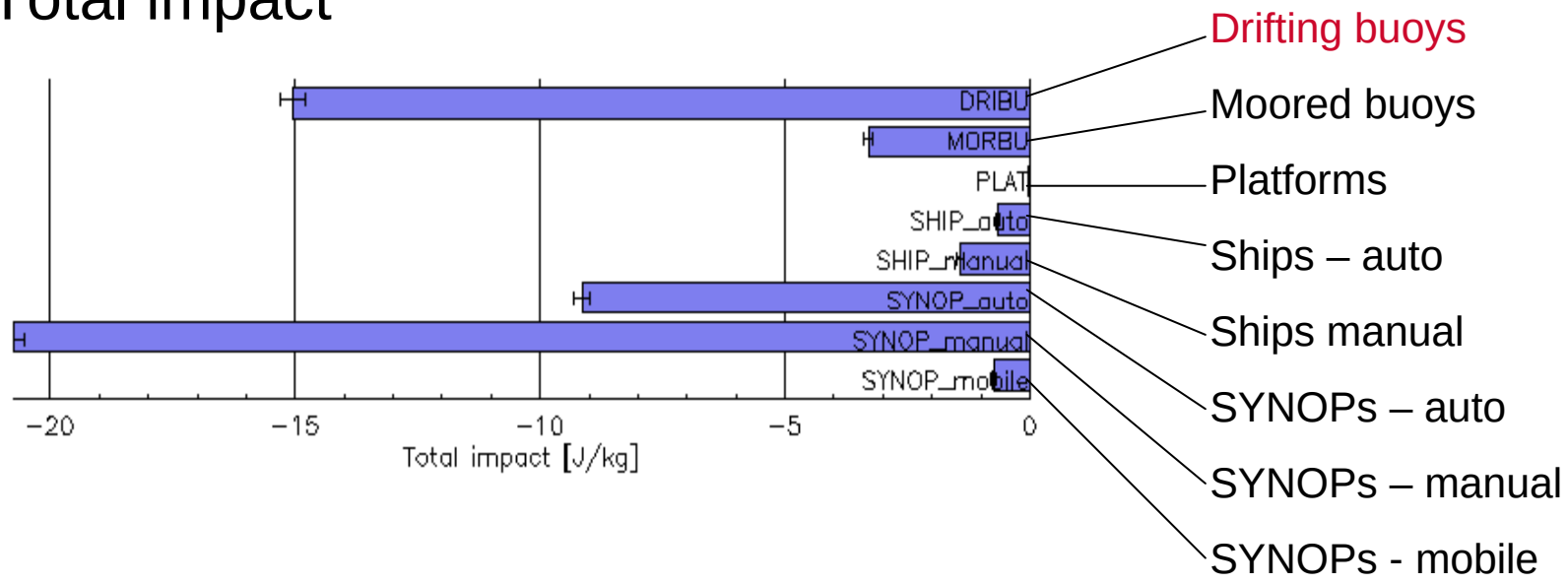
red: negative

In situ surface observations

Forecast Sensitivity to Observations (FSO)

Period: 22 August – 29 Sept 2012 (39 days)

Total impact

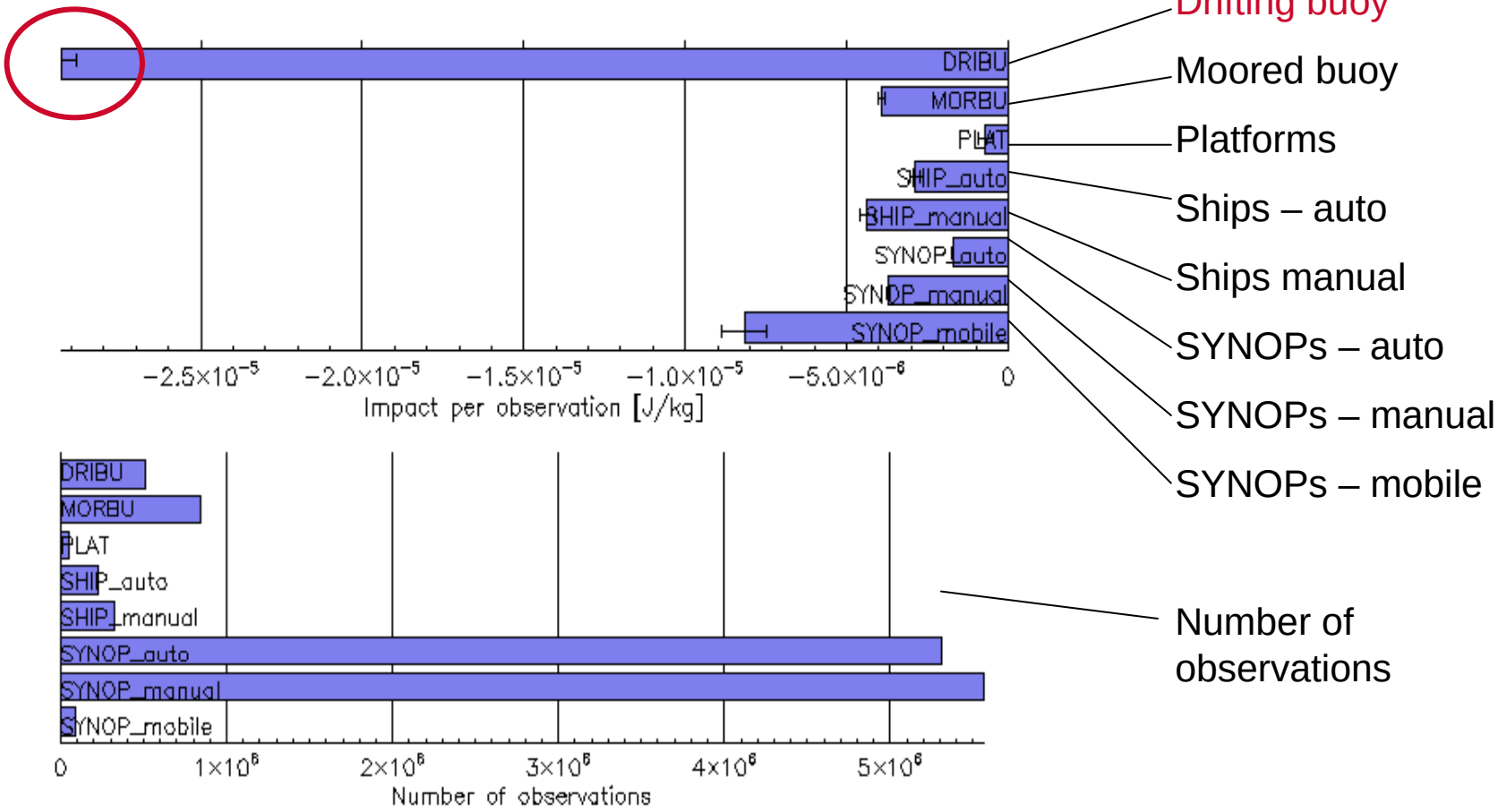


In situ surface observations

Forecast Sensitivity to Observations (FSO)

Period: 22 August – 29 Sept 2012 (39 days)

Impact per observation

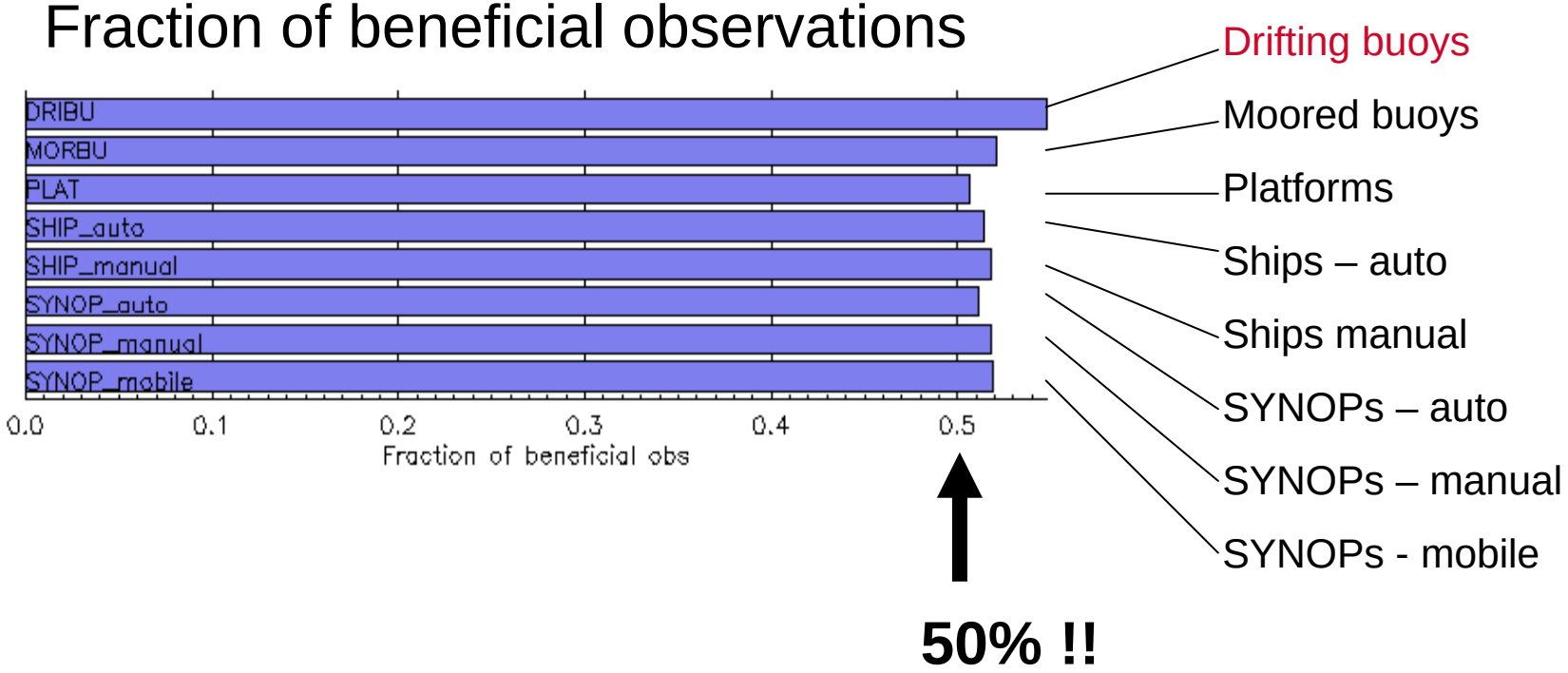


In situ surface observations

Forecast Sensitivity to Observations (FSO)

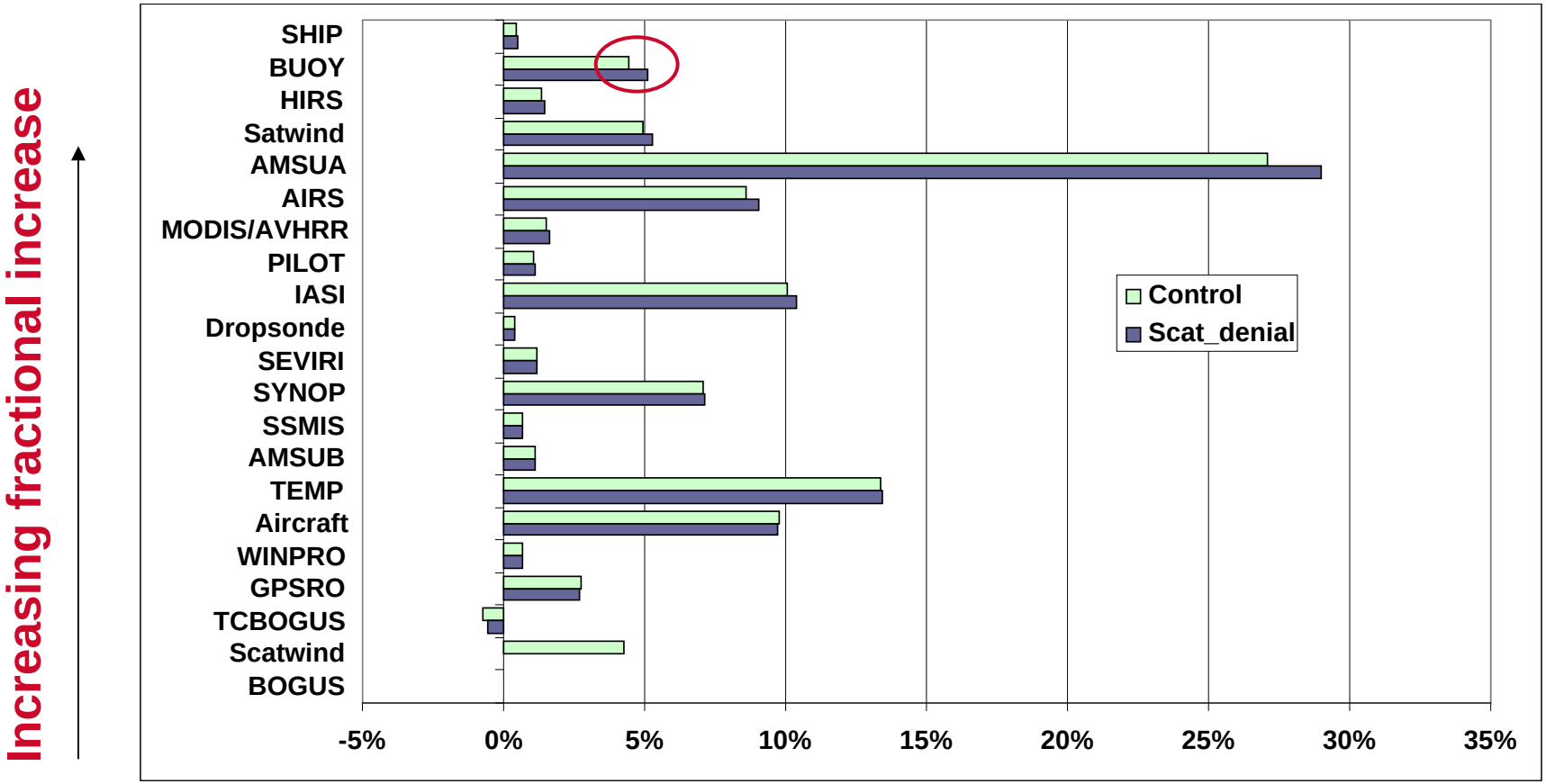
Period: 22 August – 29 Sept 2012 (39 days)

Fraction of beneficial observations



Satellite surface wind impact

Forecast Sensitivity to Observations (FSO)



When ASCAT, ERS-2 and WindSat winds are denied, other surface-marine observations partially compensate

In situ surface observations

Forecast Sensitivity to Observations (FSO)

SUMMARY

In the Met Office global NWP system, surface pressure observations from drifting buoys:

- contribute substantially to total forecast skill,
- have the highest impact per observation of all surface pressure observations,
- have the highest fractional beneficial impact of all surface pressure observations.

Their relative impact on surface pressure/wind forecasts is expected to be higher

Data denial experiments at the Met Office

- In recent years, the Met Office has run some data denial experiments in which major classes of observations have been denied in turn.
- These have included denial of surface pressure obs

PROBLEM:

- The only experiments run have denied ALL surface pressure observations
- Effect:
  - very large impact, through artefact of data assimilation system,
  - atmosphere gradually changes mass → large bias in surface pressure
  - not helpful to explore issues concerning impact of surface pressure from ocean buoys (only)

Thank you! Questions?