



Norwegian
Meteorological
Institute

Assimilation of Aeolus HLOS Winds in HARMONIE-AROME at Met Norway

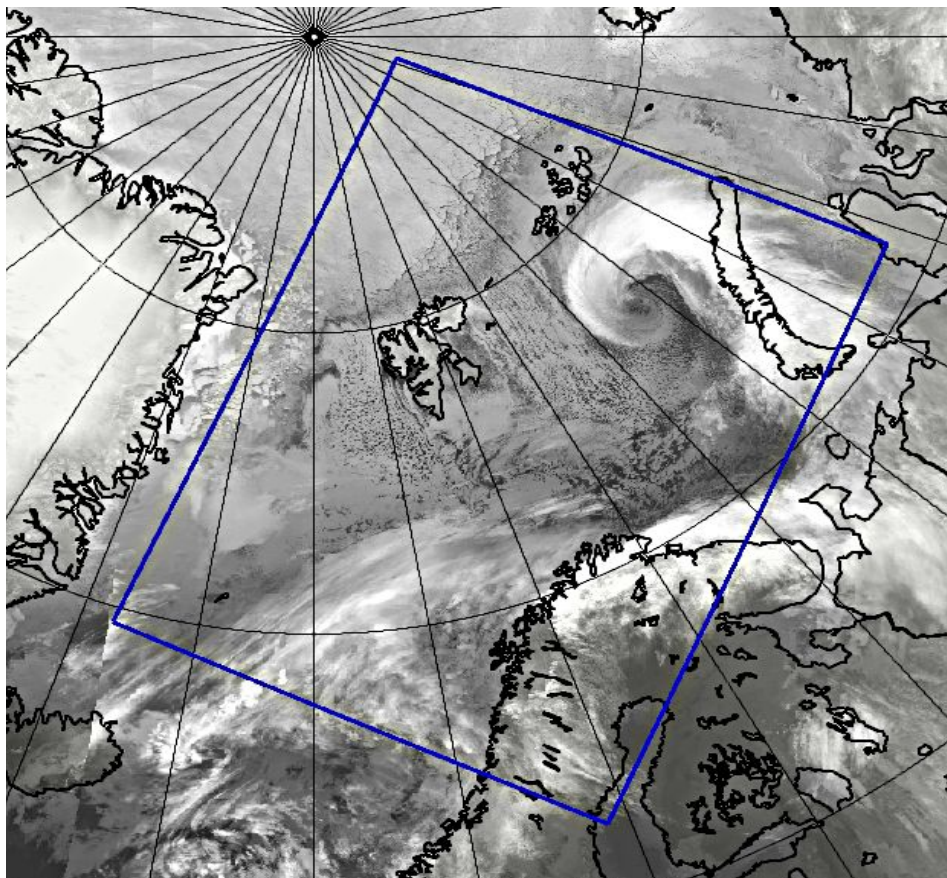
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14.04.2021

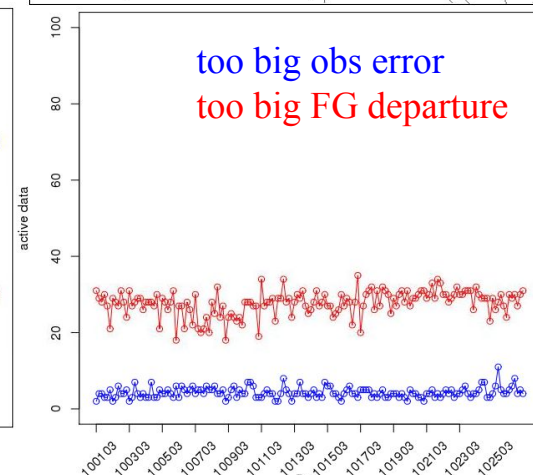
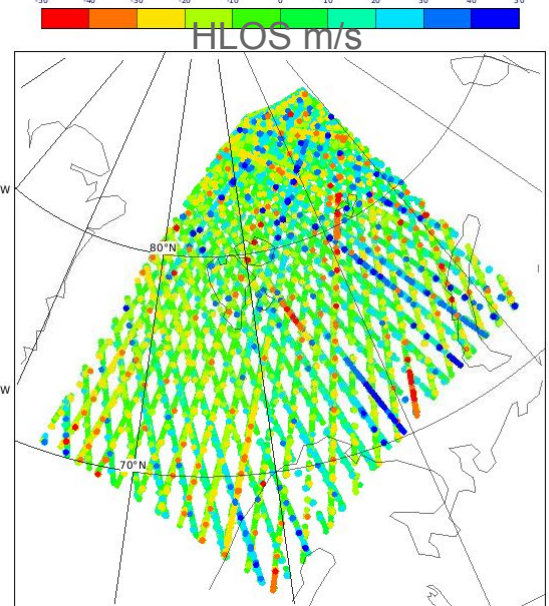
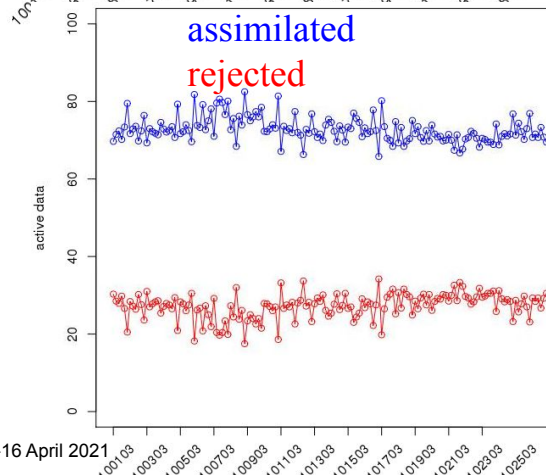
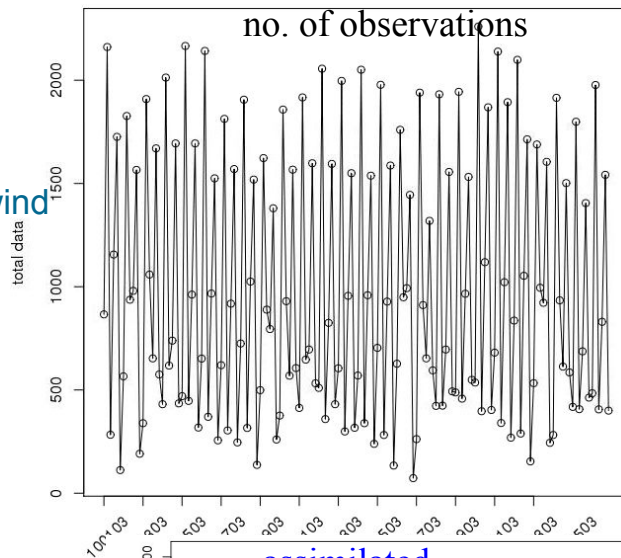
15th International IWWG Workshop 12-16 April 2021

Arome-Arctic

- Arome-Arctic operational NWP system
 - covering European Arctic
 - Arome physics and parameterization
 - 2.5 km horizontal resolution
 - 65 vertical levels lowest at 10m and highest at 10 hPa
 - 736×736×65 grid points
 - 3DVAR 3 hourly analysis update
 - 3 hourly data assimilation window
 - hourly lateral boundary conditions from IFS
 - offline surface model SURFEX v8
-
- CY43 version of Harmonie-Arome NWP model
 - observations conv, gnss, mhs/amsua/iasi, scat, AMVs
 - only up to 6 radiosondes available for assimilation
 - few aircraft observations at such high latitudes
 - very few observations available at 00 UTC

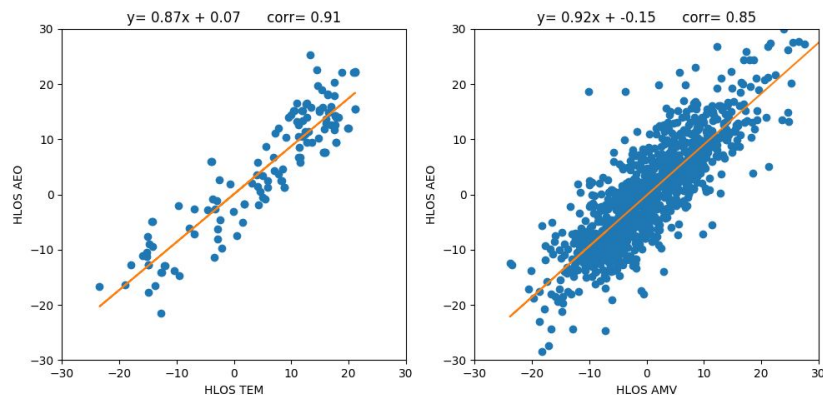
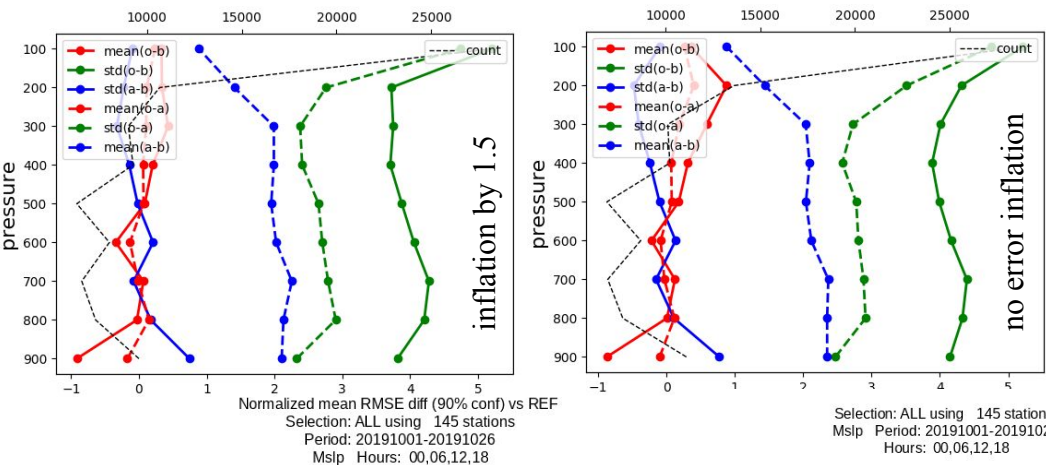


- first reprocessed B10 L2B HLOS wind
- 2019 Oct 01 to 25
- merge all available orbits within the data assimilation window
- preprocess with ECMWF guideline for L2B wind assimilation
- only Ray clear and Mie cloudy
- use Ray sigma < 8m/s, Mie sigma < 5m/s
- inflate Mie sigma by 1 and 1.5
- Ray and Mie sigma < 1m/s are set to 1m/s
- IFS observation operator
- no vertical thinning
- first guess check of 5*sigma
- up to 80% assimilated while only 20% rejected
- only a small amount of data rejected due to too big first guess (FG) departure

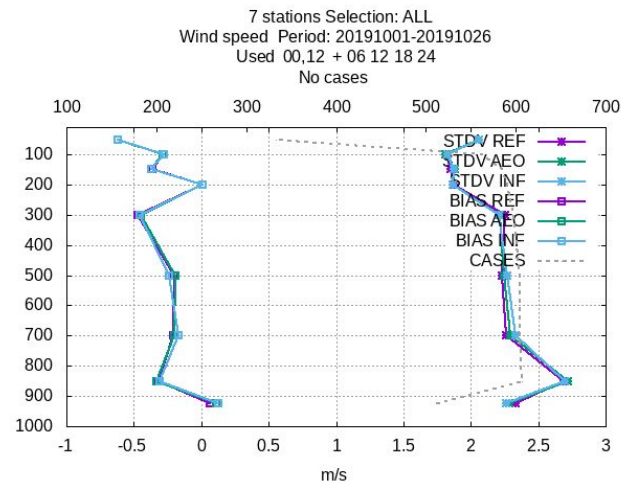
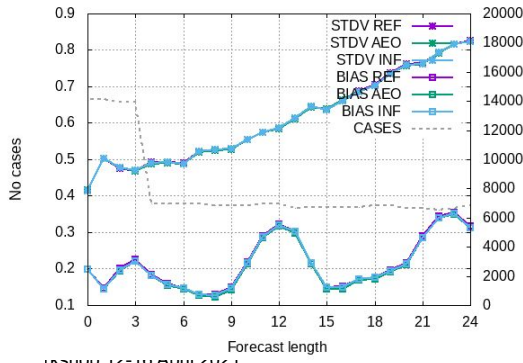
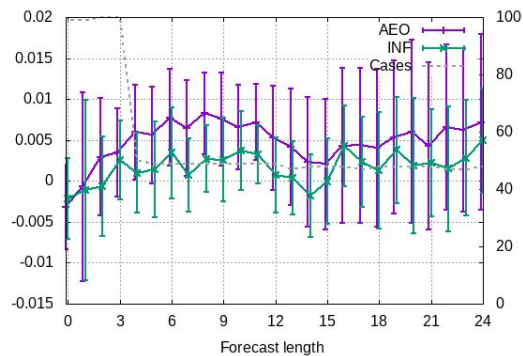


- collocation results with radiosonde and AMVs HLOS wind within 100km horizontal and 100 m vertical distance, very good correlation but not very high!

- statistics show the impact of Aeolus HLOS wind assimilation on the analysis in HARMONIE-AROME and how much the observations adjust the initial state.



- the impact of Aeolus data assimilation on the short range forecasts is generally neutral.



Thanks!