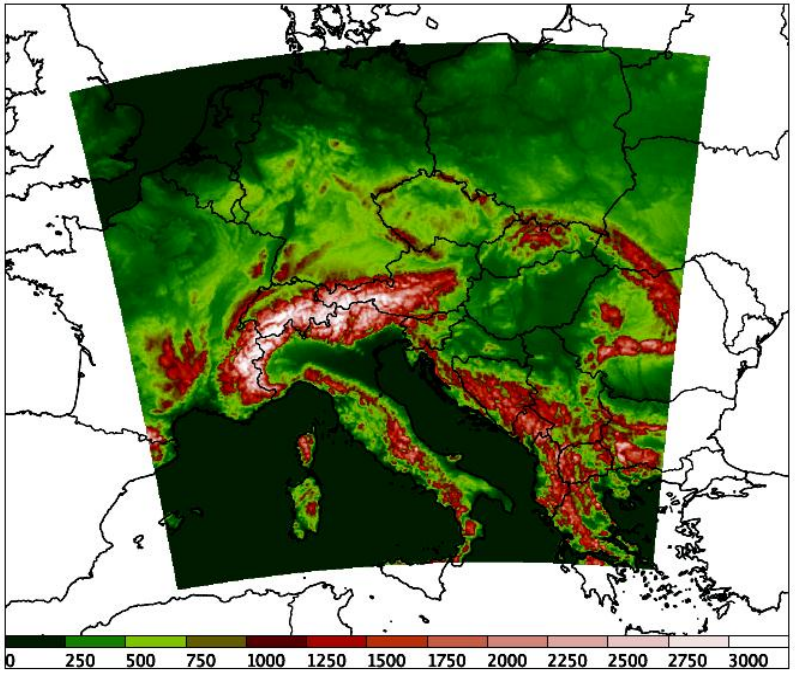
Local data assimilation in Slovenia - 2013

Operational data assimilation system

Operational suite

- ALARO cy35t1, 4.4 km resolution, 43 vertical levels
- 6-hourly data assimilation cycle
- 3D-Var + CANARI + SST replacement
- 4 production runs (54 h); starts at 2:50, 9:40, 14.28, 21:45 UTC
- Static B-matrix



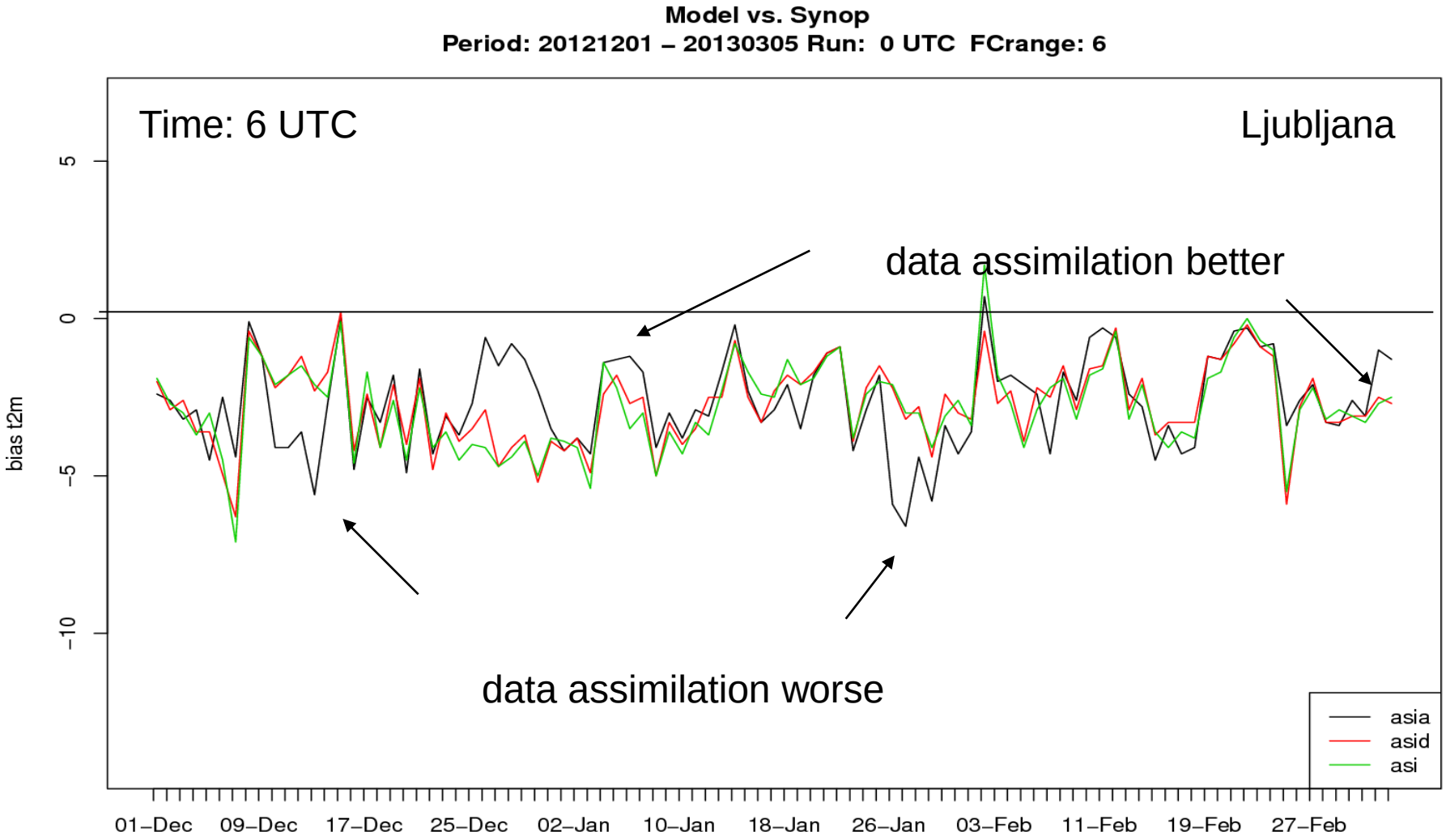
New SGI, cy36 and ECFLOW

- Since June new SGI (~ 1000 CPUs)
- Validation of cy36 in progress
- SMS scripts replaced with ECFLOW scripts

Performance during winter 2012/13

Temperature & snow issues

Significant T bias - winter 2012/2013



Periods of interest

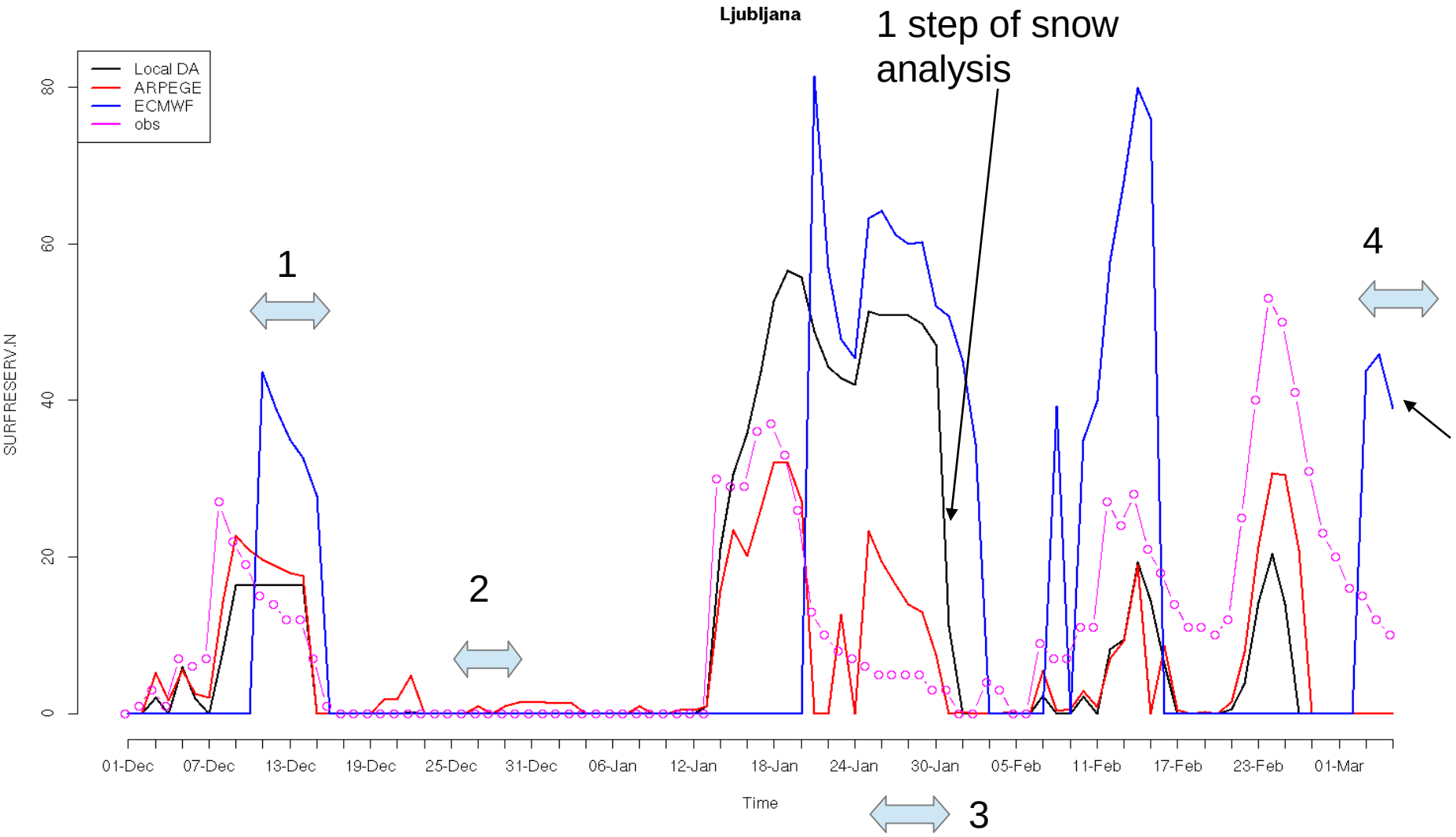
10-16 Dec: transition from cold to warm, snowmelt, snow cover in Aladin-DA, too-low T2m

25-31 Dec: transition from warm to cold, no snow on ground and in the model (but snow in ARPEGE)

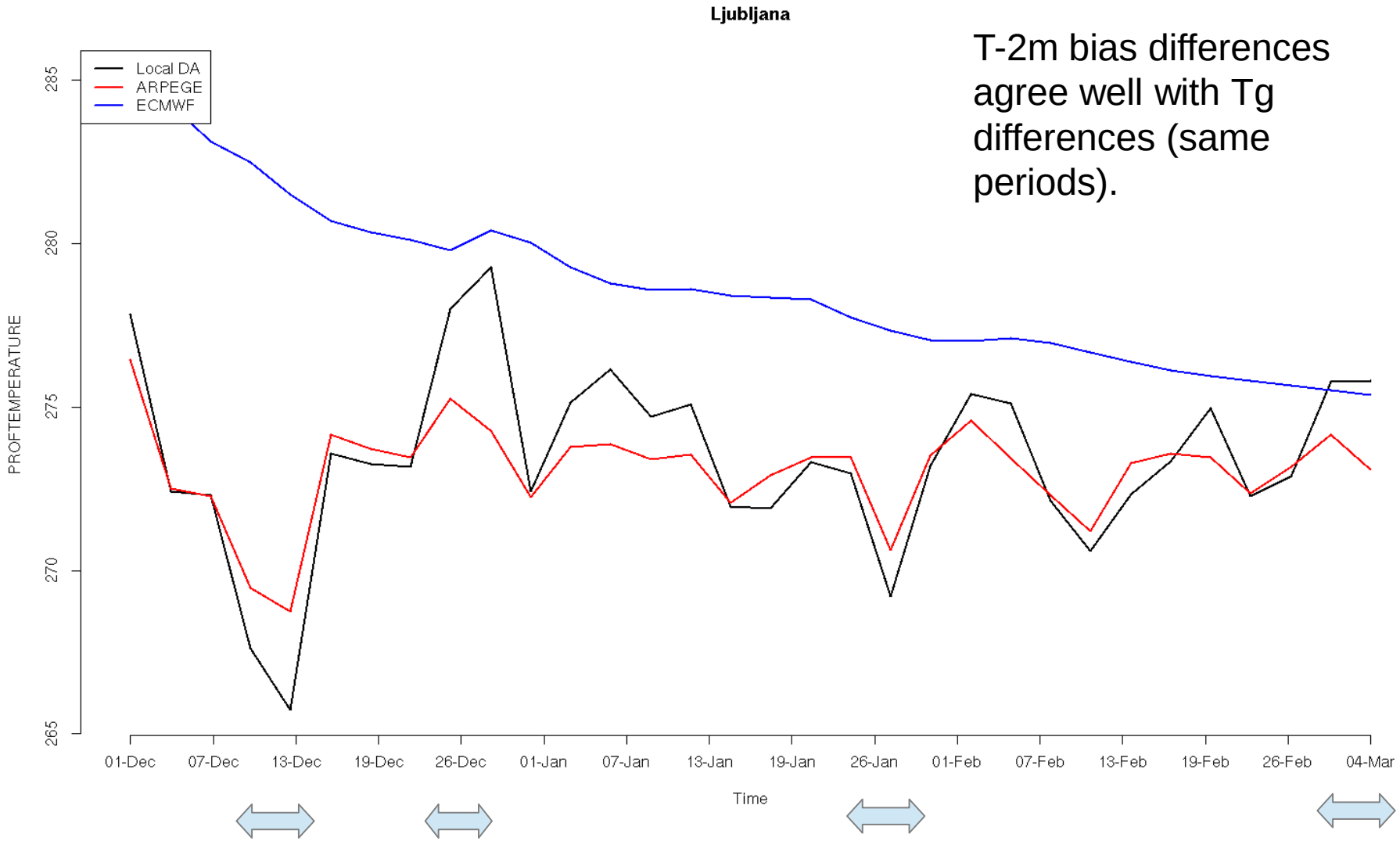
26 Jan-1 Feb: transition from cold to warm,snowmelt, lots of accumulated snow in Aladin-DA, 1 step of snow assimilation (CANARI) needed

3 Mar -> : clear days, warming, snowmelt, no snow in the model, response in Aladin-DA quicker, but gets gradually to warm (not shown)

Snow content (kg/m2) and observed snow height (cm) – assim. and LBC



Ground temperature (assim. and LBC)



T-2m bias differences agree well with Tg differences (same periods).

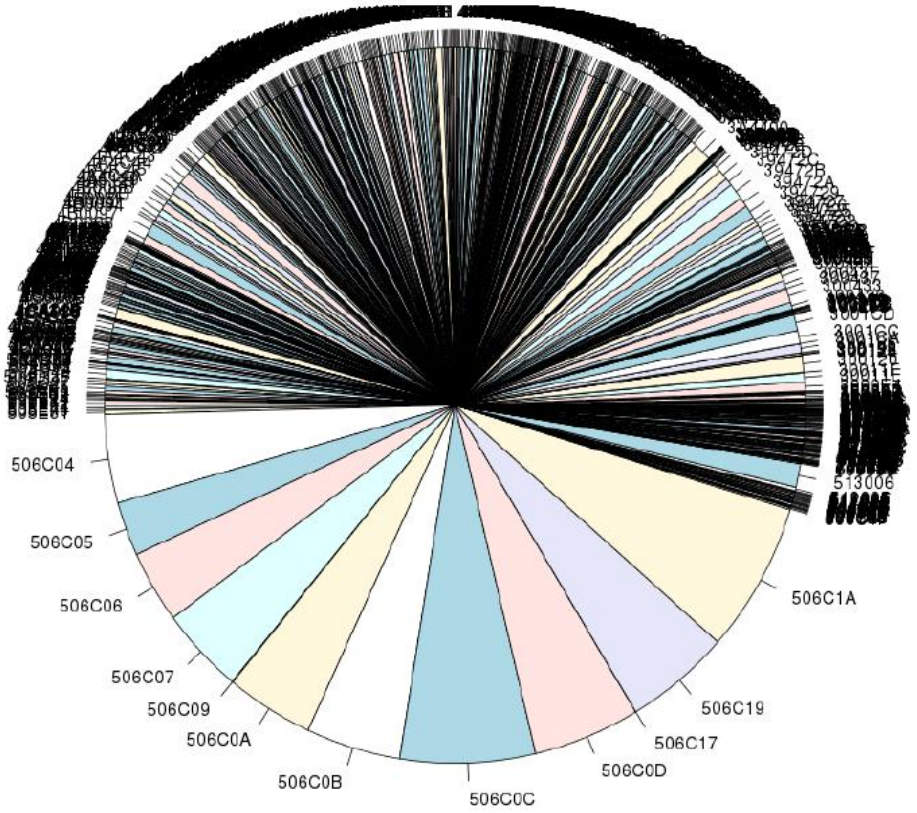
Modifications to oper. suite

- Improved fit to observations by increasing REDNMC
- Weak relaxation to climatology in CANARI re-introduced (RCLIMCA)
- 1 step of snow analysis

Mode-S aircraft observations

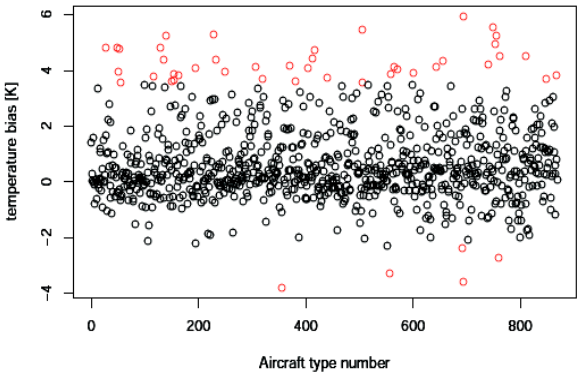
Mode-S MRAR data

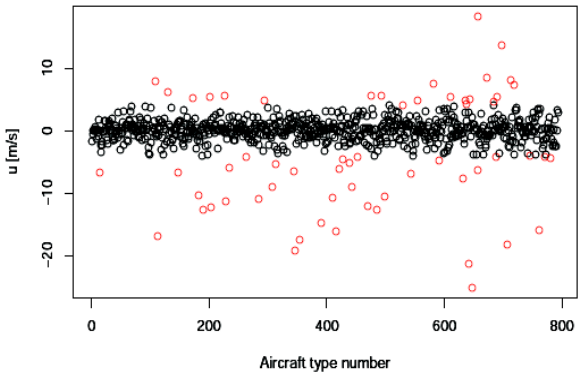
- 2 years of data collected
- 5% of all aircraft
- ½ of all data from national carrier (Adria Airways)
- Most frequent type CRJ, less data from Airbuses and Boeings
- Less data received recently

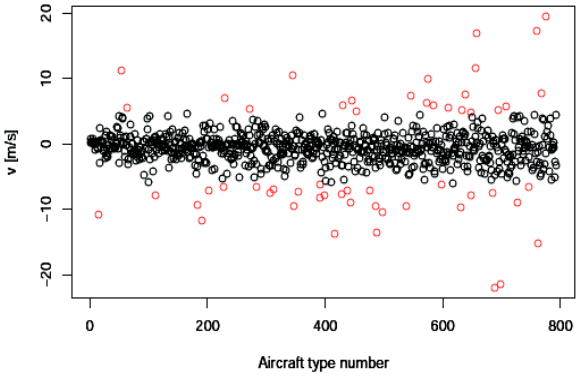


Pre-processing

- Passive assimilation of Mode-S: OMG bias and STD computed for each aircraft type
- aircraft lying beyond 1.5 IQR blacklisted (wind or temeprature)
- New white-listing approach tested recently

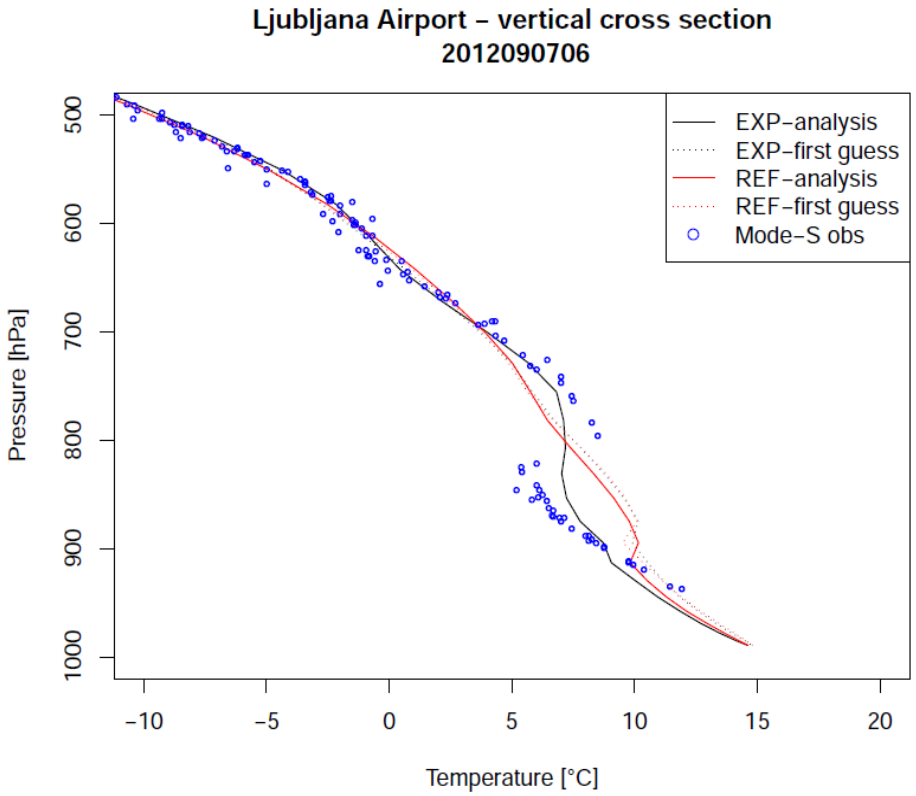


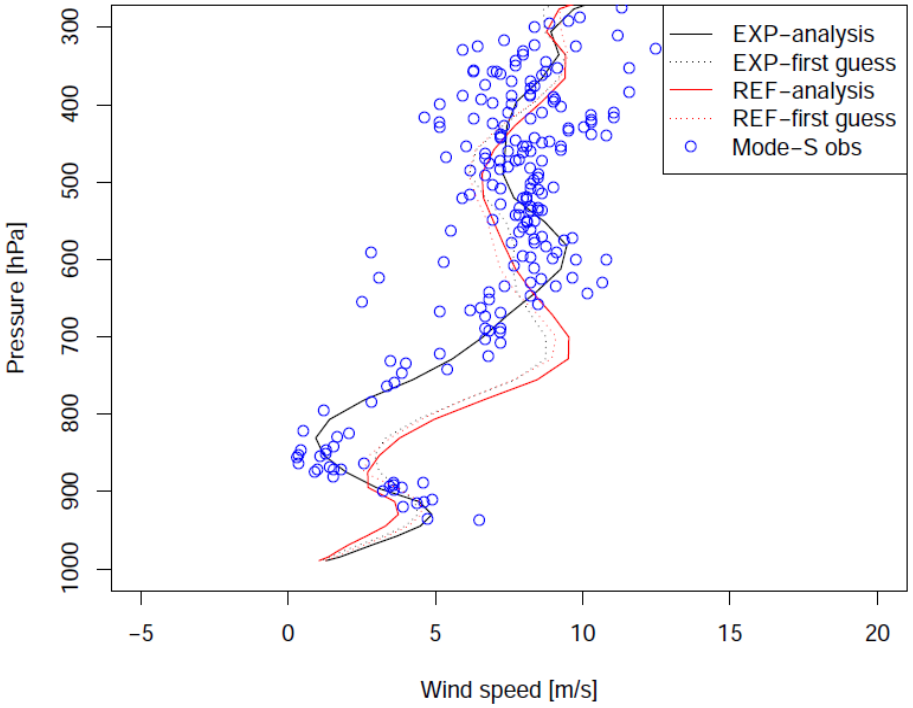




Pre-processing

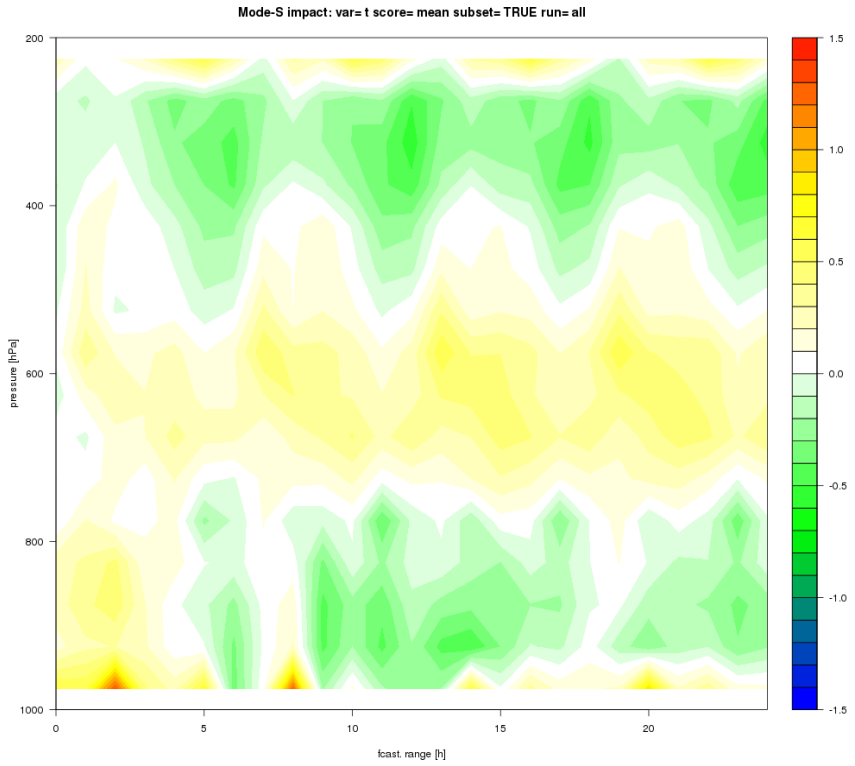
- Impact on analysis



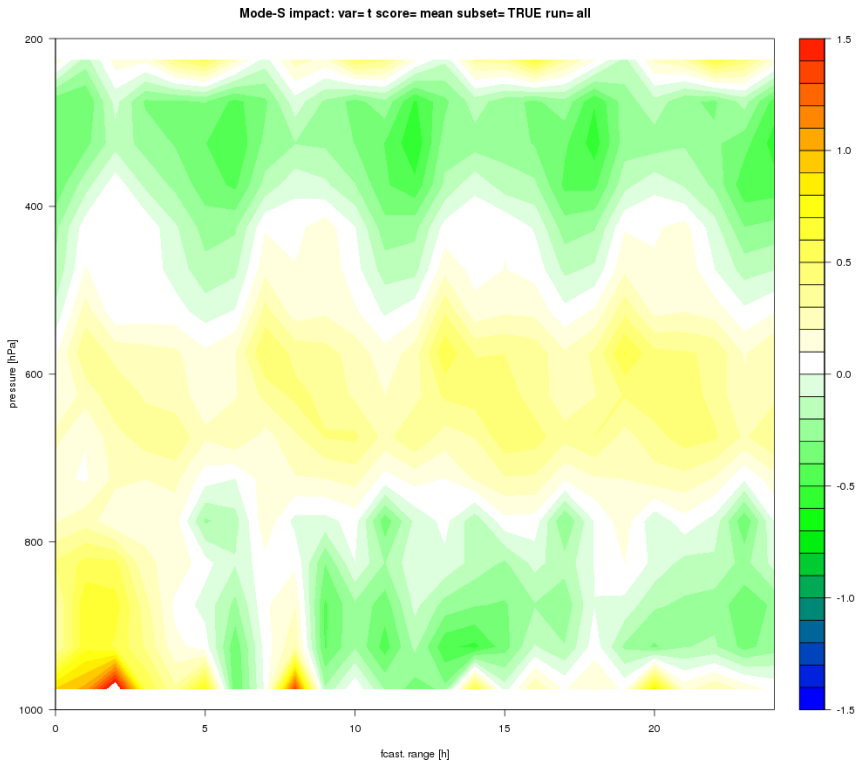


Mode-S impact experiment

- Temperature bias: verified against Mode-S

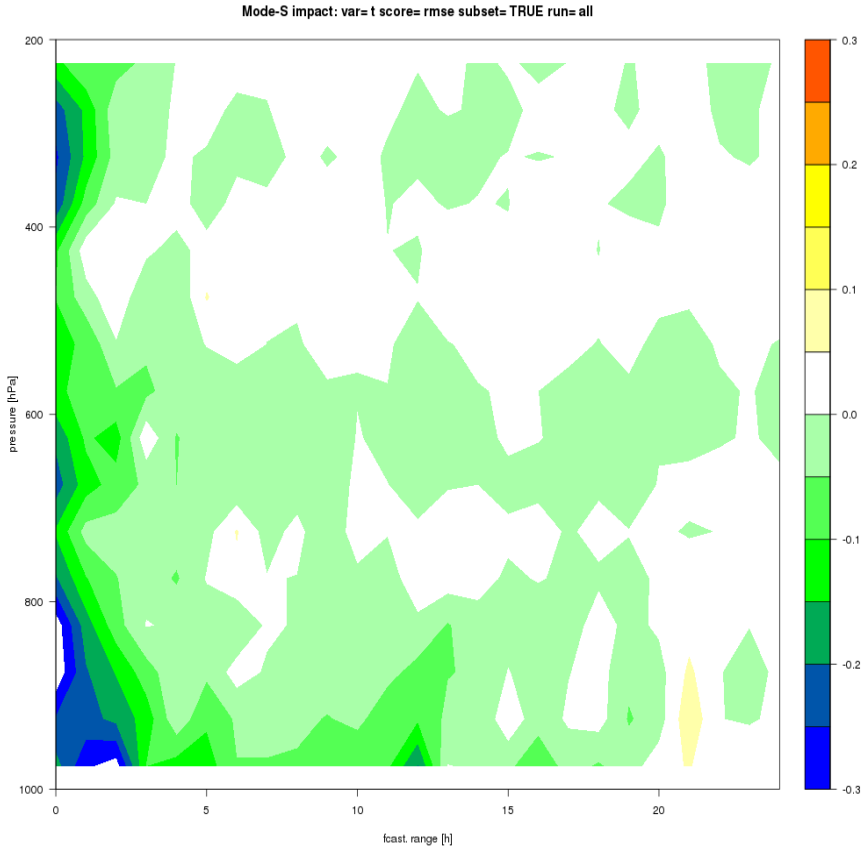


with Mode-S



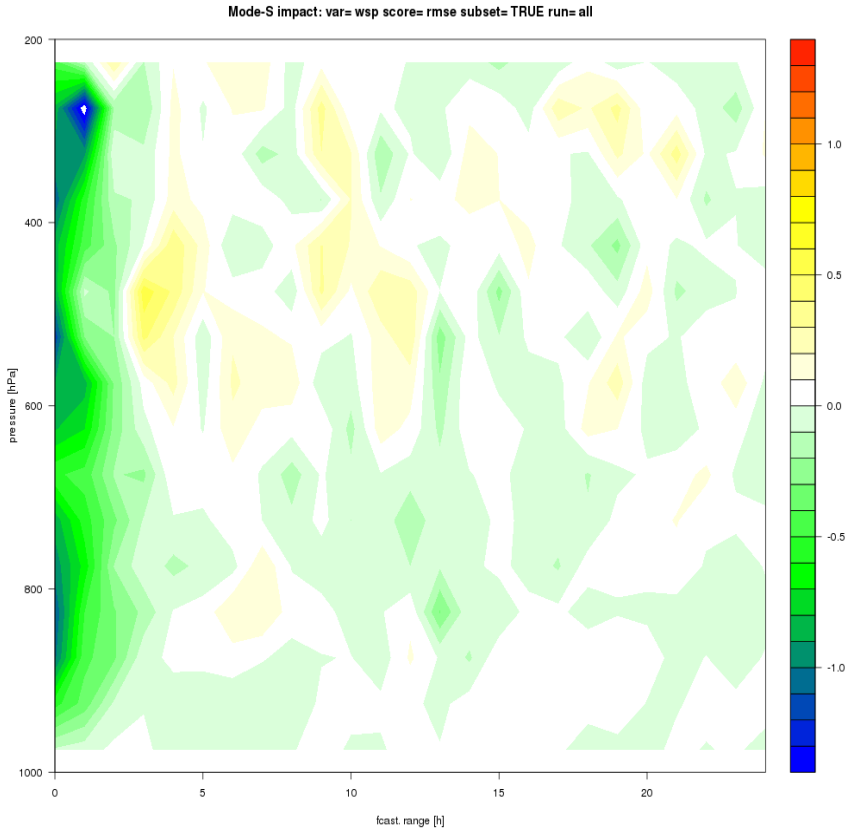
without Mode-S

Mode-S impact experiment

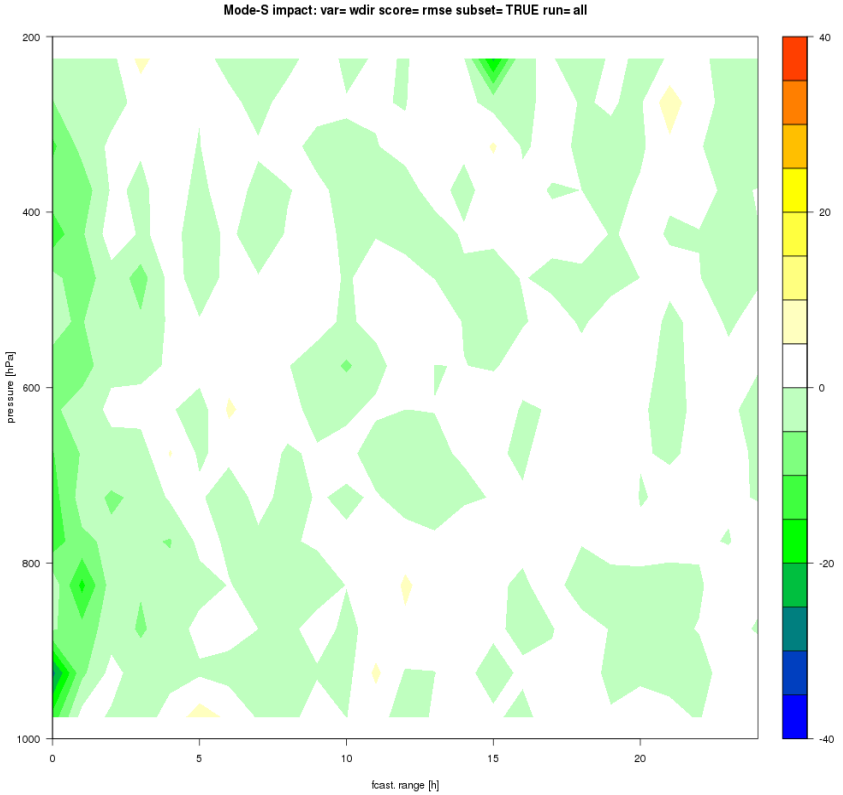


Temperature RMSE reduction

Mode-S impact experiment

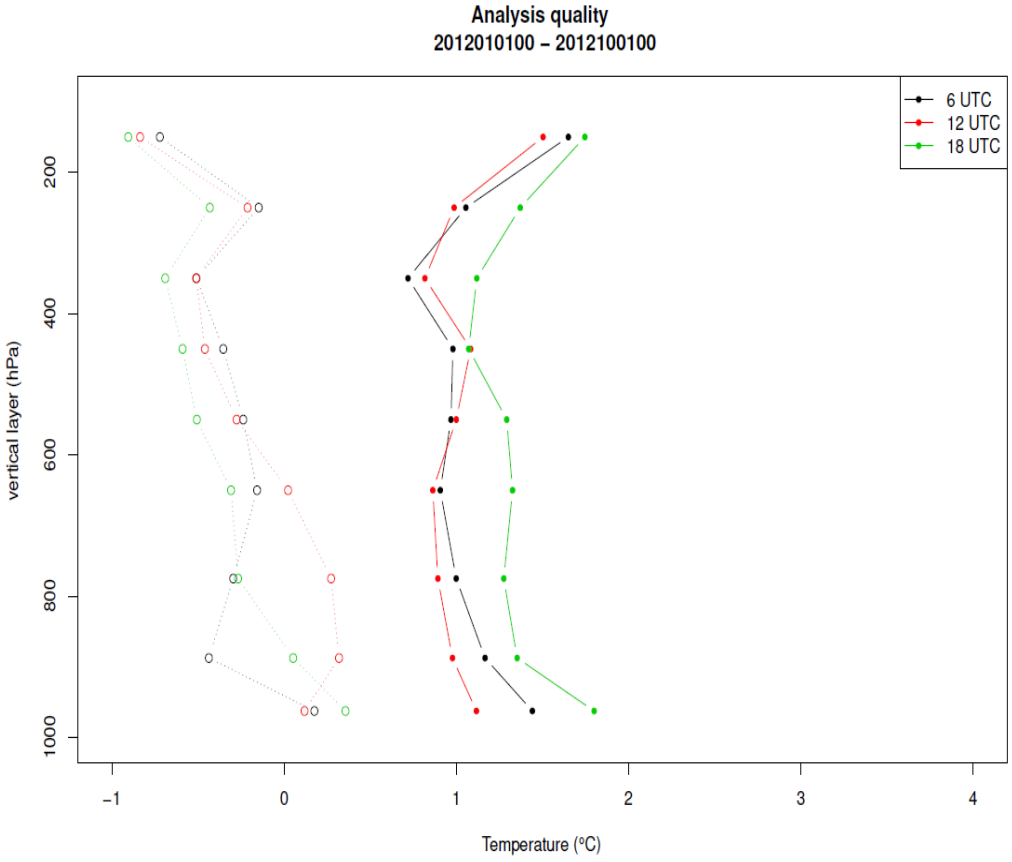


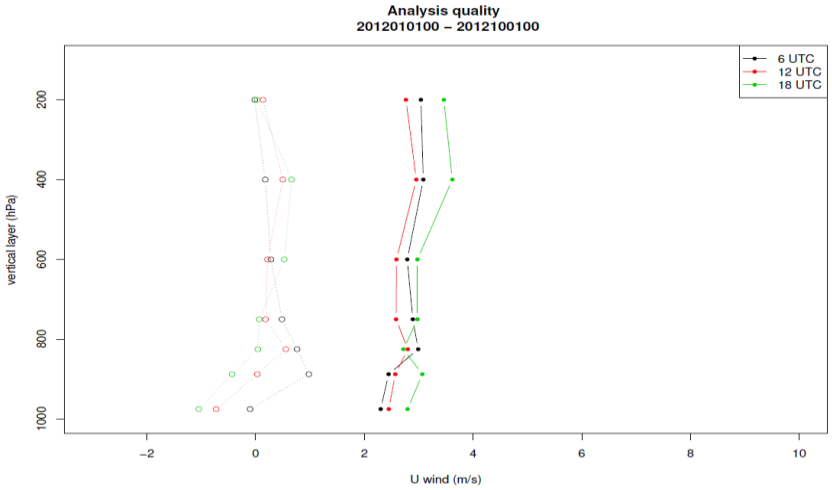
Wind speed RMSE reduction

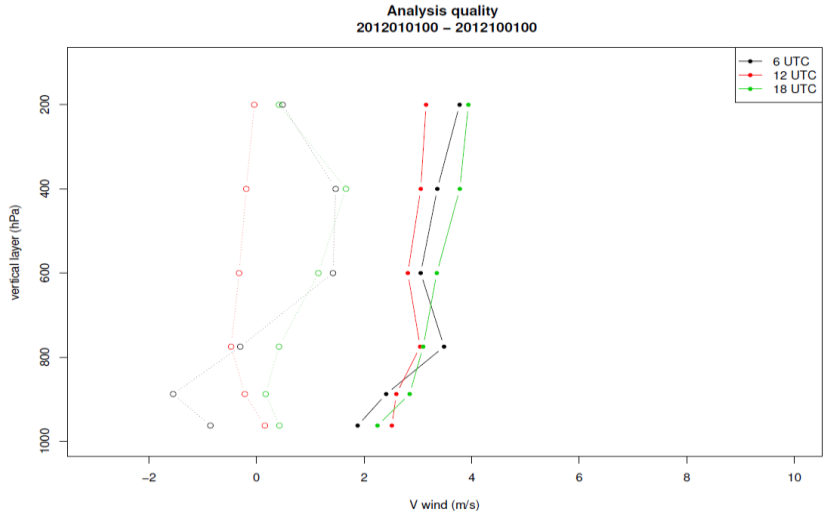


Wind direction RMSE reduction

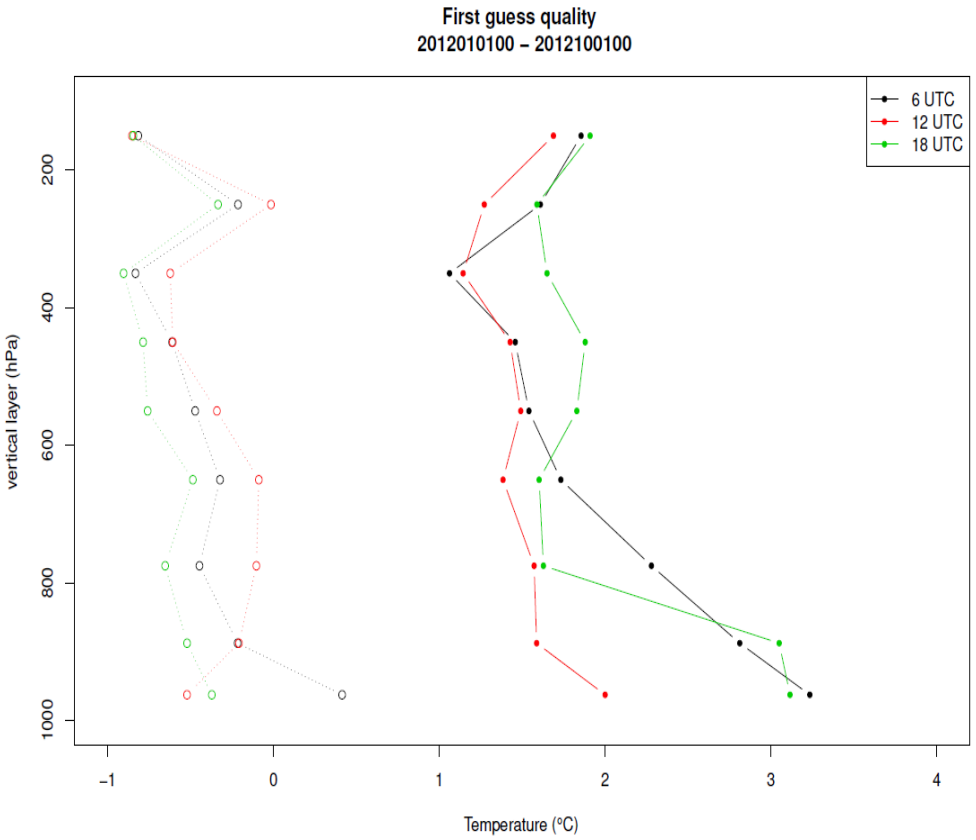
Analysis validation – Jan-Sep 2012

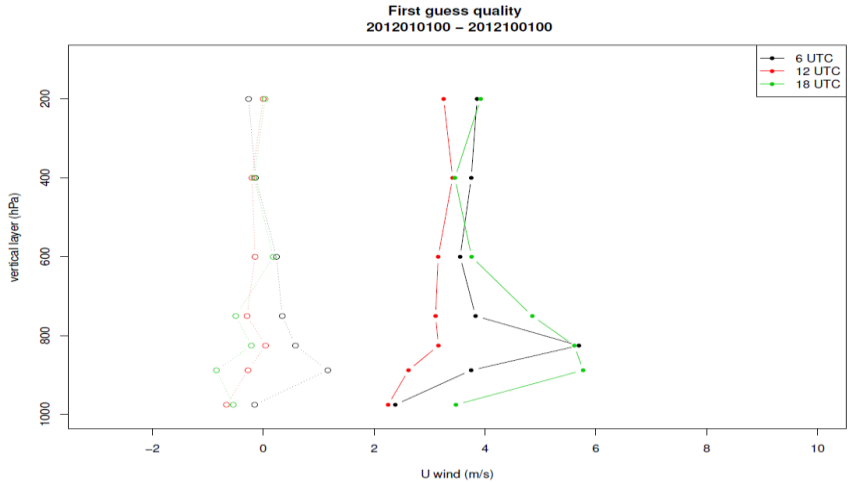


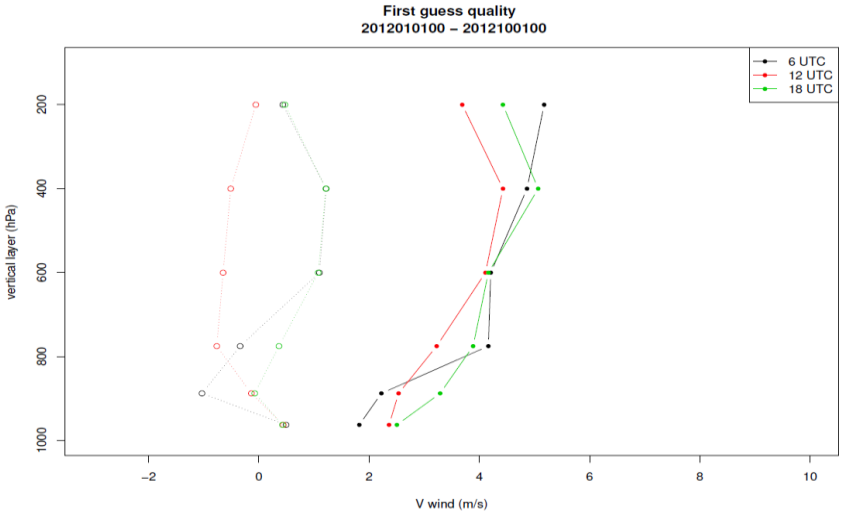




First guess validation Jan-Sep 2012







Future plans

- 3-hourly data assimilation cycle in operations, improved vert. Resolution
- recomputation of B-matrix (ALARO, AROME?)
- further studies of Mode-S impact, with emphasis on cases and improved pre-processing, collect more data if possible