

Intercomparison of operational wave forecasting systems against
in-situ observations: data from BoM, DMI, DWD, ECCO,
ECMWF, JMA, LOPS, METEOAM, METFR, METNO, NCEP,
PRTOS, SHNSM, UKMO.

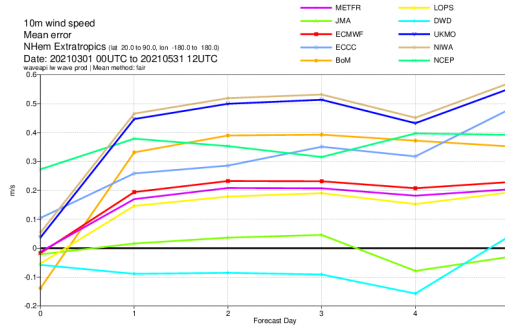
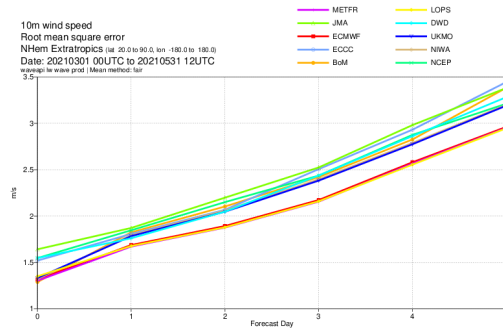
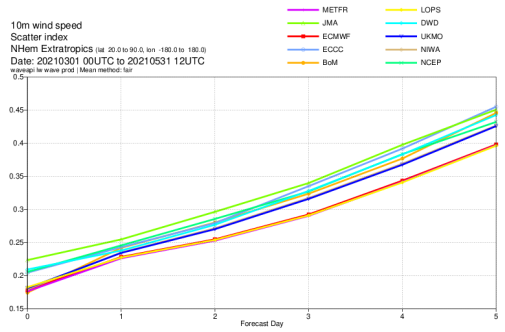
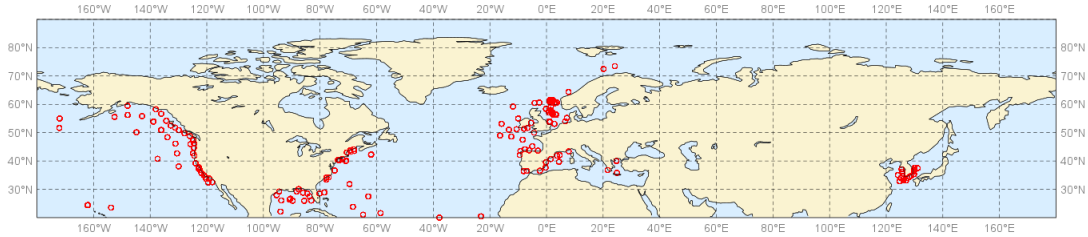
00 and 12 UTC runs

WMO Lead Centre for Wave Forecast Verification LC-WFV,
European Centre for Medium-Range Weather Forecasts ECMWF

June 21, 2021

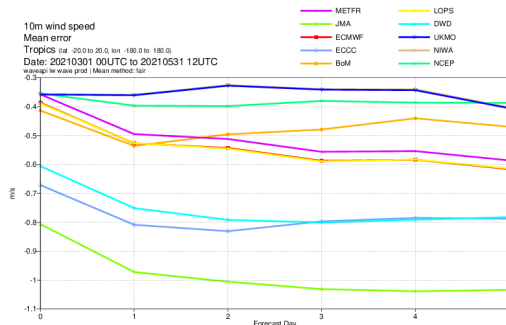
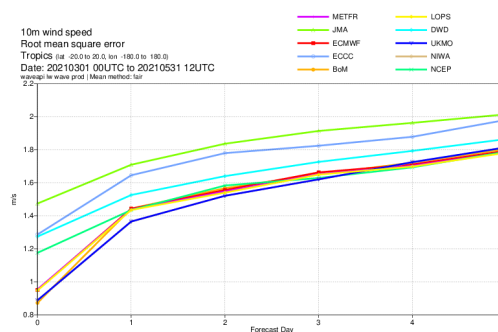
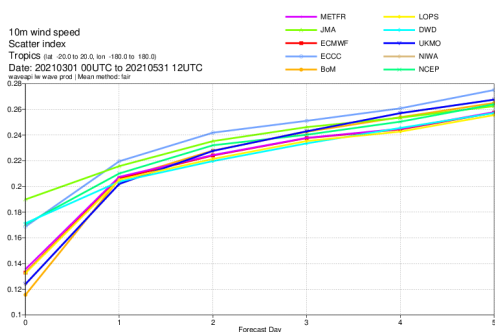
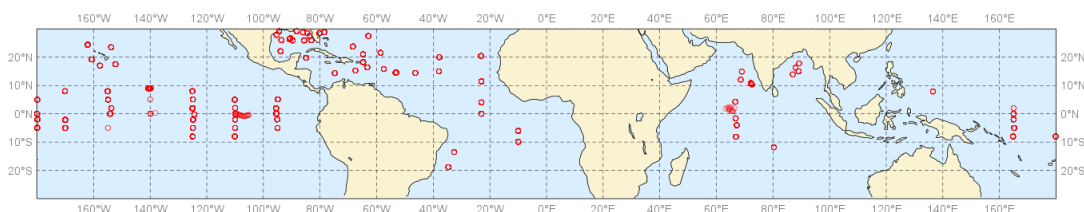
PART III: 10 meter wind speed (10ff)

Buoys observations - from 20210301 to 20210531 - (10ff)



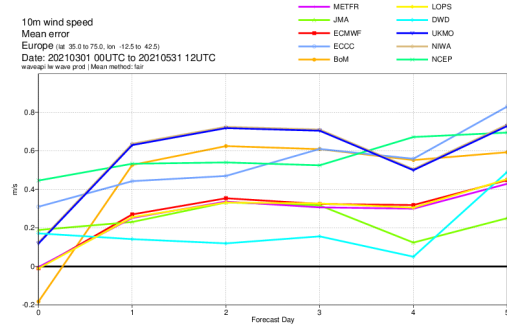
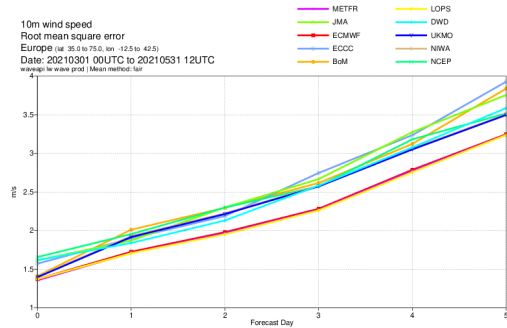
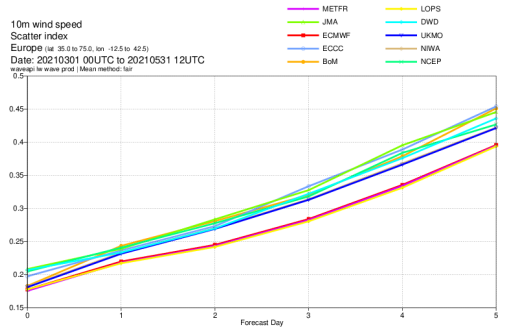
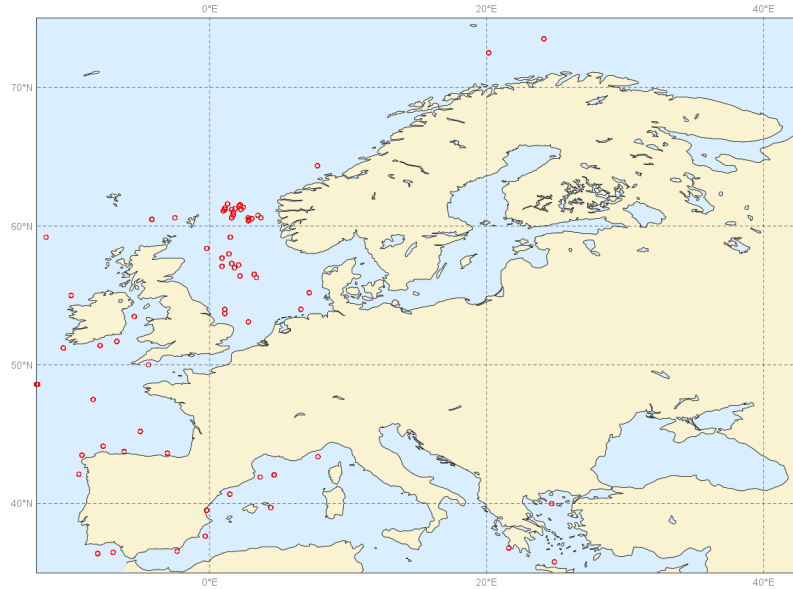
Northern Hemisphere. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



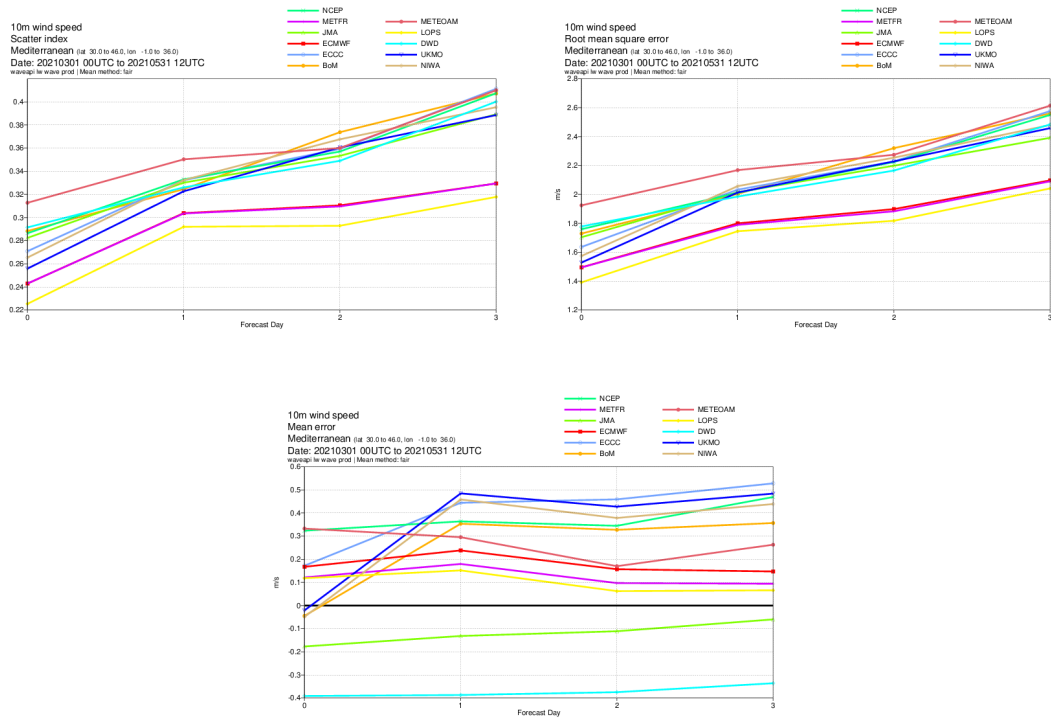
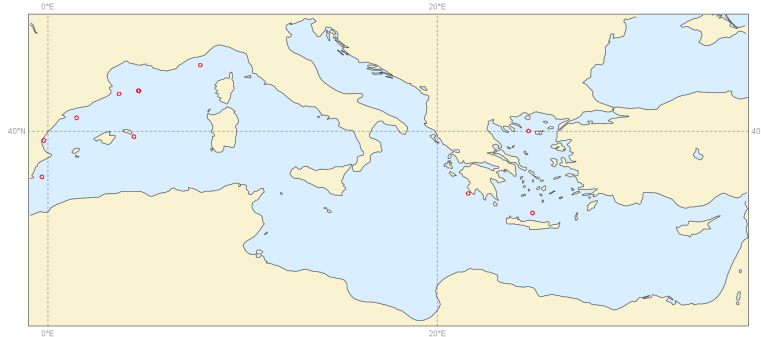
Tropics. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



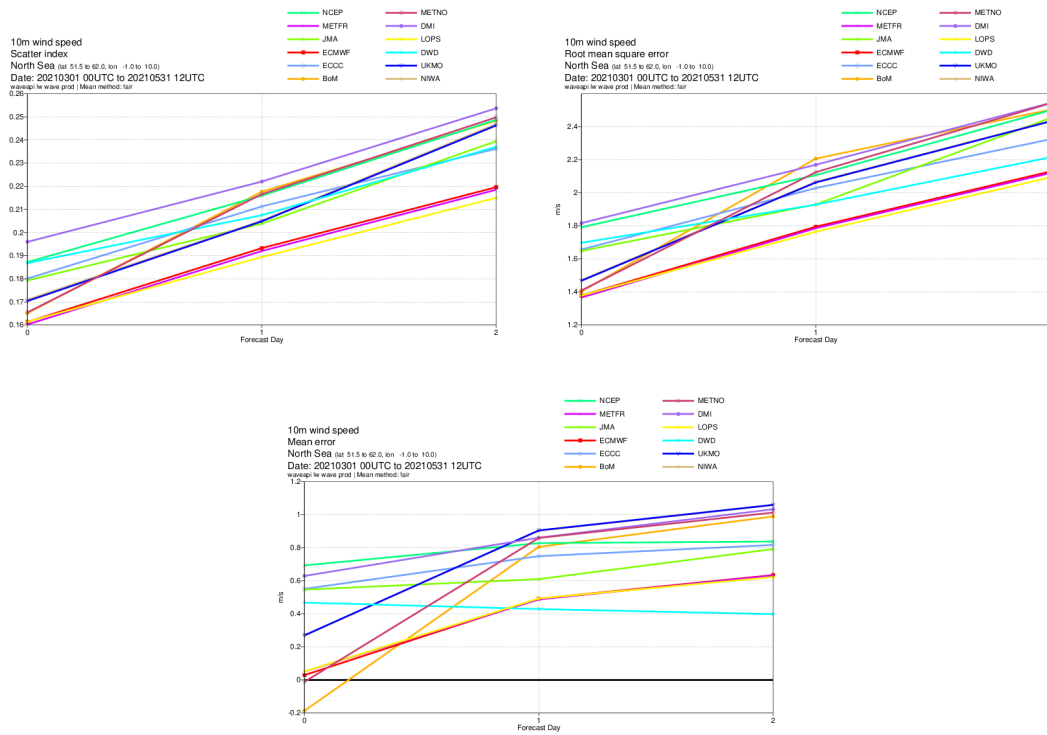
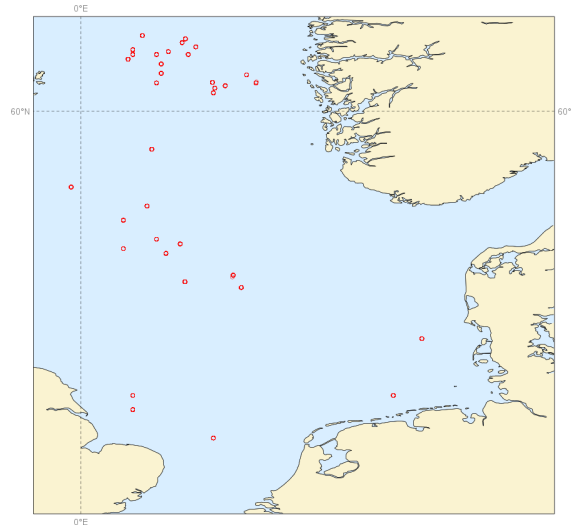
Europe. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



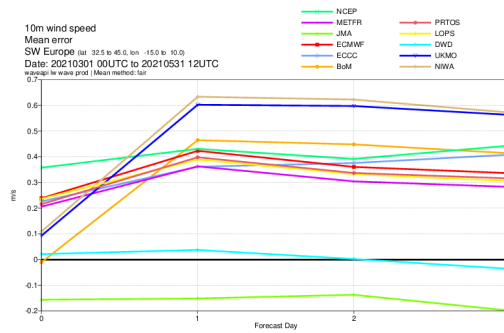
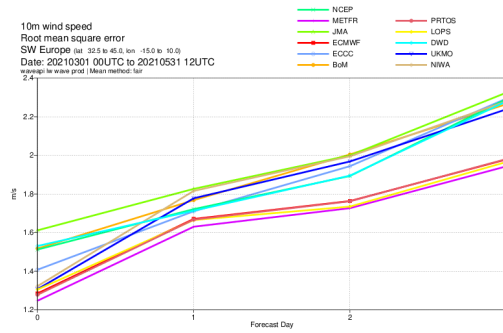
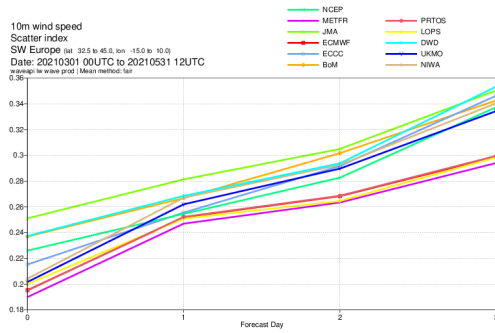
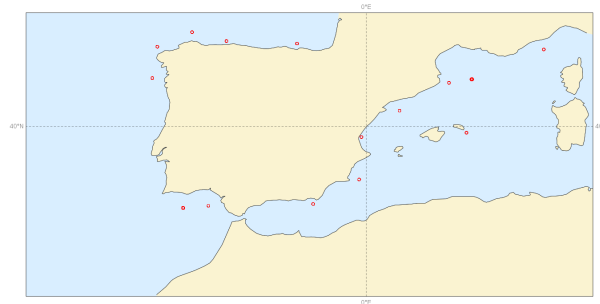
Mediterranean Sea. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



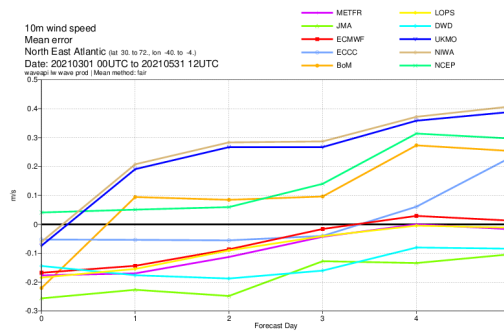
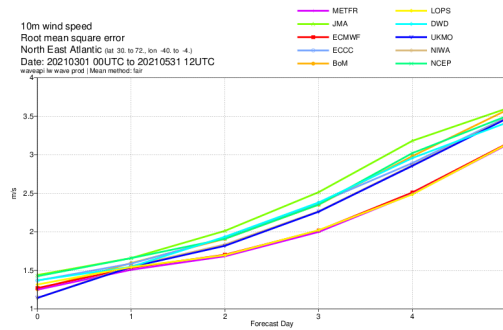
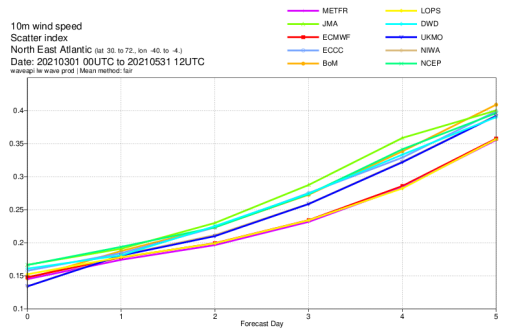
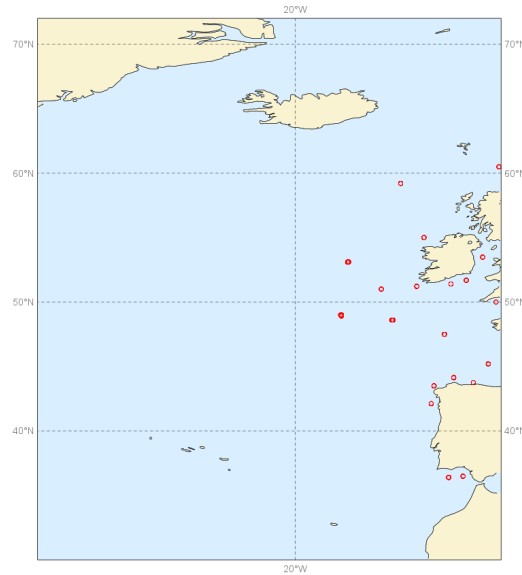
North Sea. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



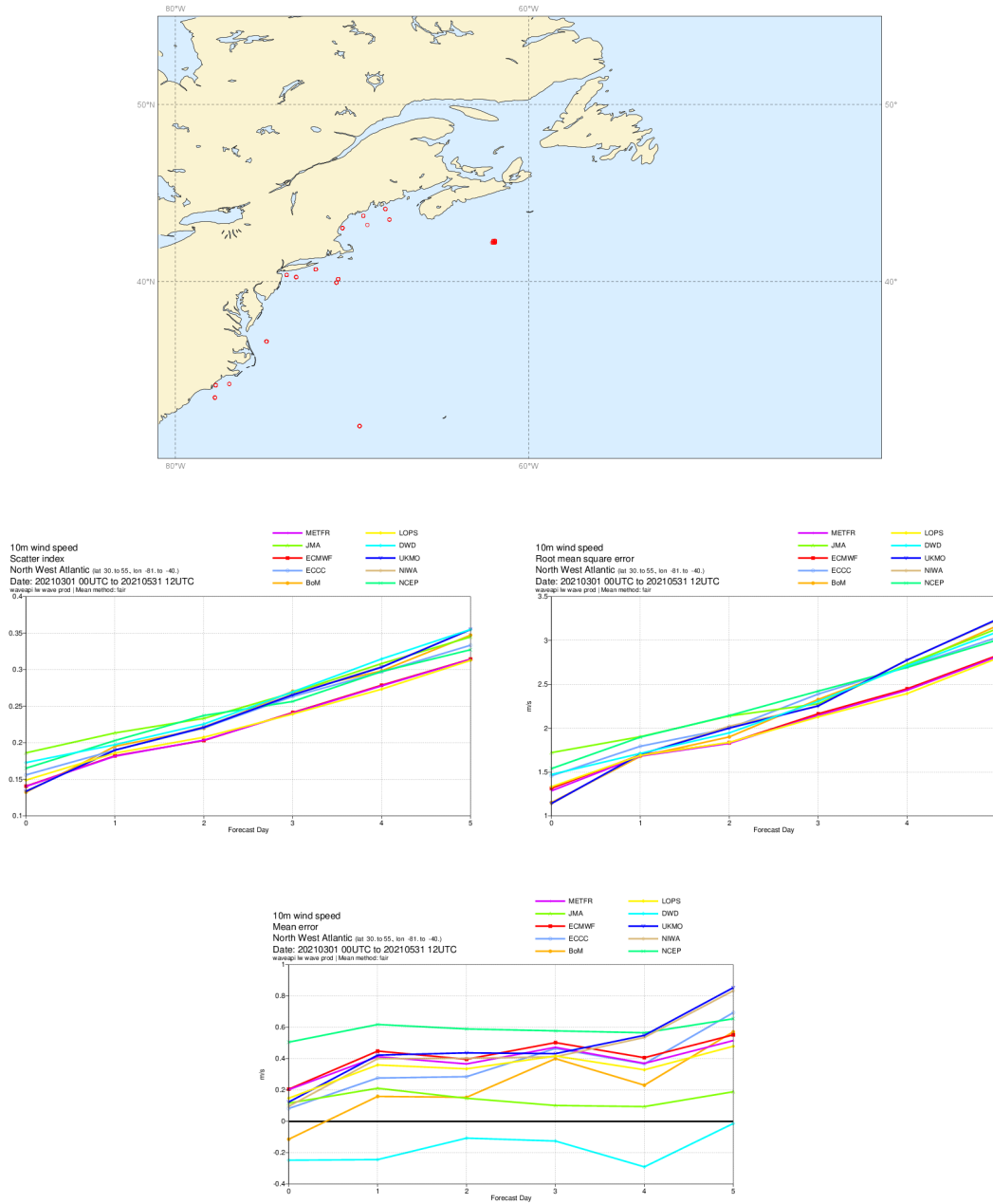
South West Europe. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



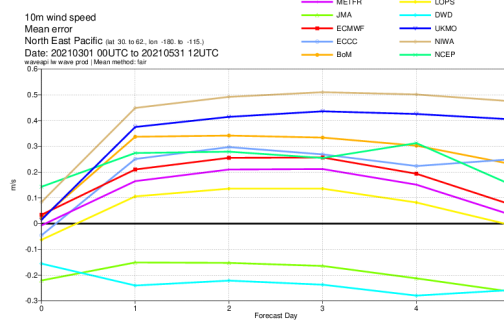
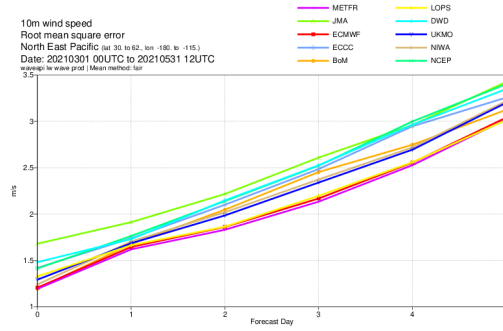
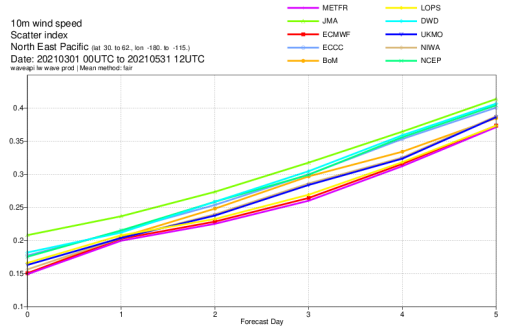
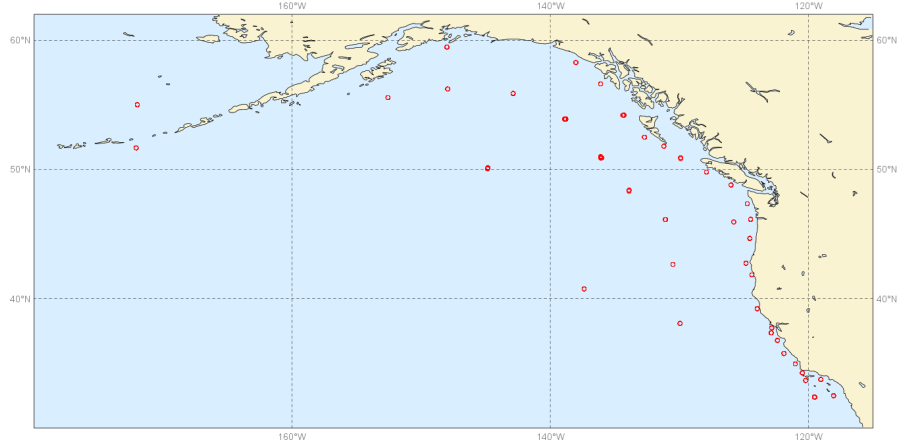
North East Atlantic. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



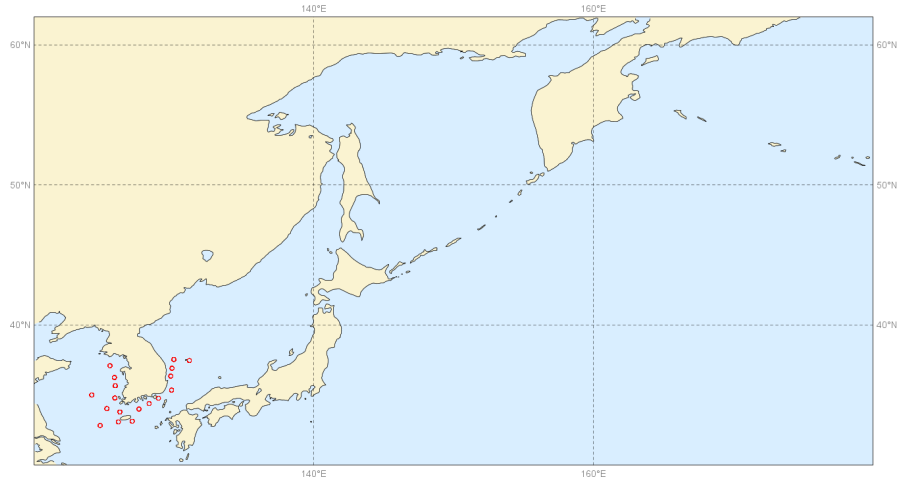
North West Atlantic. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)

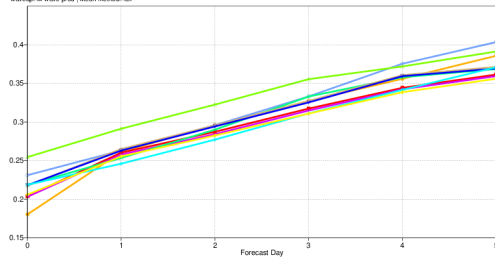


North East Pacific. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

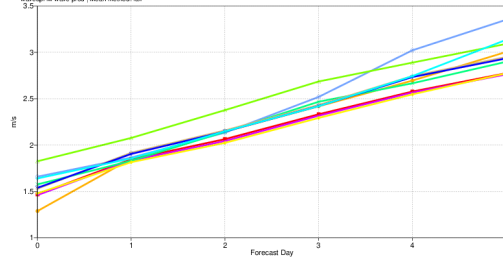
Buoys observations - from 20210301 to 20210531 - (10ff)



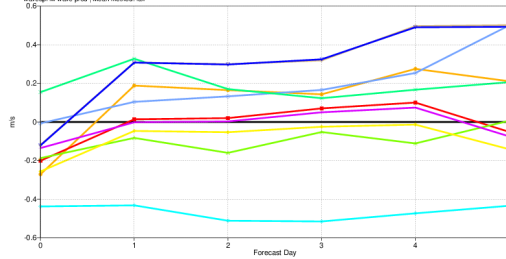
10m wind speed
Scatter index
North West Pacific (lat 30 to 62, lon 120 to 180)
Date: 20210301 00UTC to 20210531 12UTC
Average for every grid (Mean method, lat)



10m wind speed
Root mean square error
North West Pacific (lat 30 to 62, lon 120 to 180)
Date: 20210301 00UTC to 20210531 12UTC
Average for every grid (Mean method, lat)

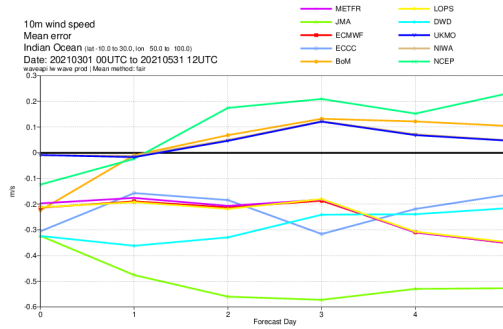
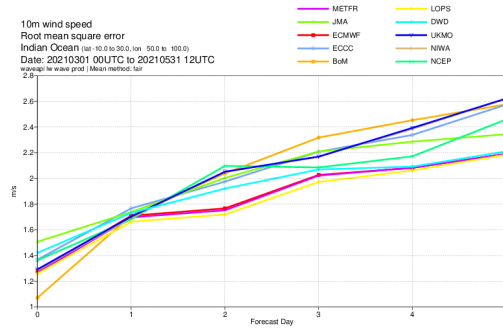
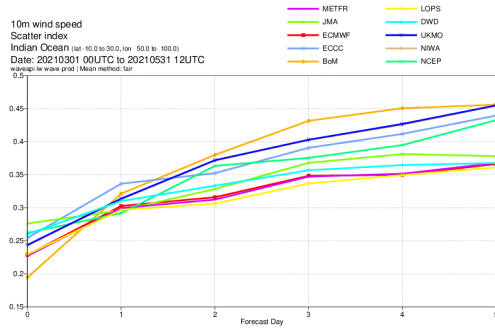
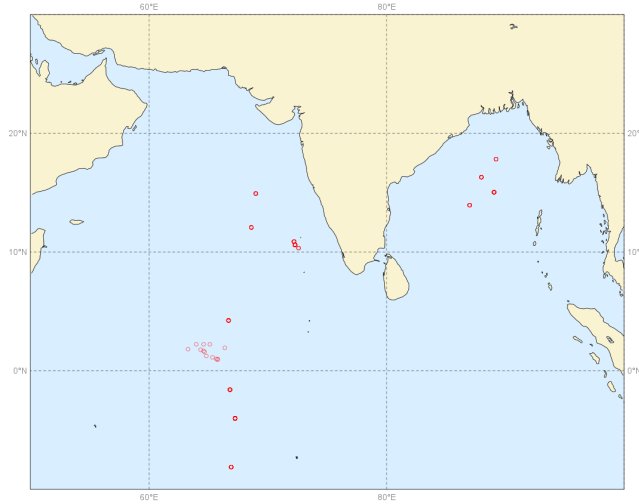


10m wind speed
Mean error
North West Pacific (lat 30 to 62, lon 120 to 180)
Date: 20210301 00UTC to 20210531 12UTC
Average for every grid (Mean method, lat)



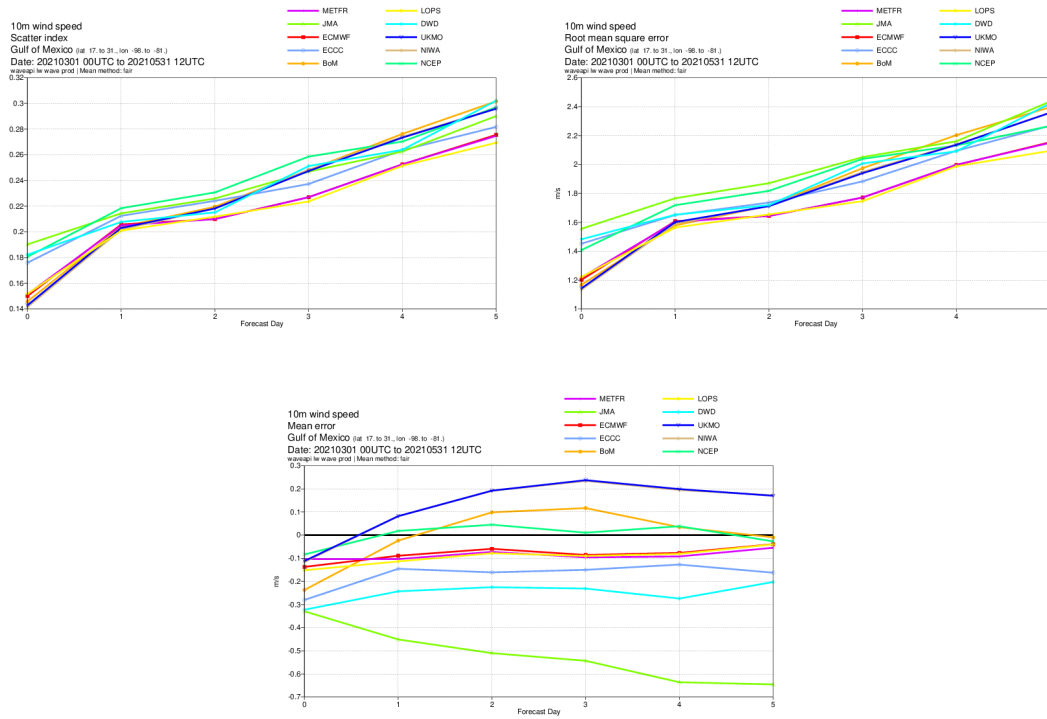
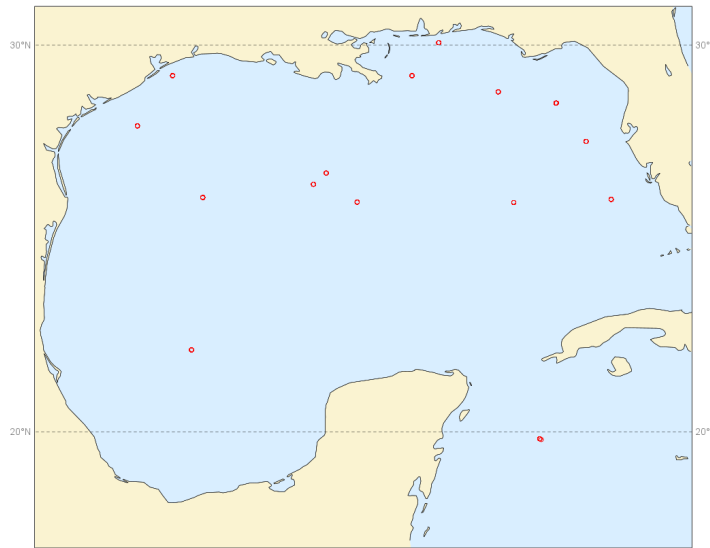
North West Pacific. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



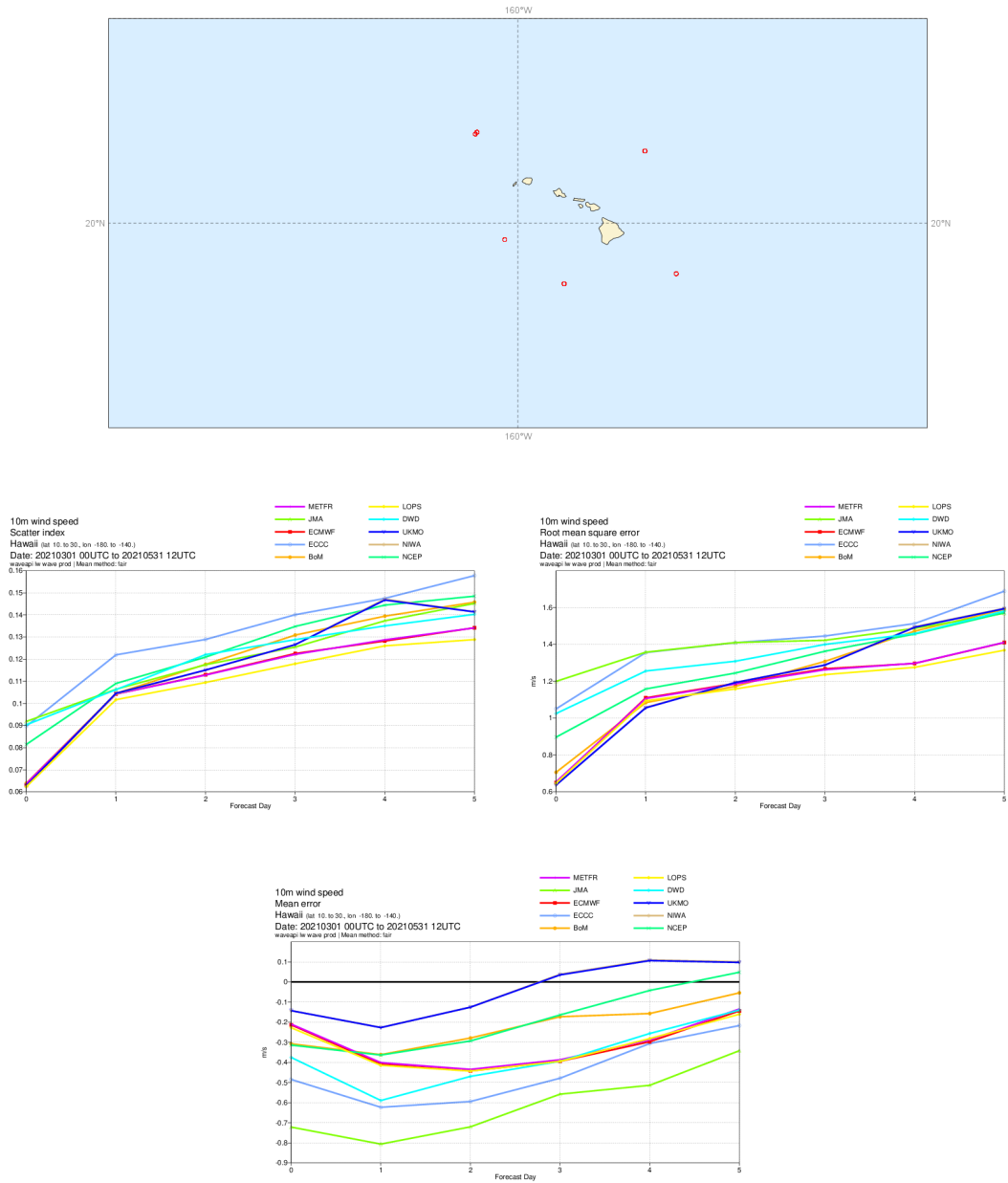
Indian Ocean. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)



Gulf of Mexico. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)

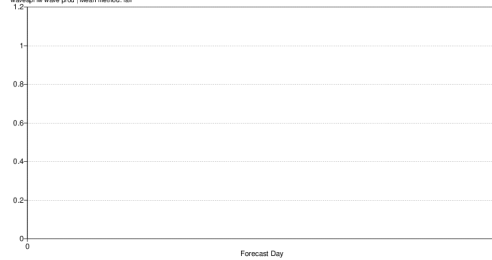


Hawaii. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

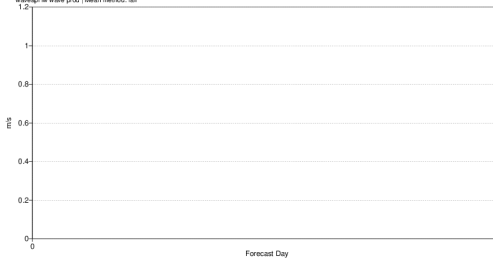
Buoys observations - from 20210301 to 20210531 - (10ff)



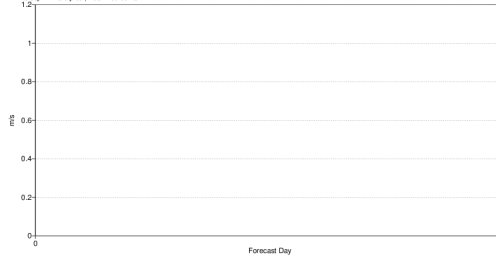
10m wind speed
Scatter index
S America (south) (lat -57.5 to -12.5, lon -80.0 to -42.5)
Date: 20210301 00UTC to 20210531 12UTC
Average for every grid. Mean method. lat



10m wind speed
Root mean square error
S America (south) (lat -57.5 to -12.5, lon -80.0 to -42.5)
Date: 20210301 00UTC to 20210531 12UTC
Average for every grid. Mean method. lat

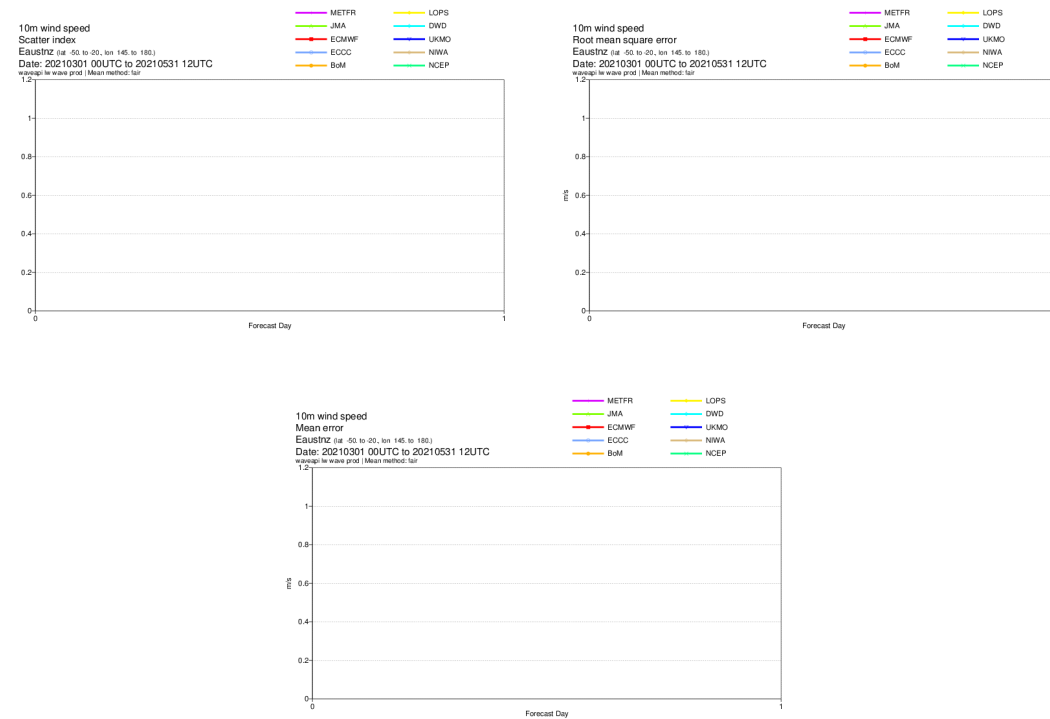
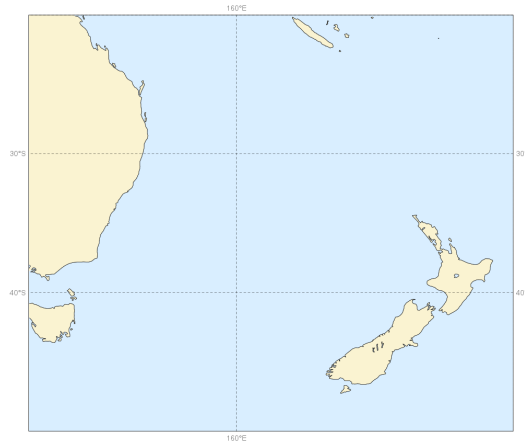


10m wind speed
Mean error
S America (south) (lat -57.5 to -12.5, lon -80.0 to -42.5)
Date: 20210301 00UTC to 20210531 12UTC
Average for every grid. Mean method. lat



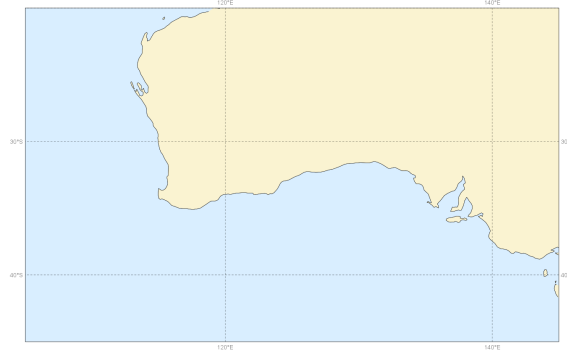
South of South America. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

Buoys observations - from 20210301 to 20210531 - (10ff)

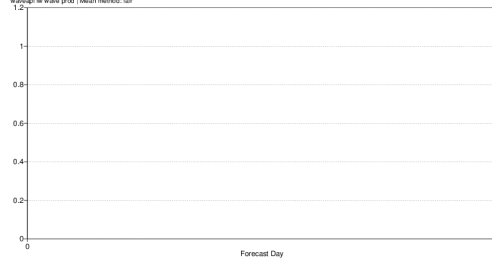


East Australia - New Zealand. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).

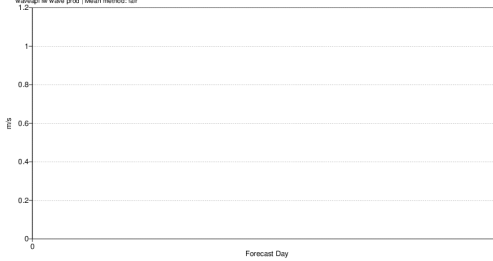
Buoys observations - from 20210301 to 20210531 - (10ff)



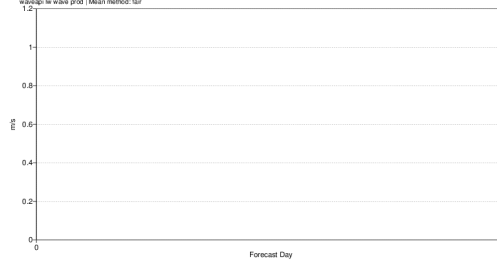
10m wind speed
Scatter index
Ssw.australia (lat 45 to 30, lon 135 to 145)
Date: 20210301 00UTC to 20210531 12UTC
wspaq: lr wave prod | Mean method: tar



10m wind speed
Root mean square error
Ssw.australia (lat 45 to 30, lon 135 to 145)
Date: 20210301 00UTC to 20210531 12UTC
wspaq: lr wave prod | Mean method: tar



10m wind speed
Mean error
Ssw.australia (lat 45 to 30, lon 135 to 145)
Date: 20210301 00UTC to 20210531 12UTC
wspaq: lr wave prod | Mean method: tar



South South West Australia. Top panel: observation distribution. Middle left panel: Forecast scatter index (standard deviation of the difference normalised by the mean of the observations). Middle right panel: Forecast root mean square error (RMSE). Bottom panel: forecast mean error (bias).