COSMO Verification for the region of Sochi-2014 Olympics

Comparison of forecasts from COSMO versions of different scales

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Roshydromet

Overview

- Subjective forecasters' opinions (from the FROST survey)
- Aggregated scores (COSMO-RU7, RU2, RU1)
- Precipitation study

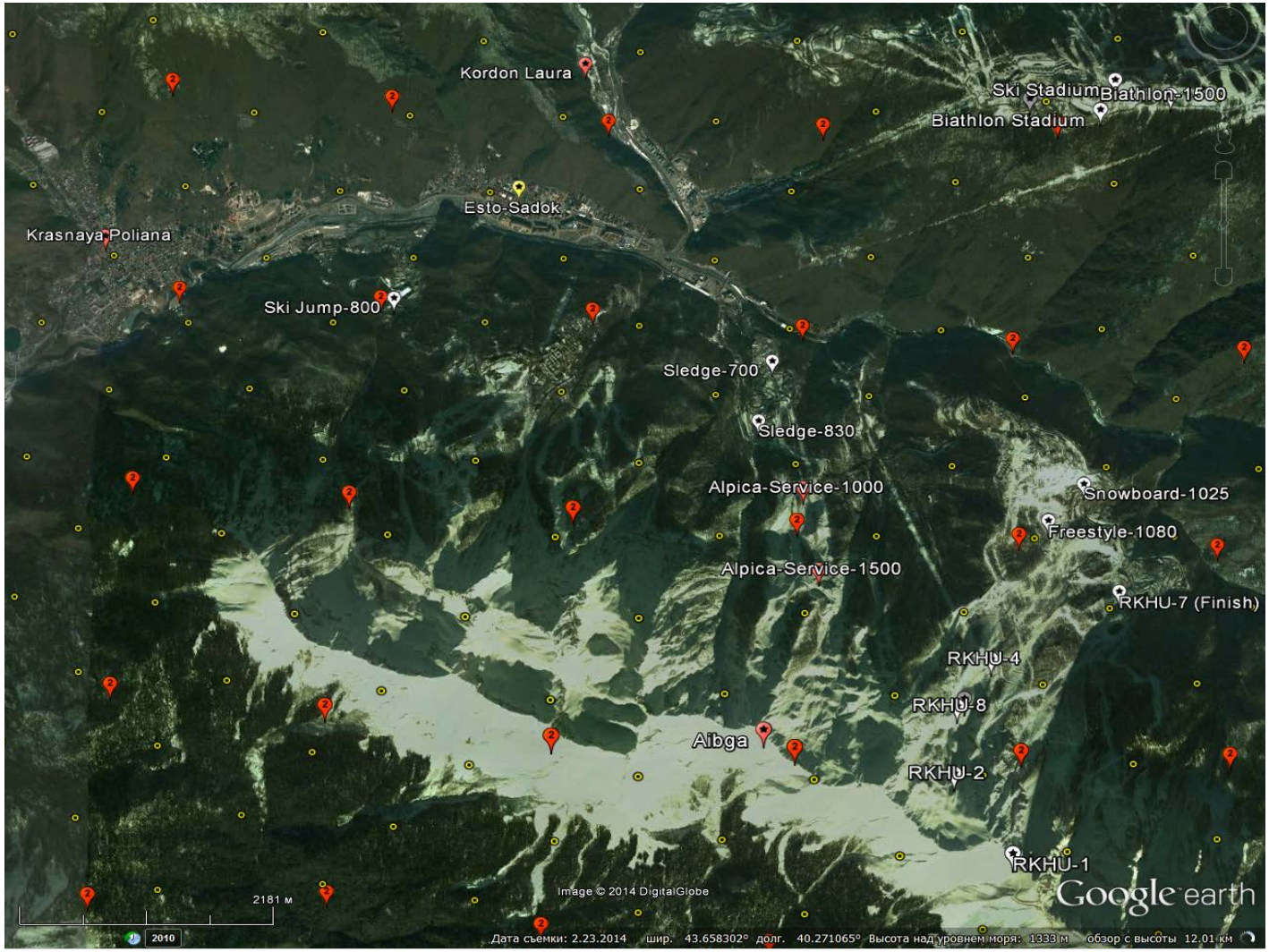
Subjective forecasters' opinions

- Models performed more or less in a similar way: temperature, precip (tendencies, onset/end of precip) – more useful, wind, gusts, visibility - poor
- In steep orography, all model forecasts suffered from uncertain identification of the model grid point most appropriate for the real-world point of interest.

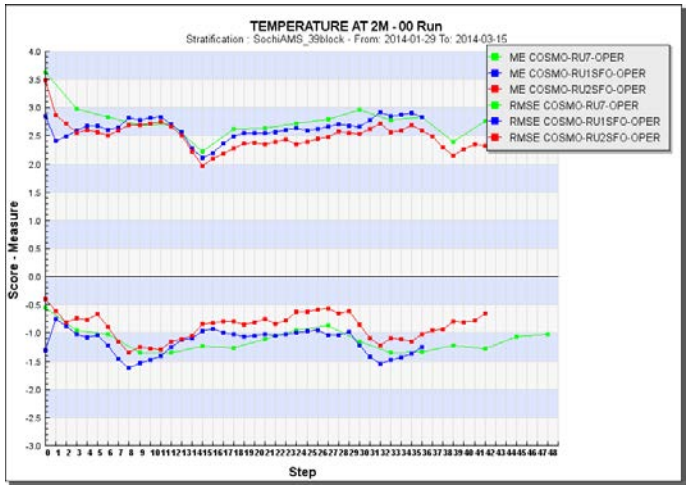
Subjective forecasters' opinions, COSMO

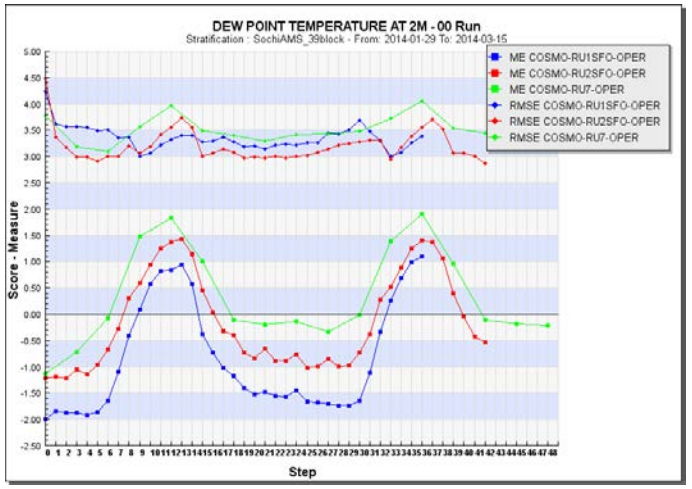
- COSMORU7: The basic model for the forecasters. Reasonable precip fact. Overestimated precip intensity. Tmin, Tmax poor. Wind poor. dT/dt OK.
- COSMORU2: Also the basic model for the forecasters. In general better than Cosmo-Ru7.
- COSMORU1: The comments are contradictory. Some forecasters preferred Cosmo-RU1 (helpful wind, humidity). Overestimated precip intensity.
- **Among the five COSMO based models/ensembles, COSMO-Ru2 is perhaps the best**

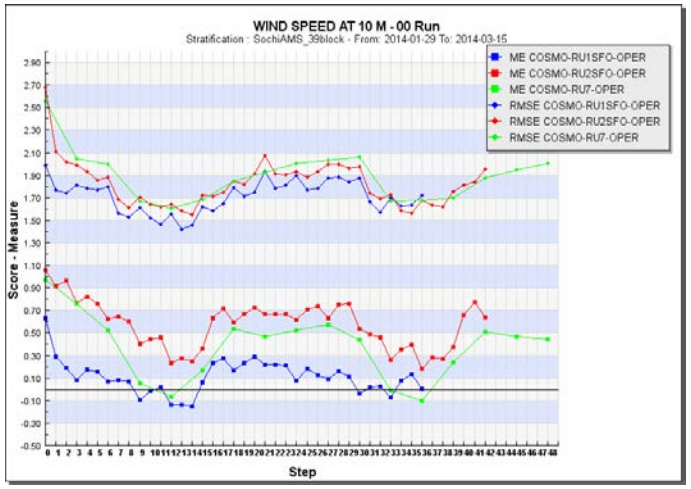
COSMO-RU1 and COSMO-RU2 nodes

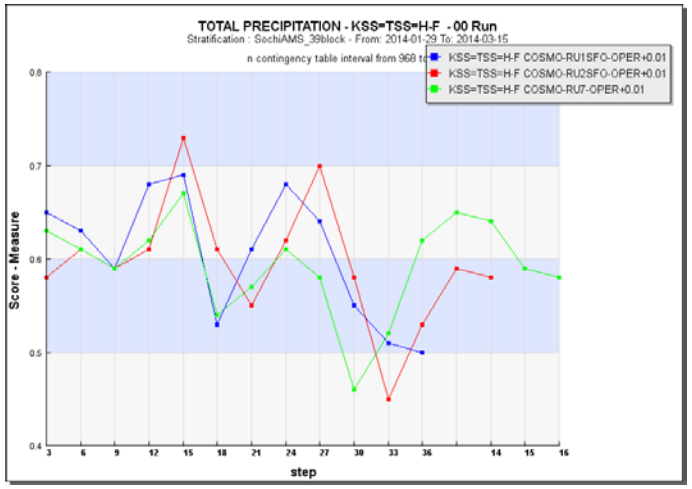


COSMO-RU1, RU2, and RU7 verification during 29.01-15.03.2014 in the Sochi region

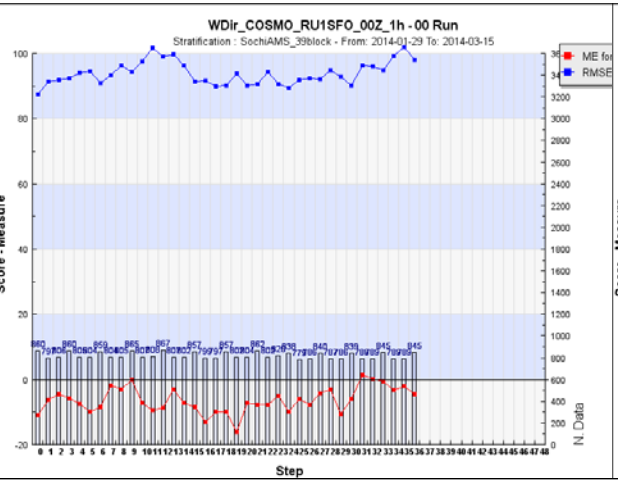


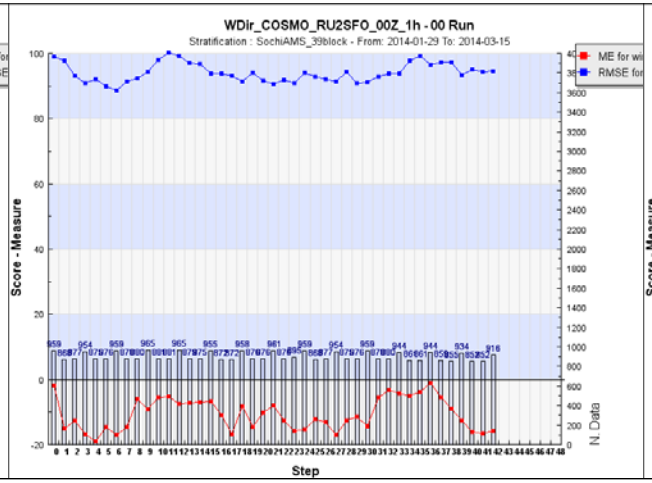


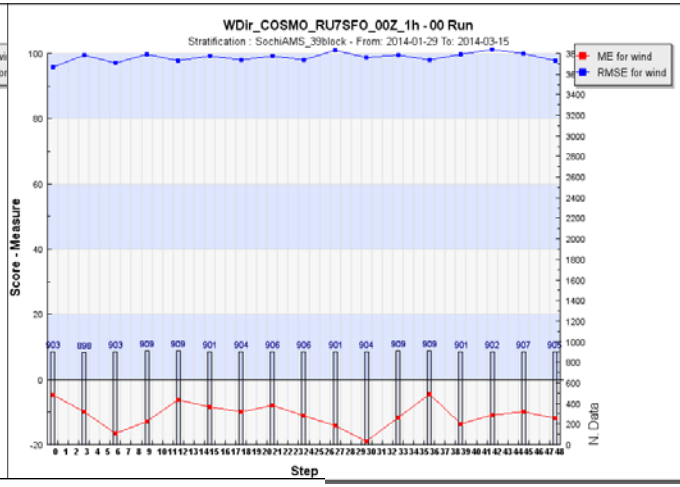


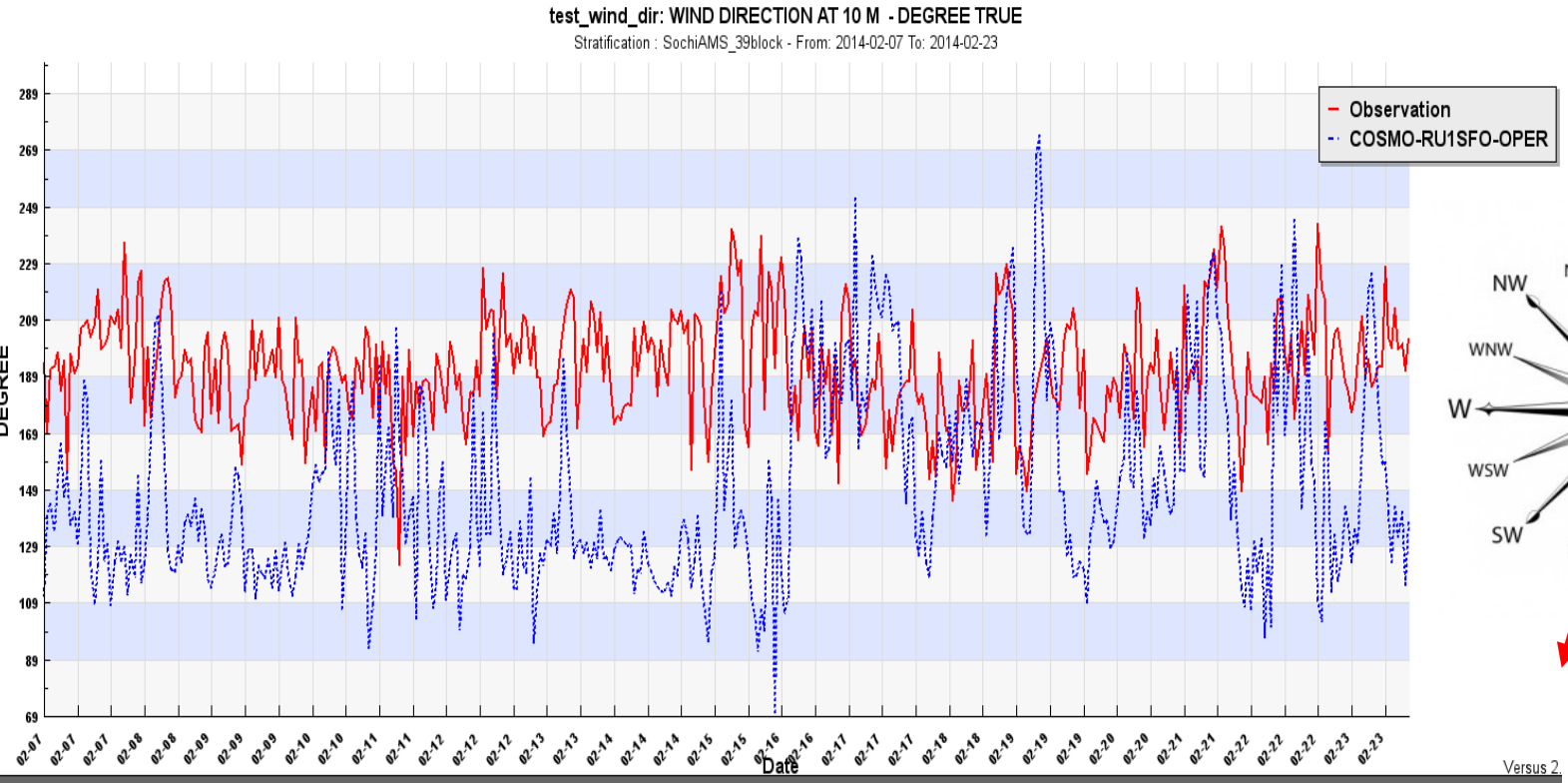


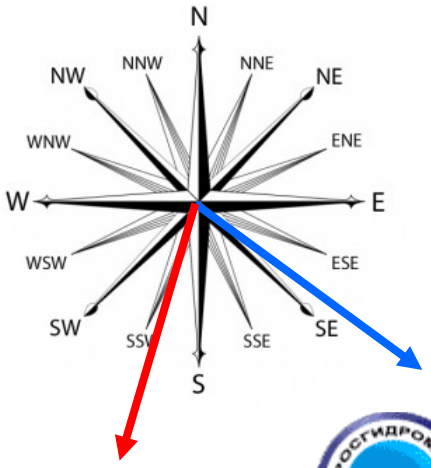
Wind direction





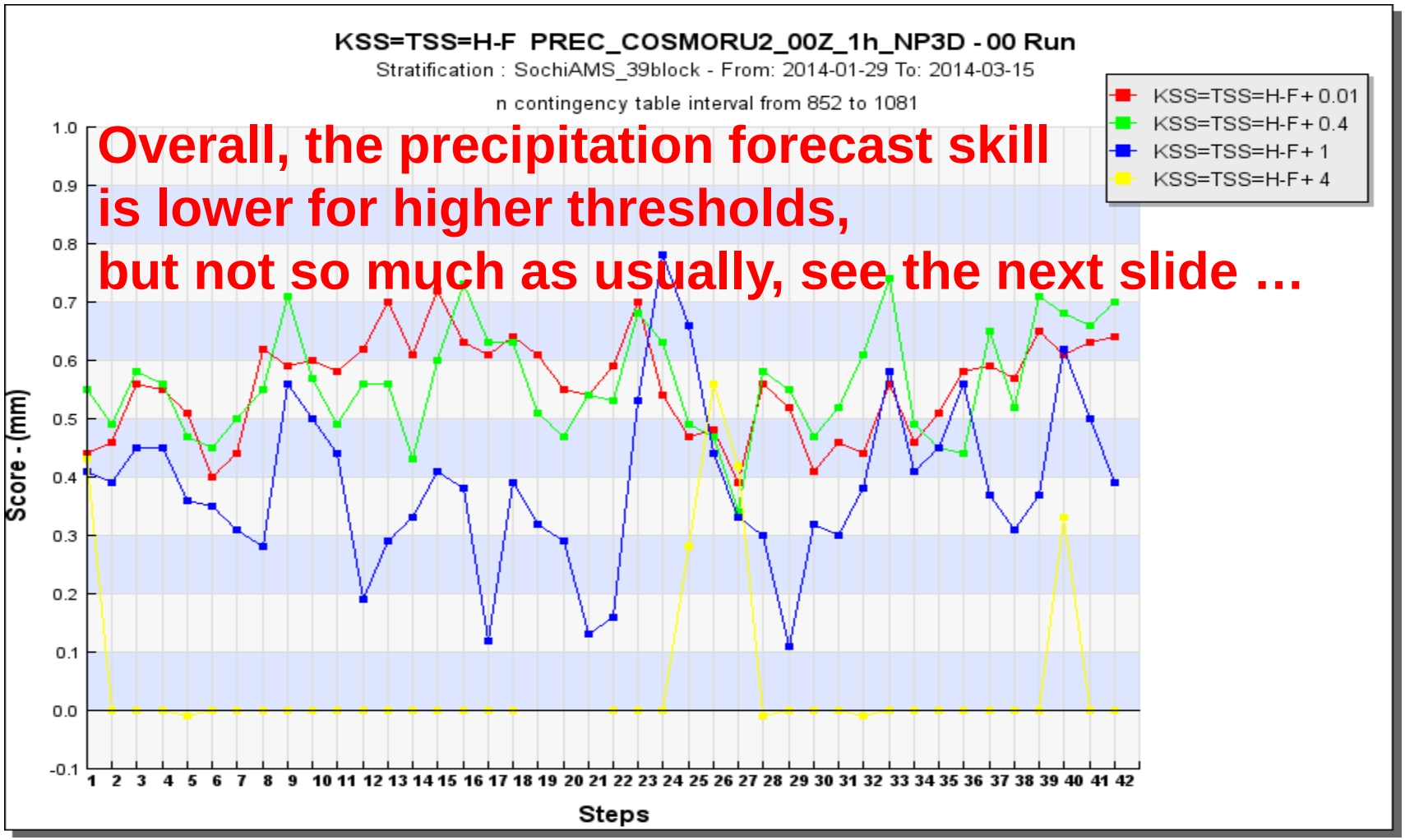




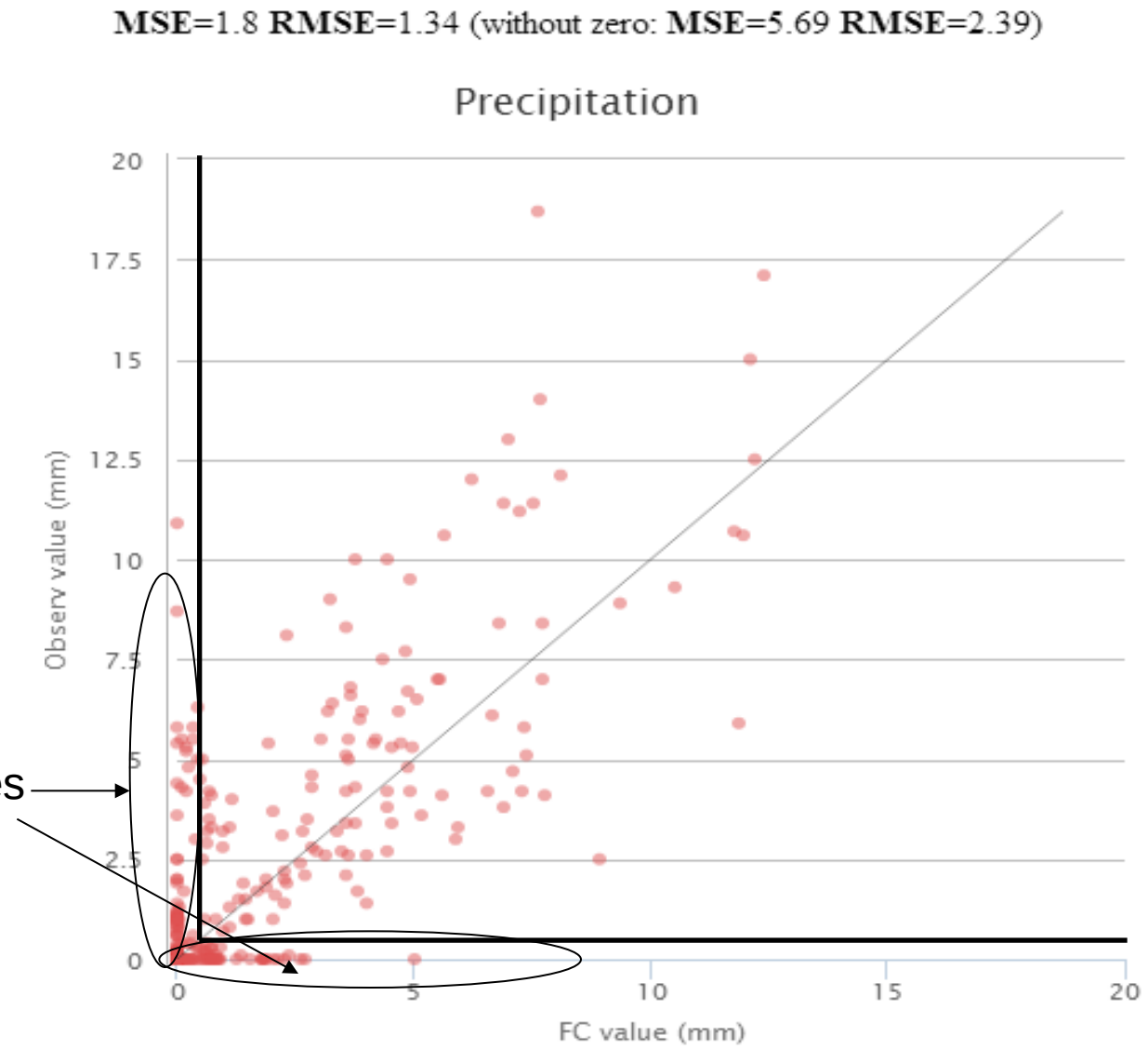


Versus 2.

Hanssen-Kuipers score for different precipitation thresholds



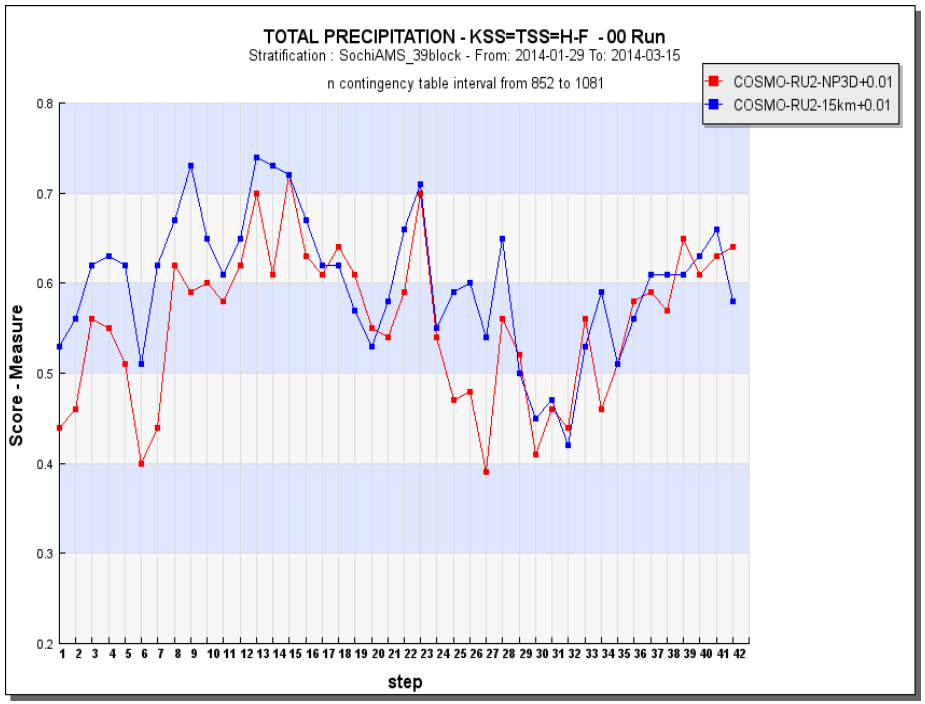
… because of the distribution of forecasts and observations (explanation to the previous slide)



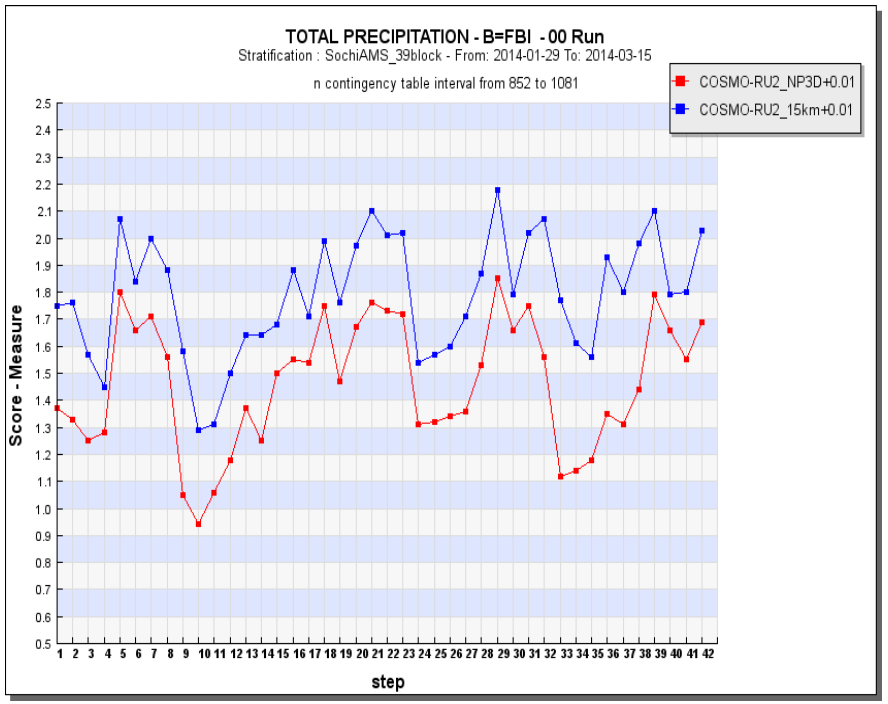
Overpopulated stripes along the axes

Nearest_point_3D and 15_km_radius methods precip > 0.01 mm/1h, COSMO-RU2

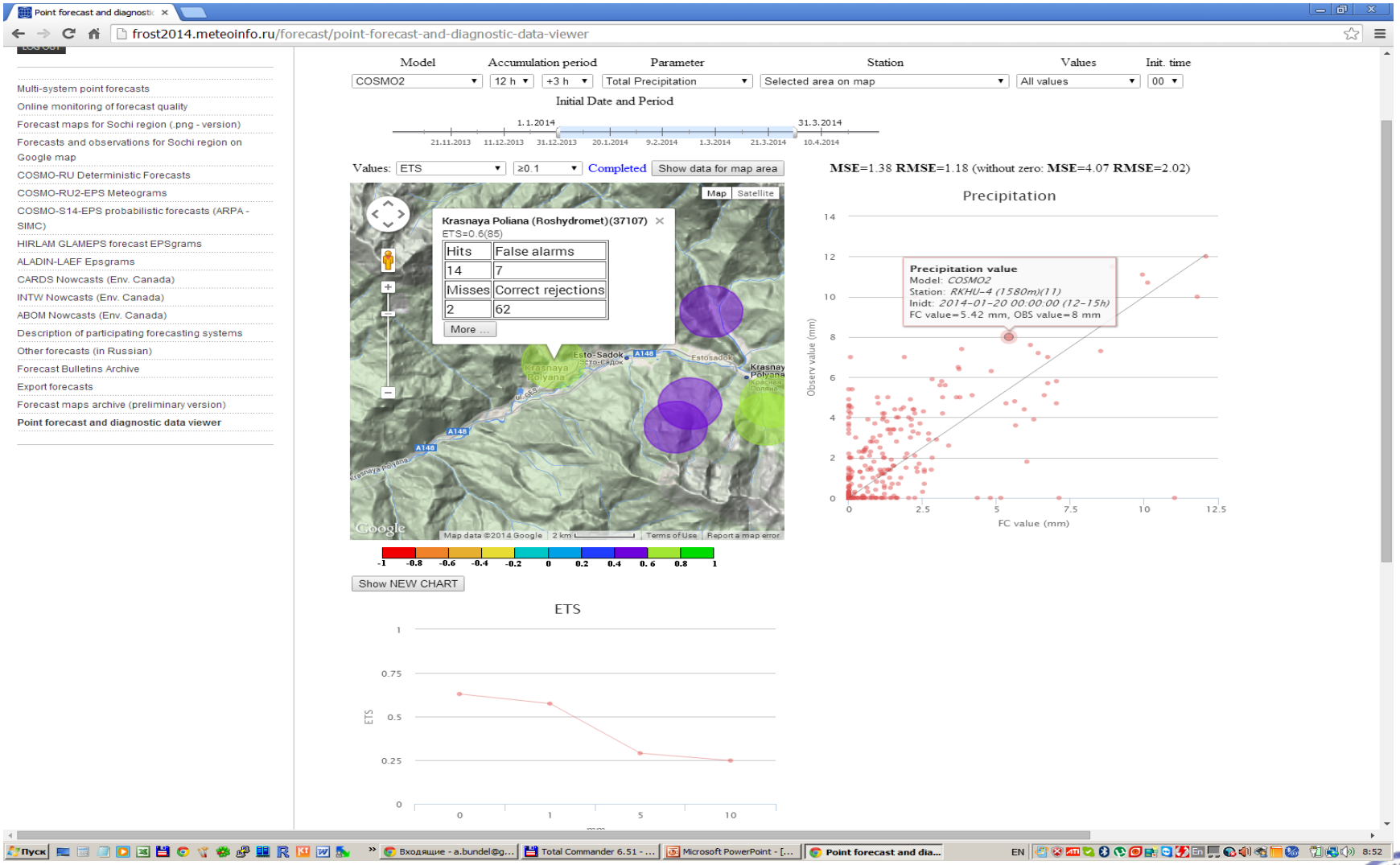
Hanssen Kuipers



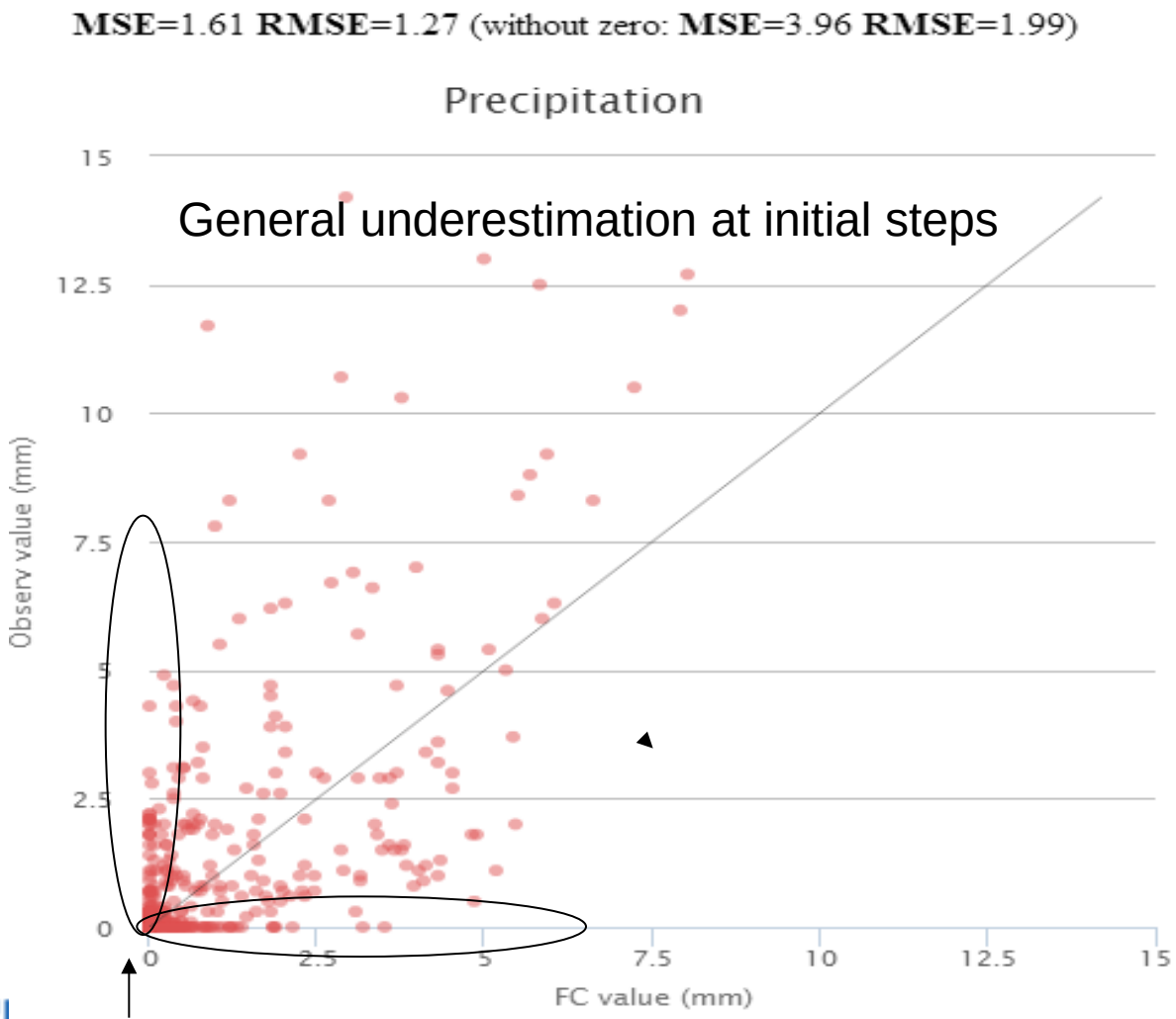
FBI



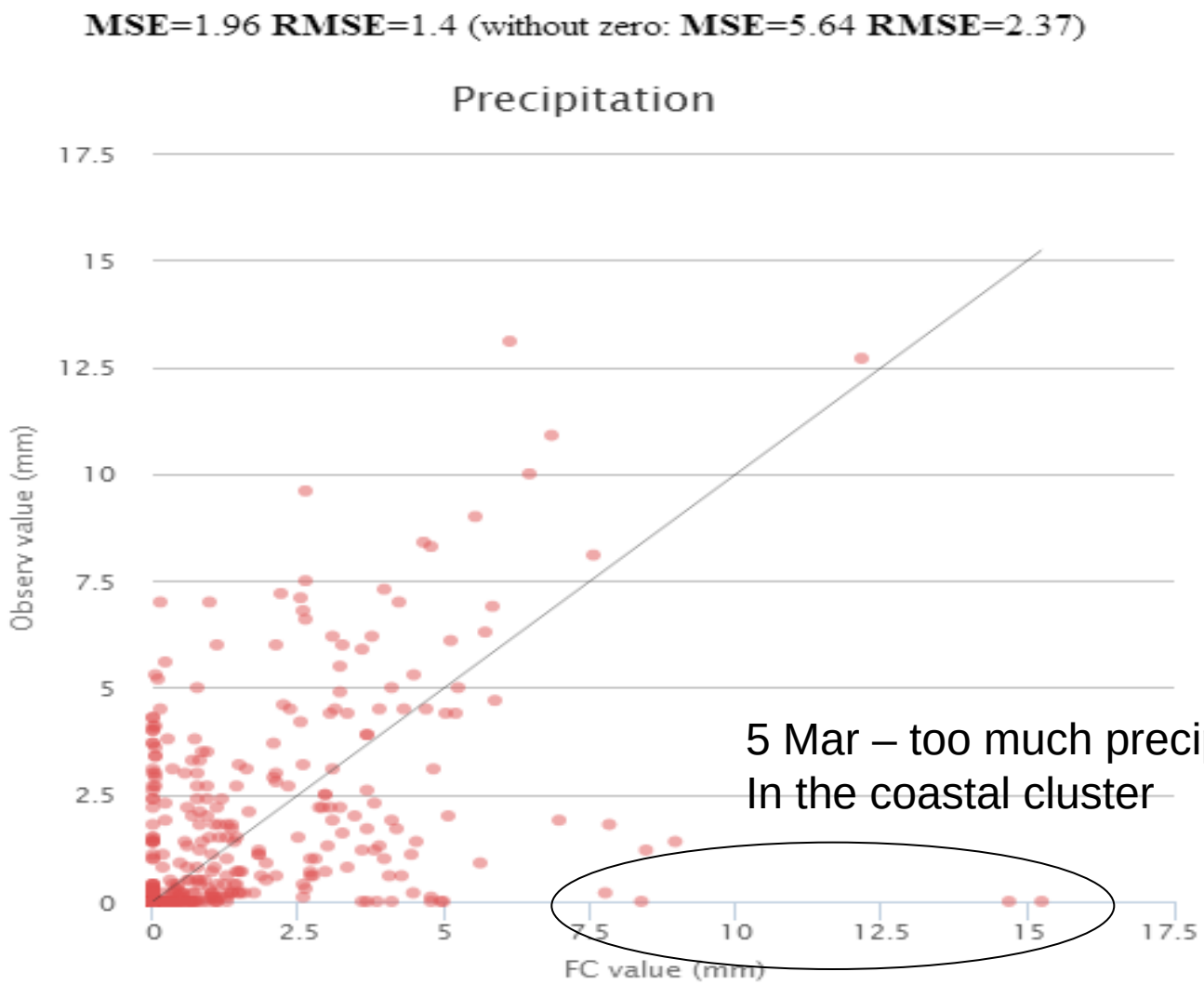
Online verification tool at FROST



COSMO-RU2 3h precip accumulations, 00Z init time, Sochi region, 01.01.2014-31.03.2014 3h lead time



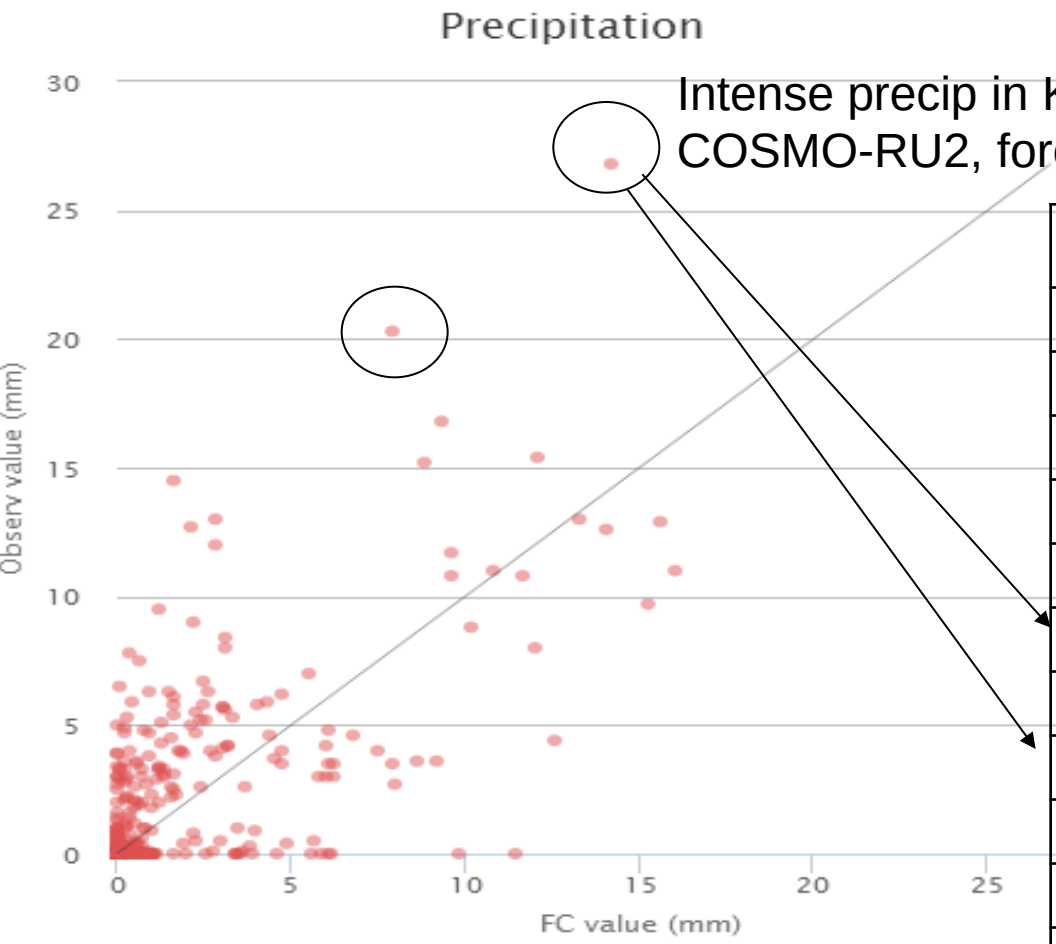
6h leadtime



5 Mar – too much precip forecasted
In the coastal cluster

9h leadtime

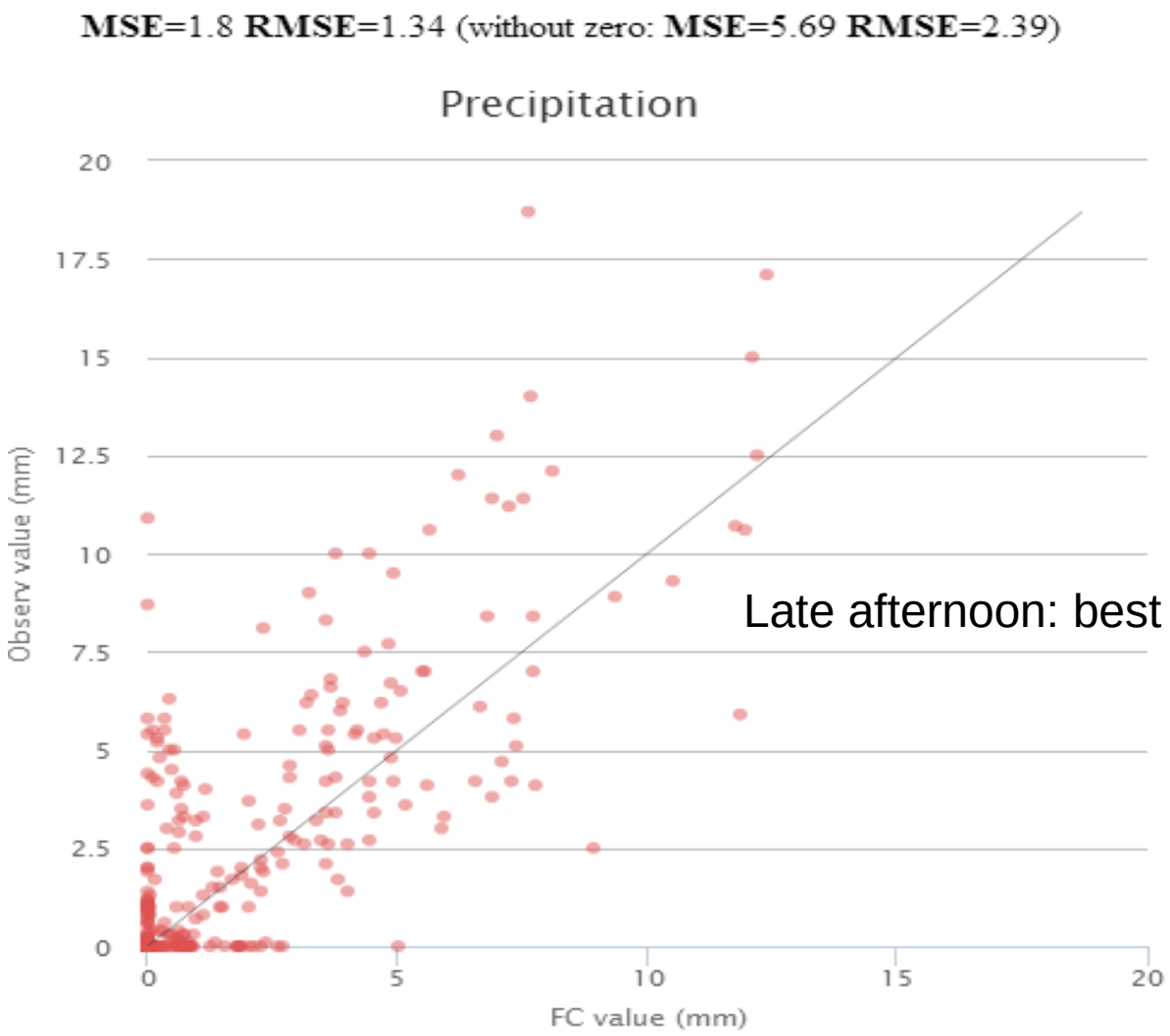
MSE=3.07 **RMSE**=1.75 (without zero: **MSE**=7.98 **RMSE**=2.82)



Intense precip in Kepsha – underestimated by COSMO-RU2, forecasted by COSMO-RU1

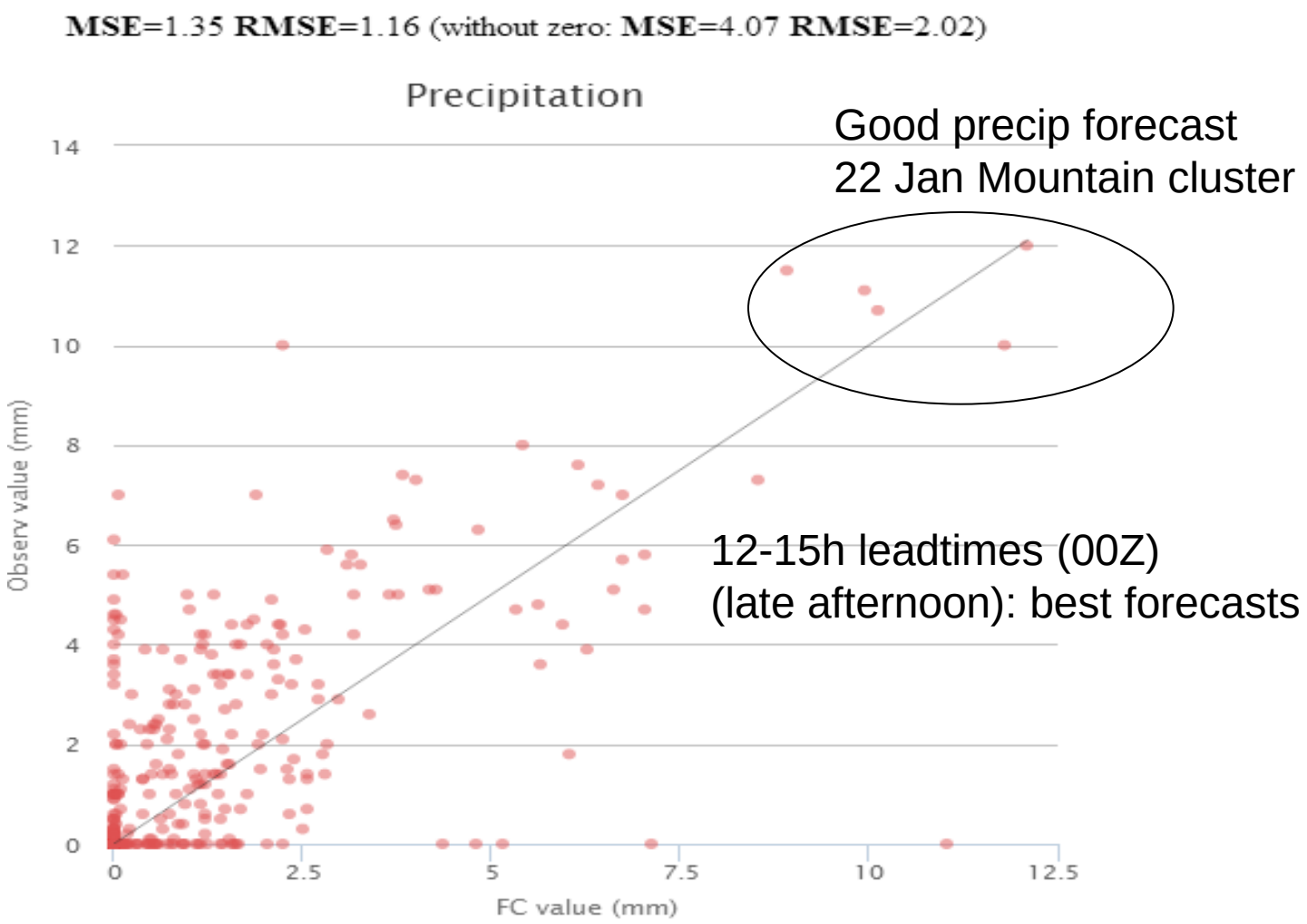
a	b	c	d	Thr >mm/3h
COSMO-RU1				
1	0	1	58	14
1	0	1	58	16
1	0	1	58	18
1	0	1	58	20
1	0	0	59	25
COSMO-RU2				
1	0	1	58	14
0	0	2	58	16
0	0	2	58	18
0	0	2	58	20
0	0	1	59	25

12h leadtime

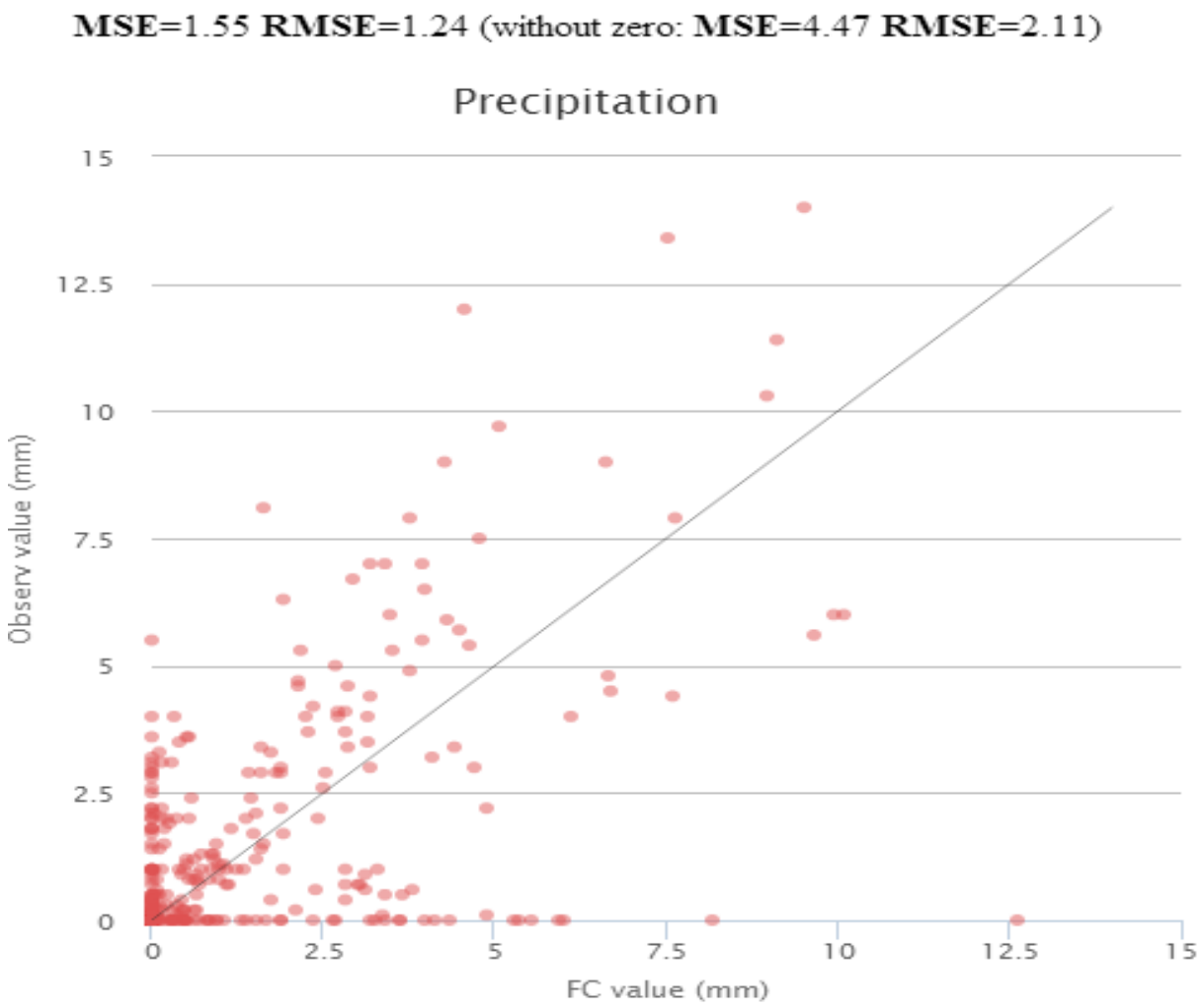


Late afternoon: best forecasts

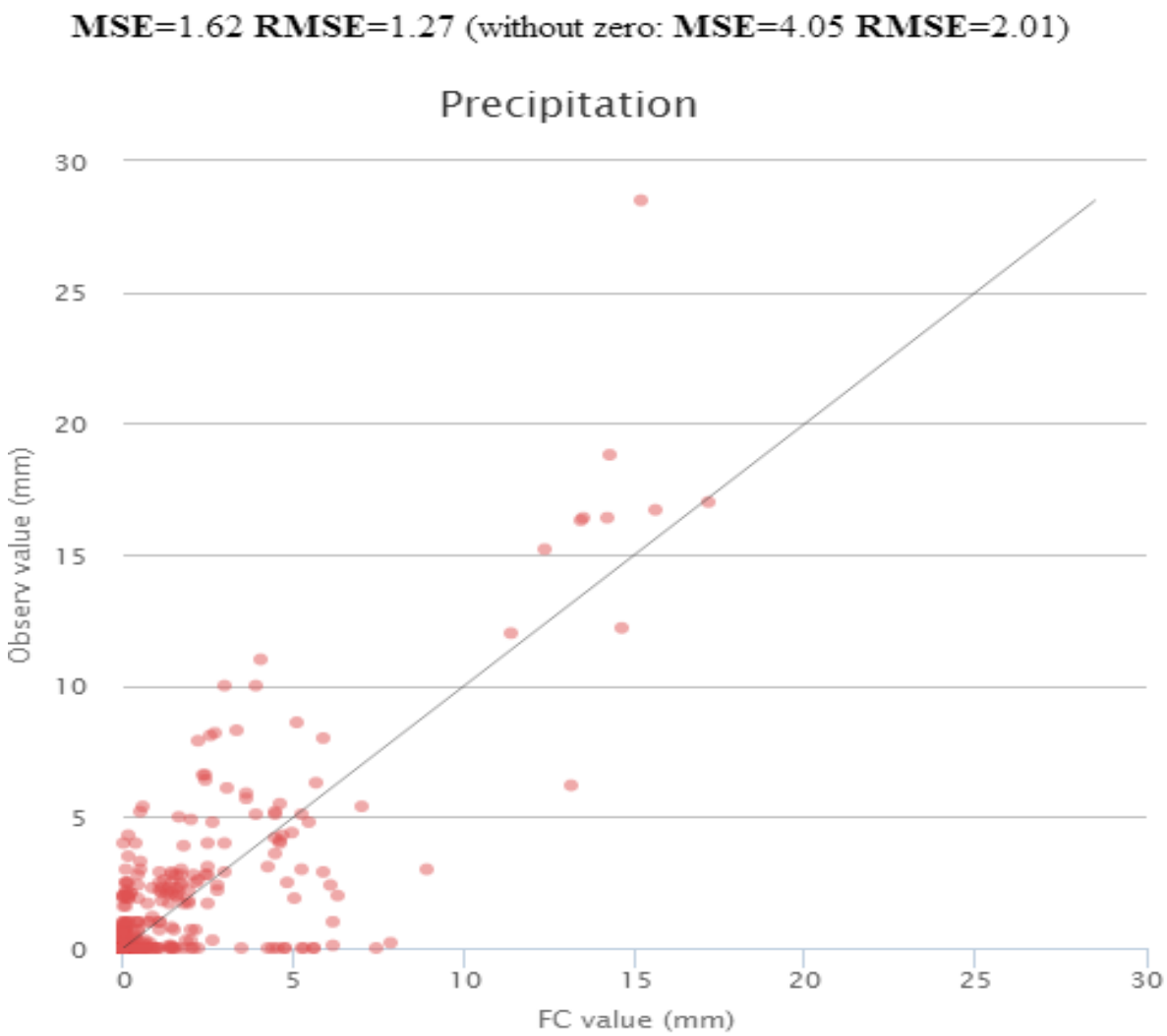
15h leadtime



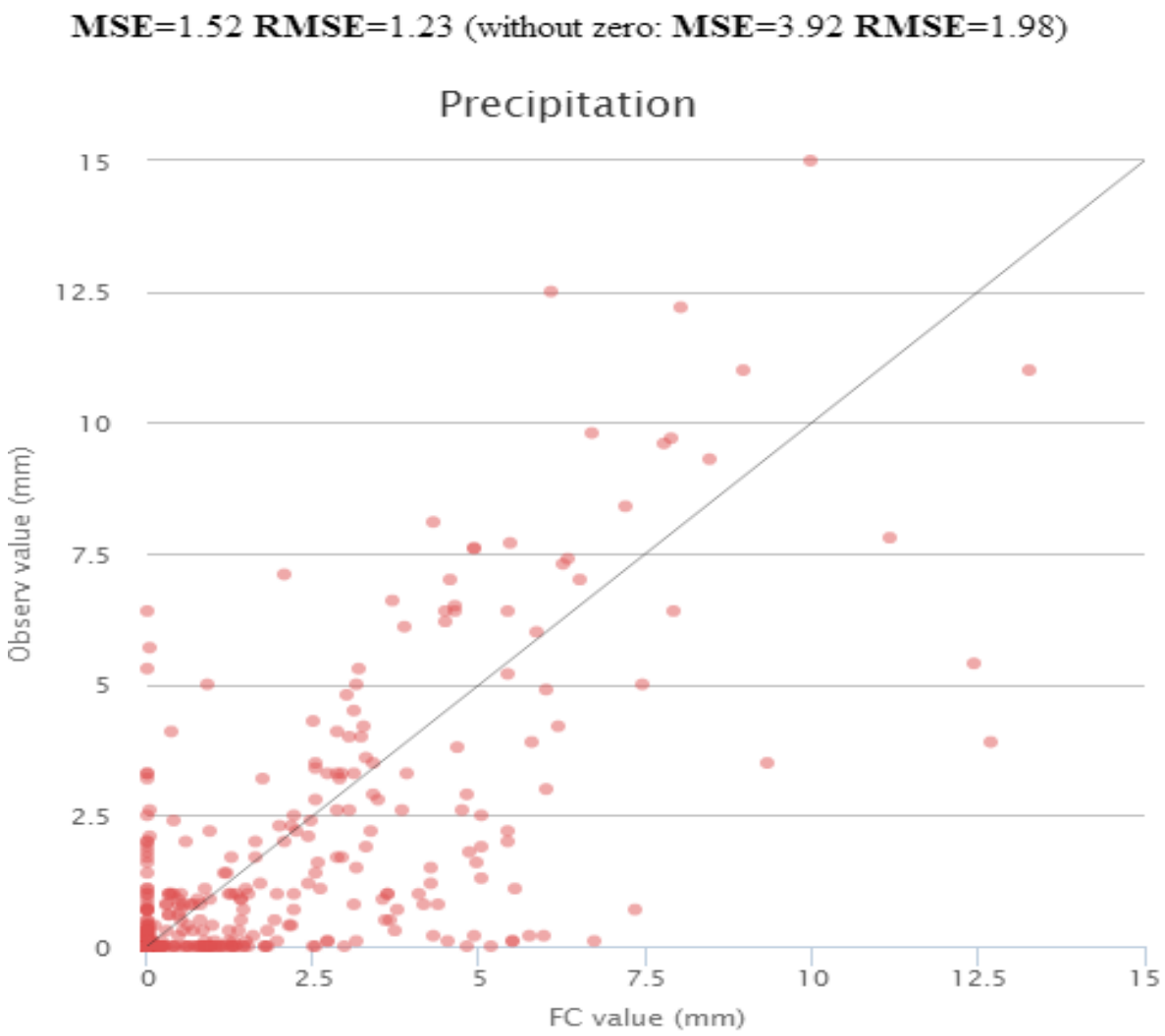
18h leadtime



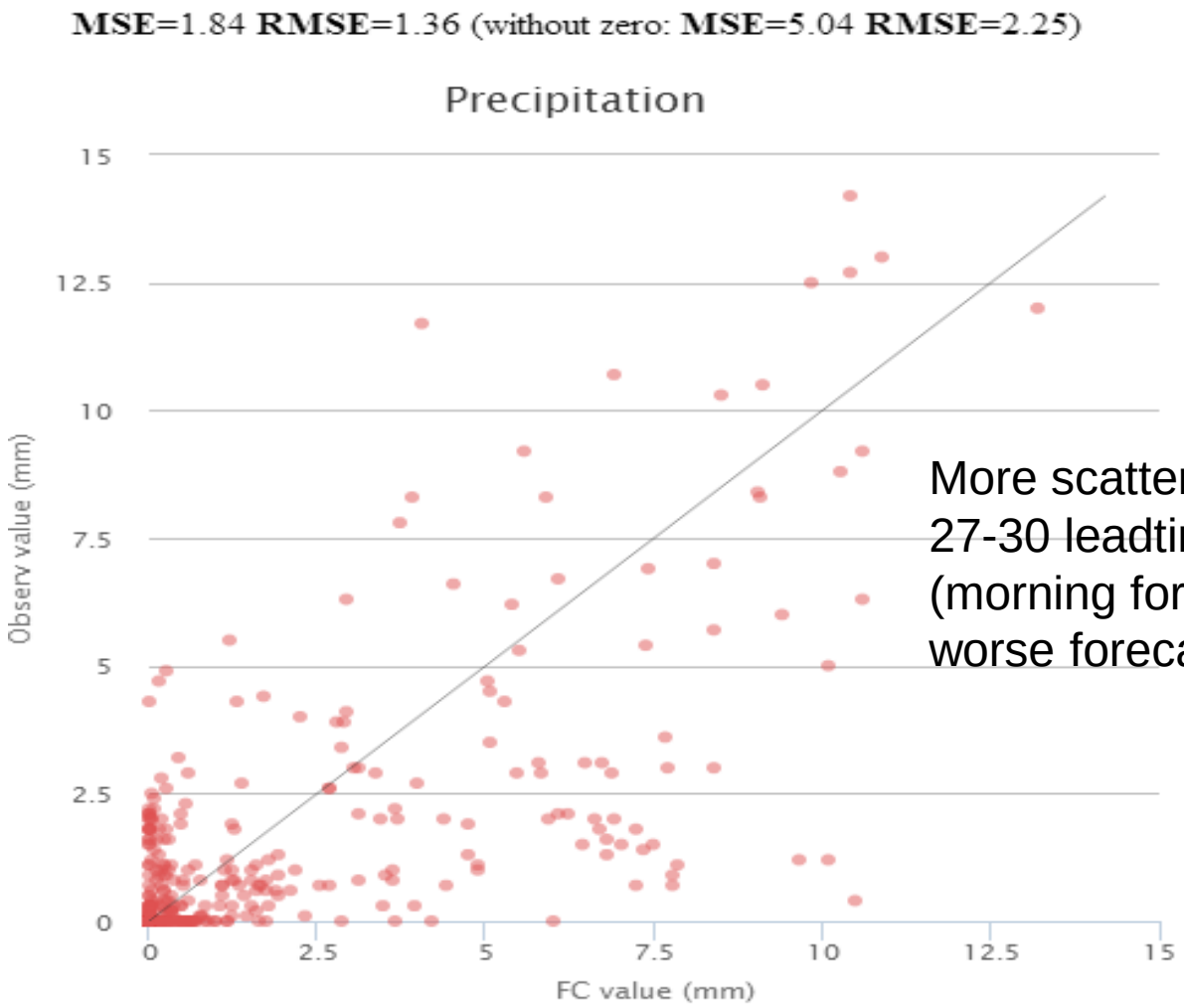
21h leadtime



24h leadtime

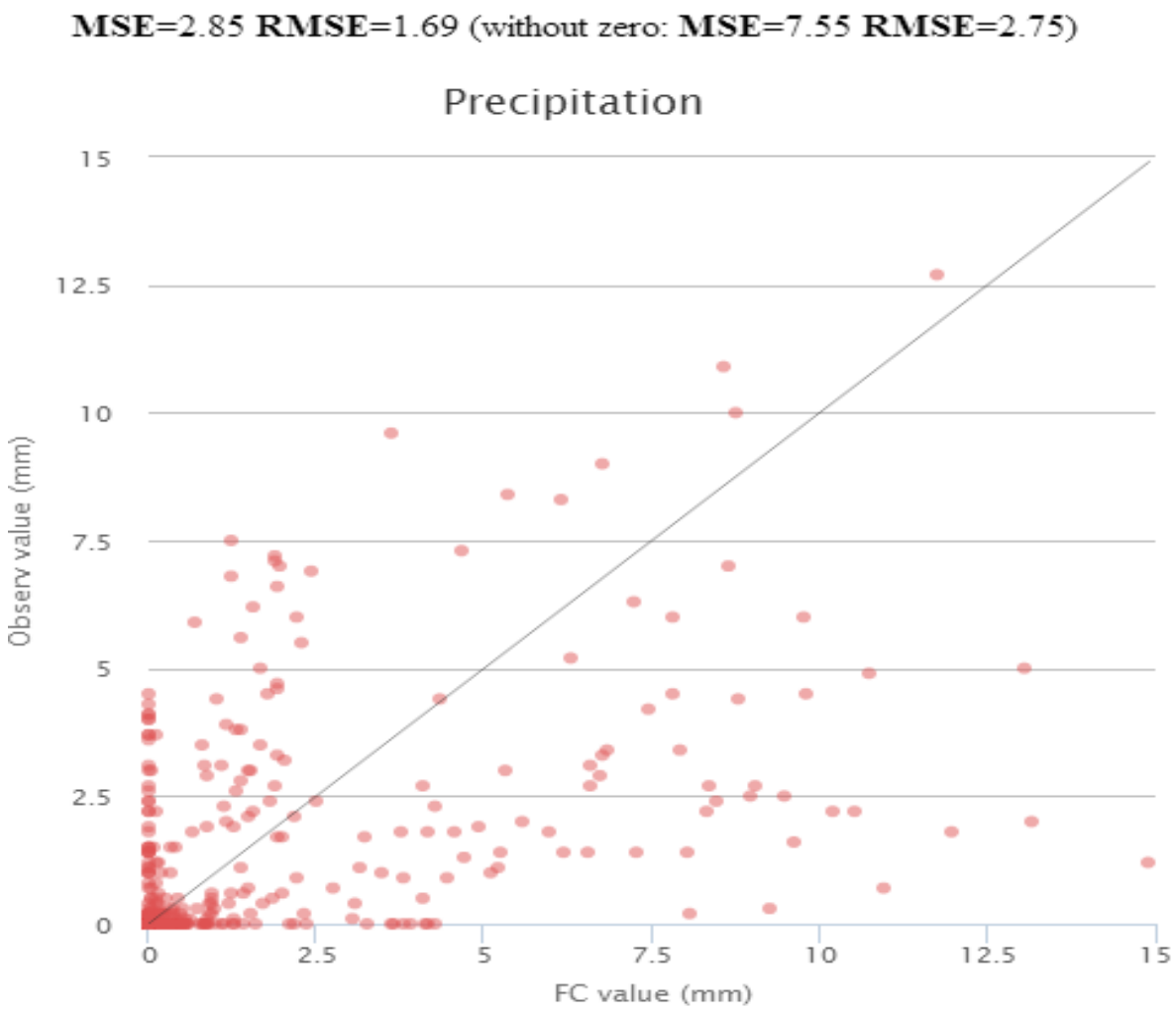


27h leadtime

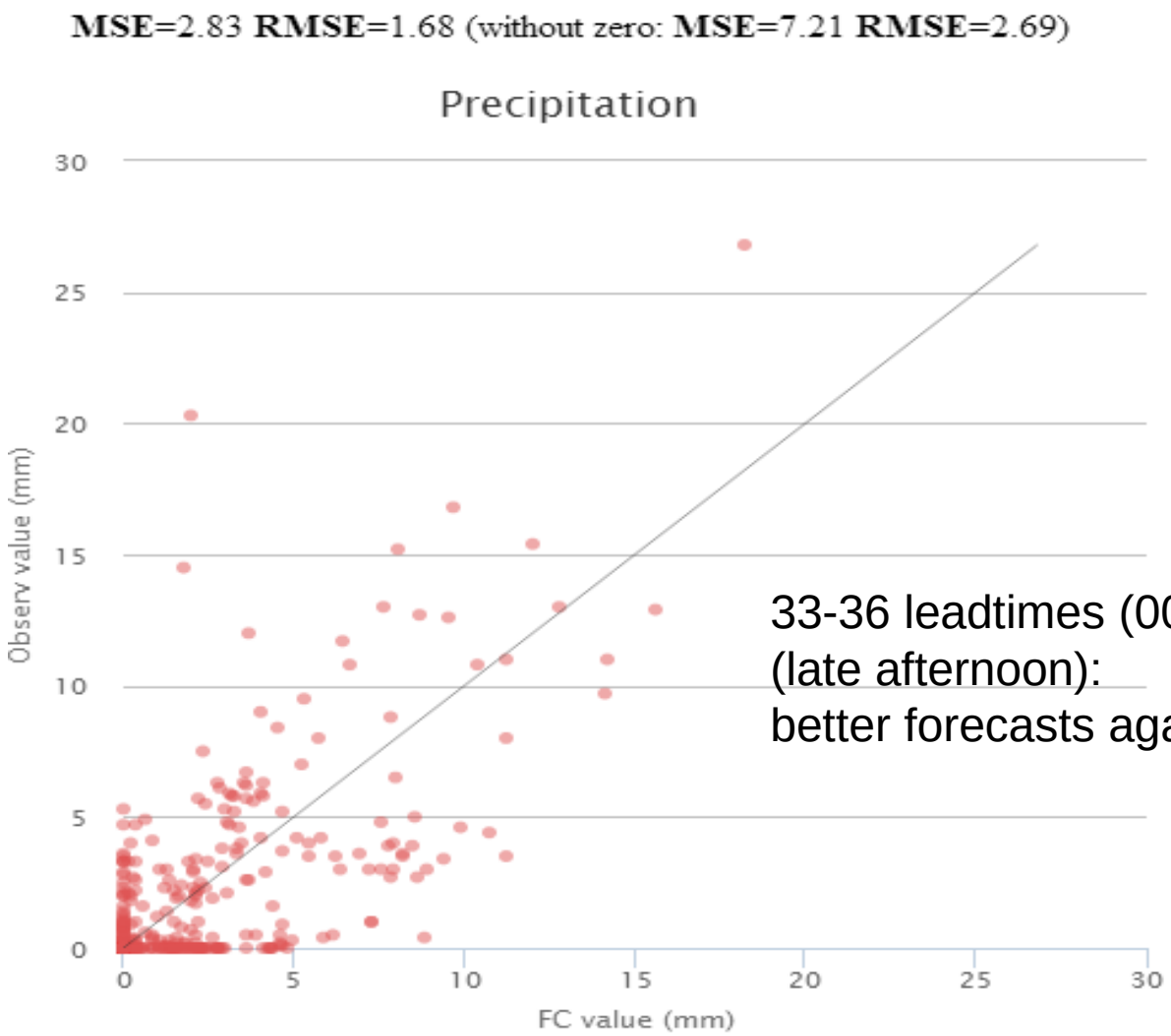


More scattering
27-30 leadtimes
(morning for local time)
worse forecasts

30h leadtime

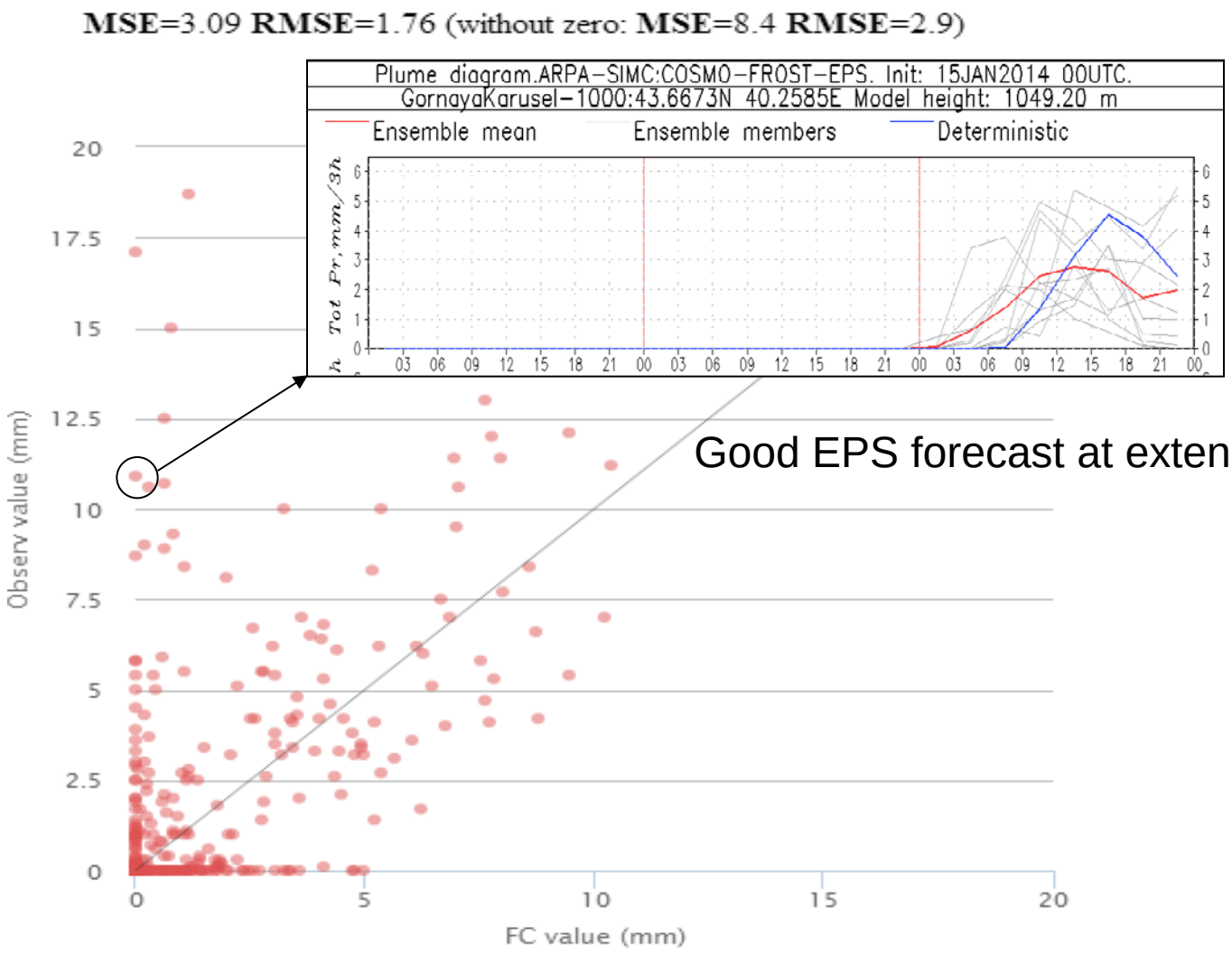


33h leadtime



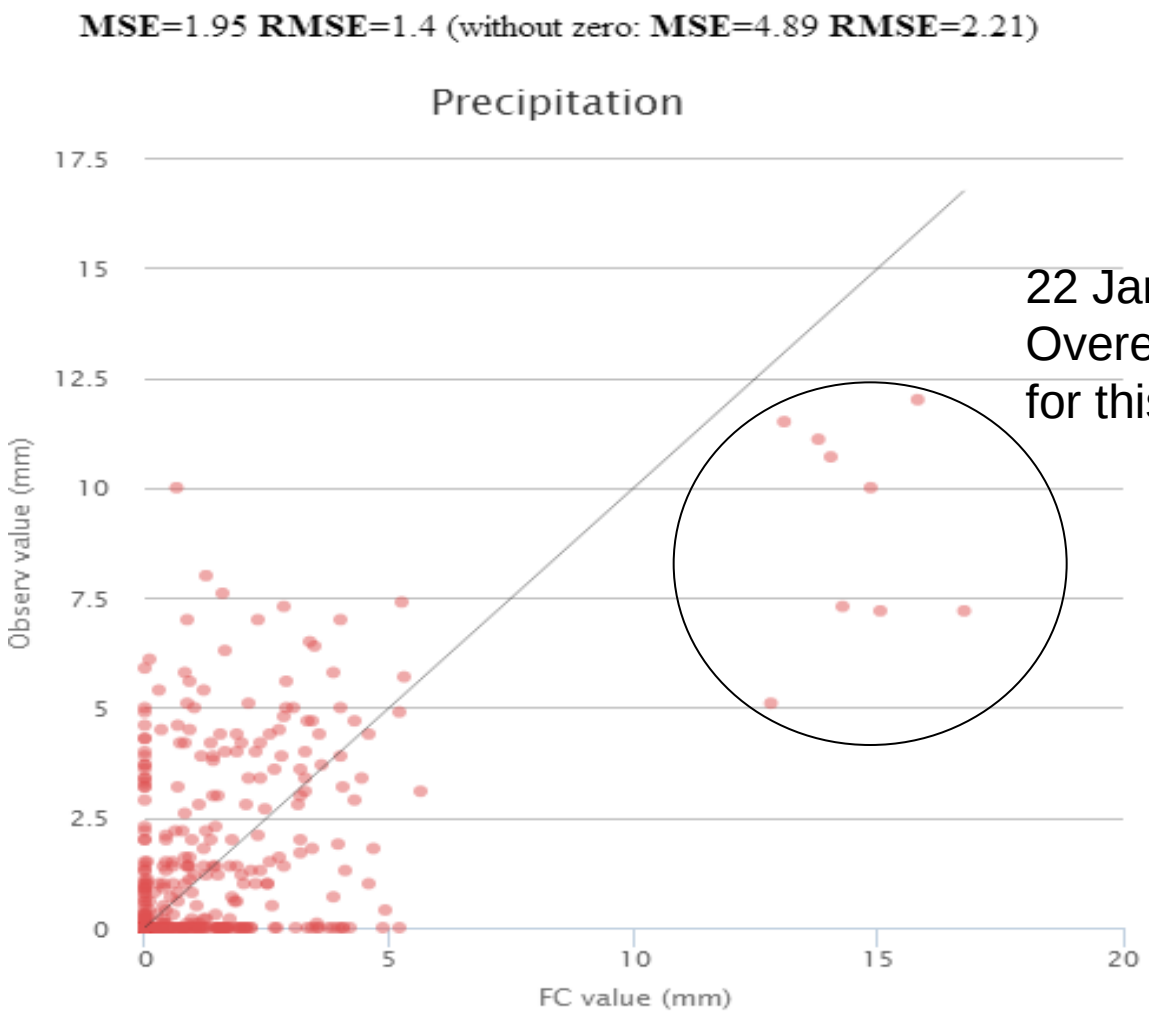
33-36 leadtimes (00Z) (late afternoon): better forecasts again

36h leadtime



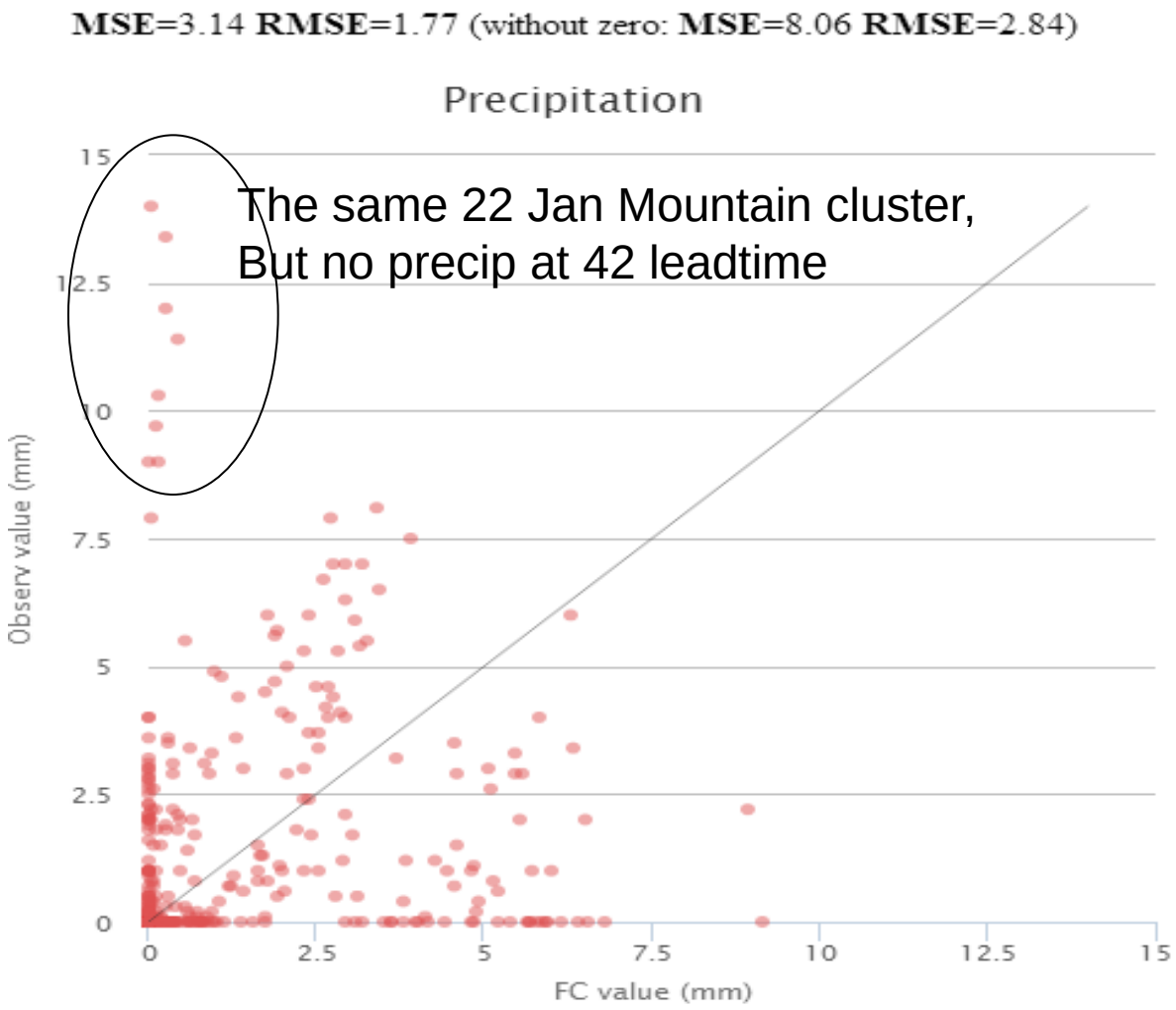
Good EPS forecast at extended leadtimes

39h leadtime



22 Jan Mountain cluster, Overestimation of precip for this leadtime

42h leadtime



Conclusions

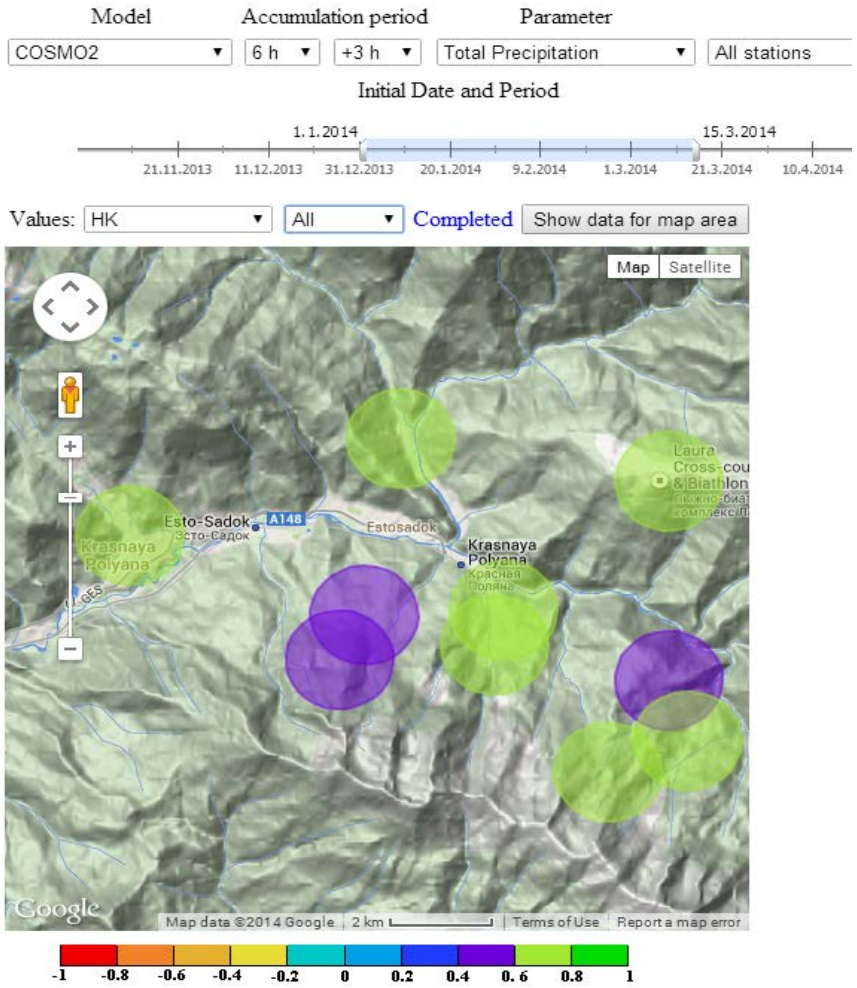
- **Traditional scores aggregated over the Sochi region show overall prevalence of COSMO-RU2 wrt COSMO-RU7 and COSMO-RU1**
- **However, some cases of intense precipitation and visibility are better predicted by COSMO-RU1**
- **Wind is also better in COSMO-RU1**
- **Precipitation is best forecasted in the late afternoon**

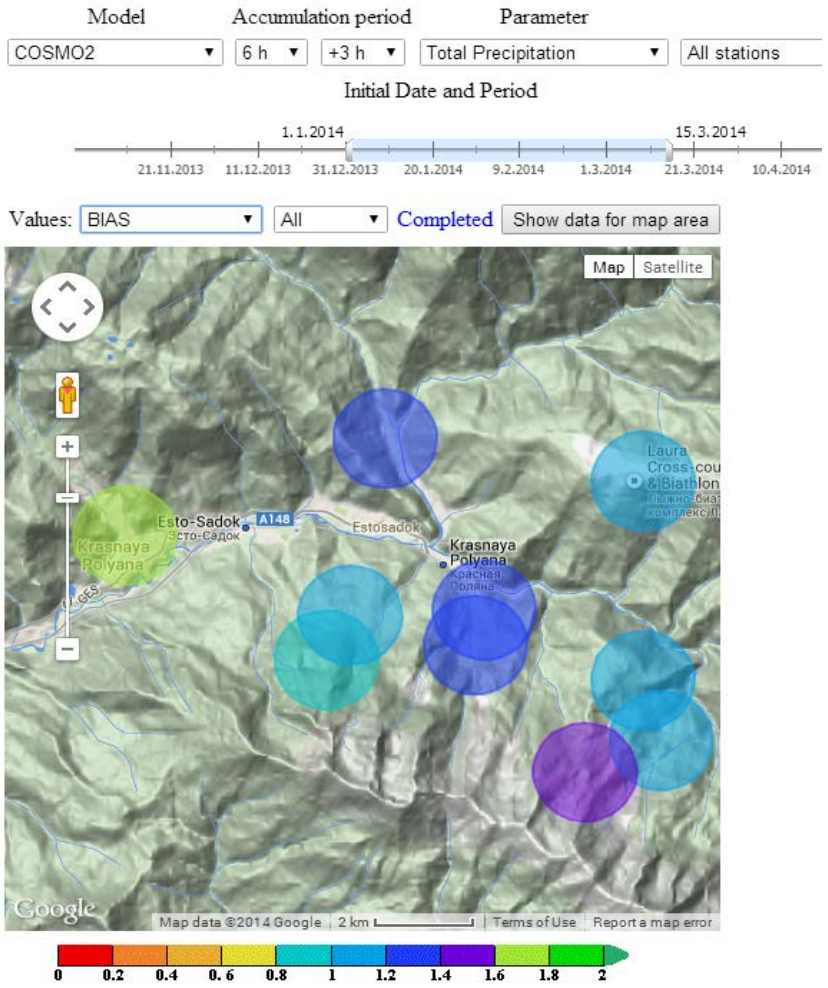
Plans

- **Further analysis of predictability of HIW cases complemented by ensemble predictability and sensitivity studies**
- **Implementation of spatial verification methods**

Thank you for your attention!

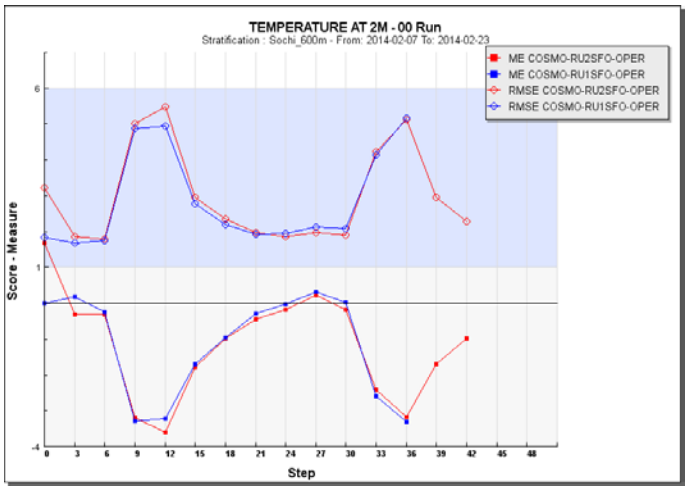
Dynamical display of geographical distribution



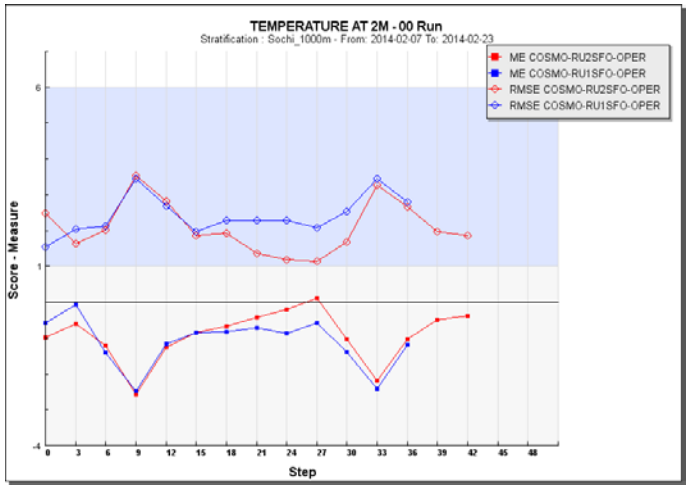


T2m, COSMO-RU1 and COSMO-RU2, Stratified by height

600 m

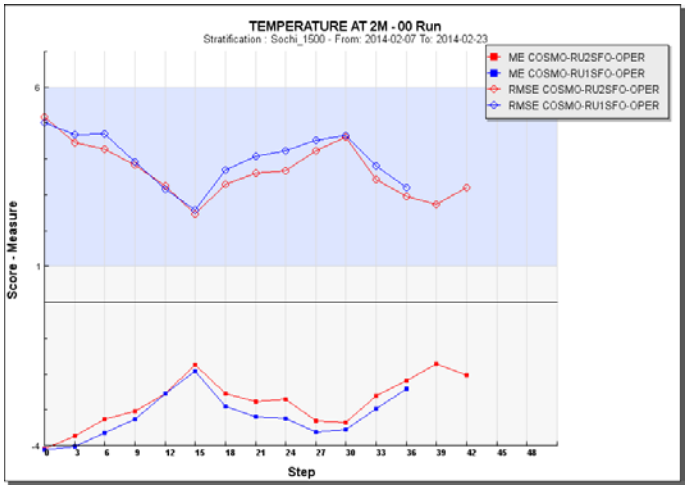


1000 m

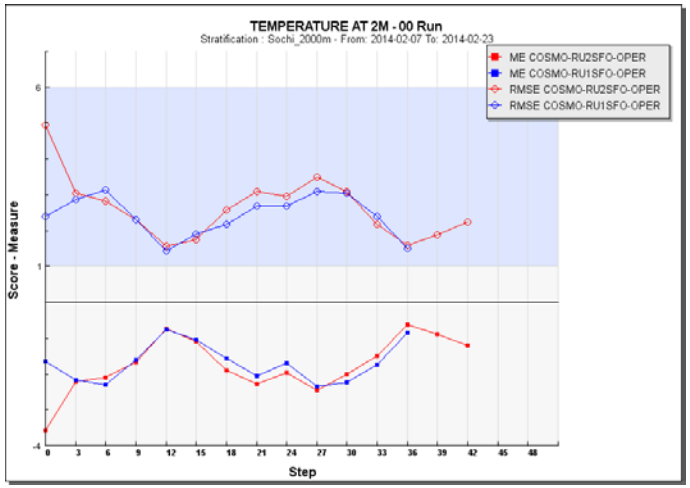


COSMO-RU1 is blue!

1500 m



2000 m



Inverse diurnal cycle of errors for higher levels