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stay report
Ljubljana 17.07.2017 – 11.08.2017
Implementation and validation of prognostic graupel computation into ALADIN code cy43t2
Appendix 1 – verification scores

Domain of model:

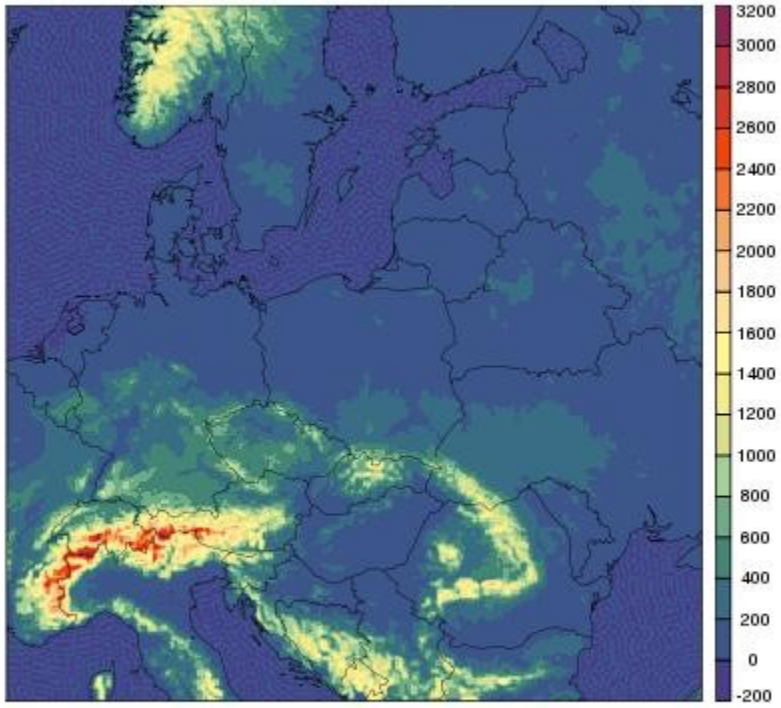
resolution:	7.4 km
vertical levels:	60 vertical levels
points:	309x309 (320x320)
start of forecast:	00 UTC

Observational data:

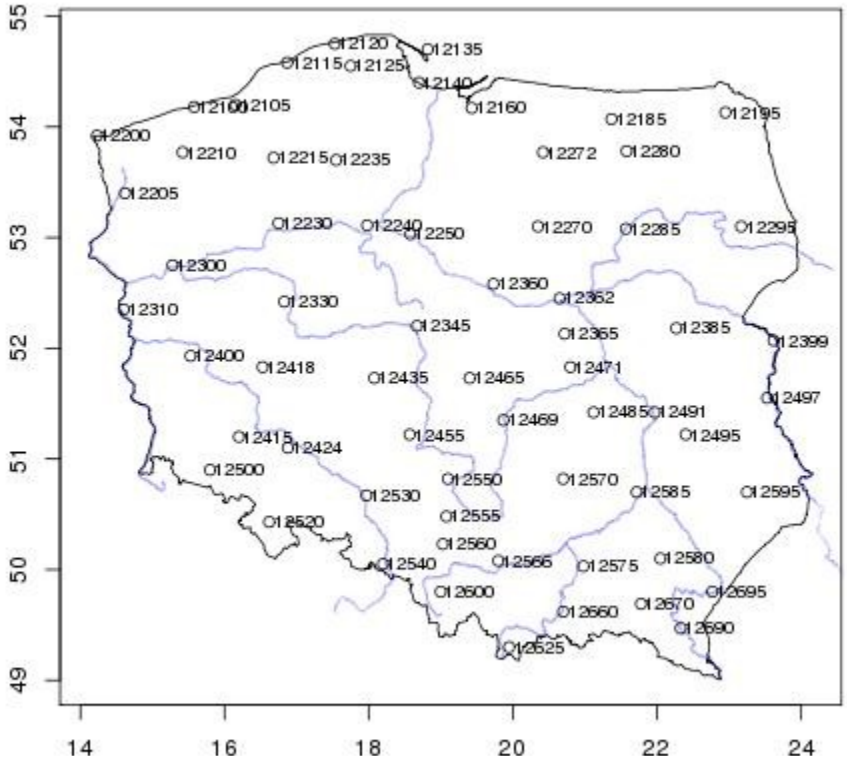
synoptic stations:	61 stations in Poland
time of experiment:	2013

Verification:

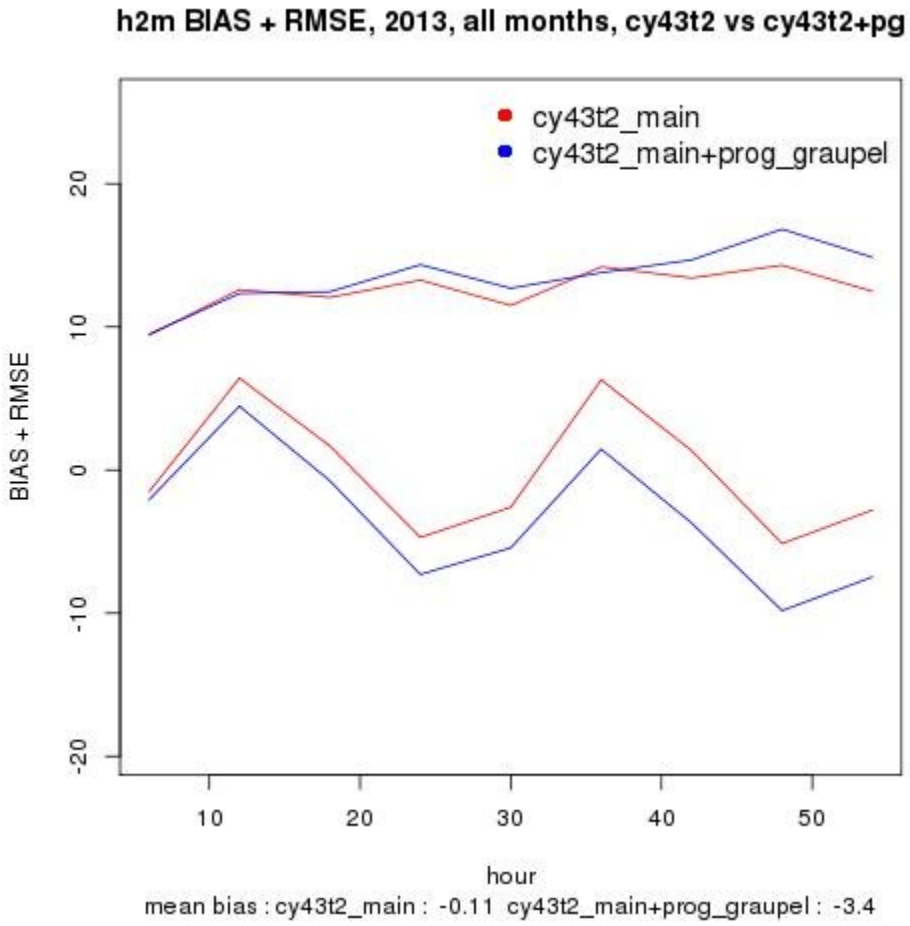
Point to point verification, closest node of model domain for all synoptic stations.



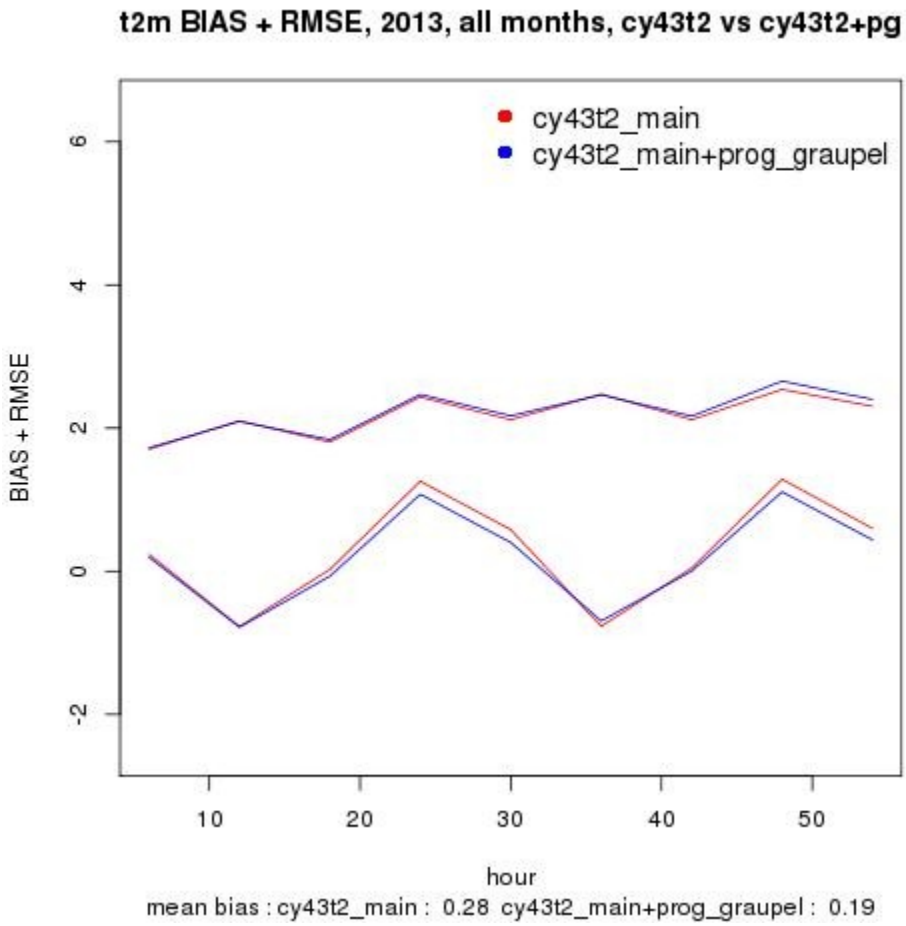
Domain for experiments.



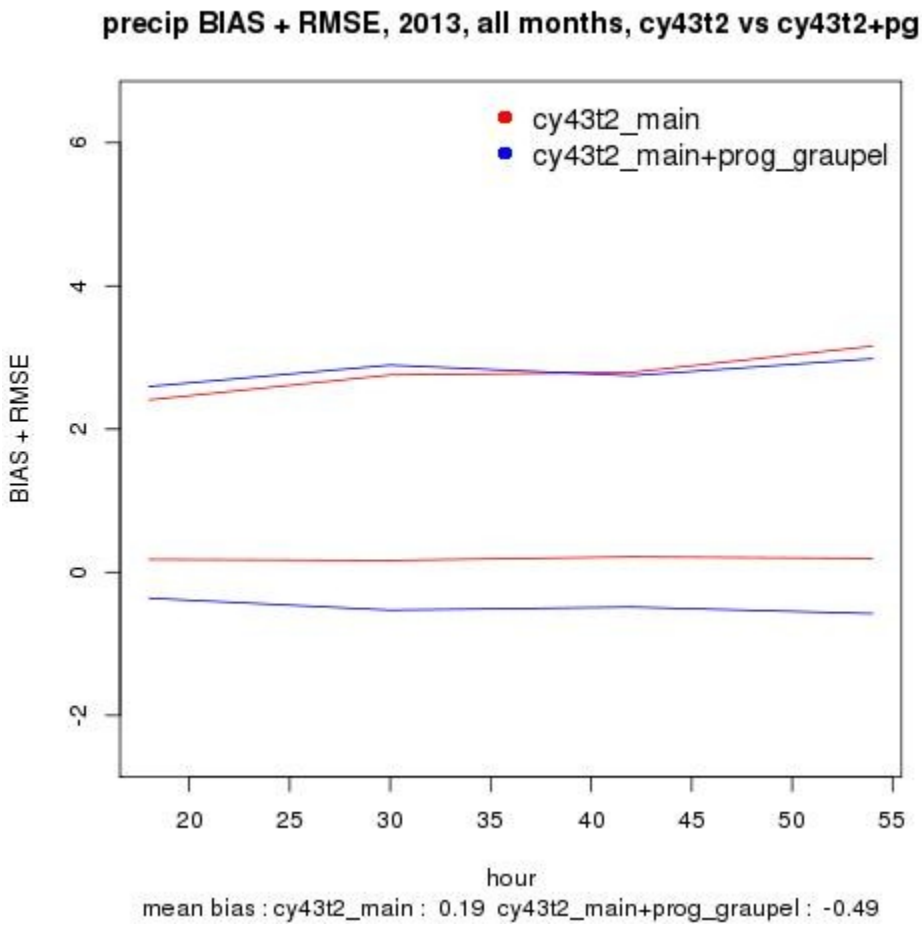
Synoptic stations used for verification



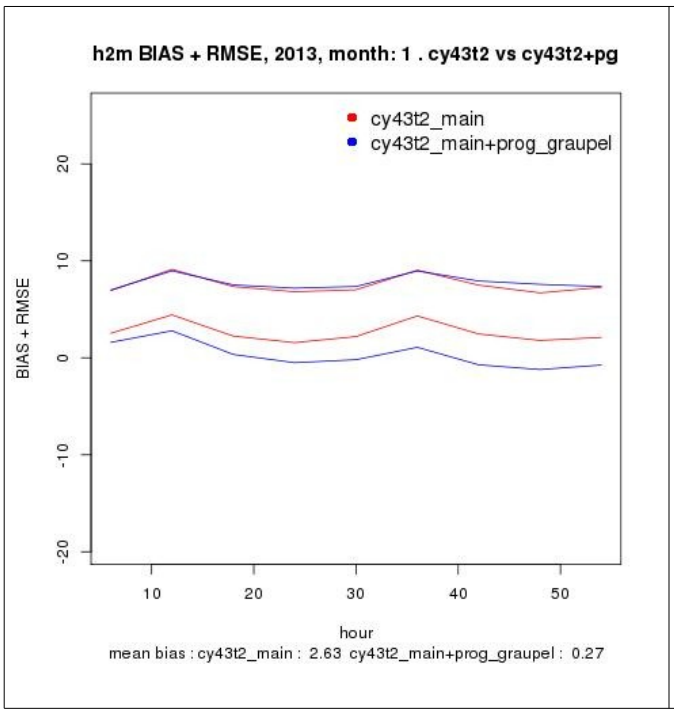
h2m scores for 2013

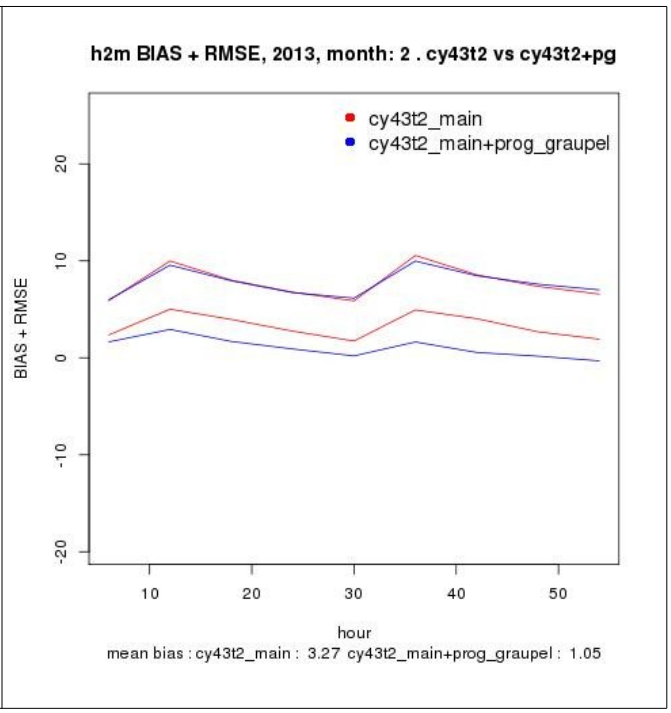


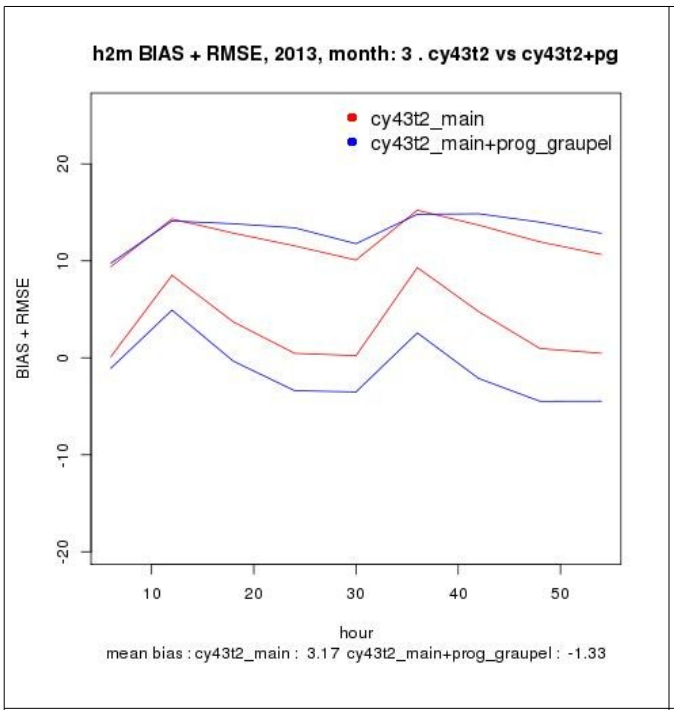
t2m scores for 2013

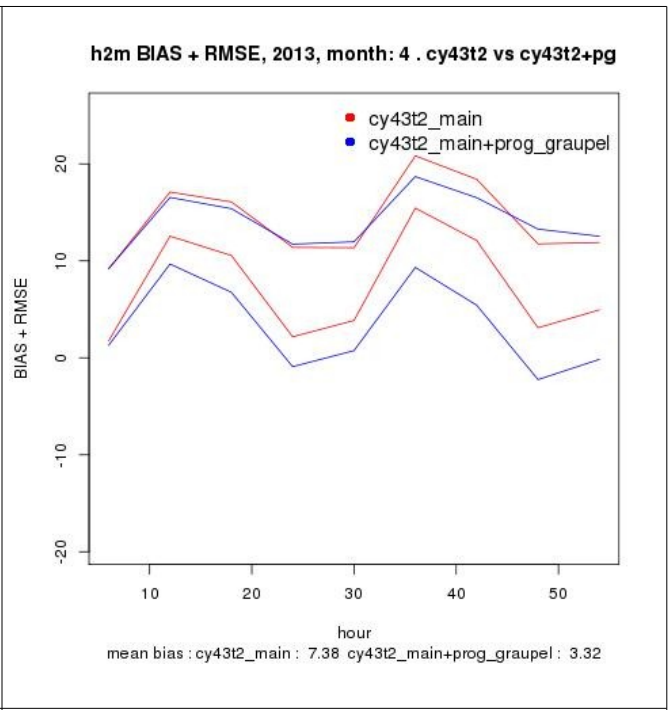


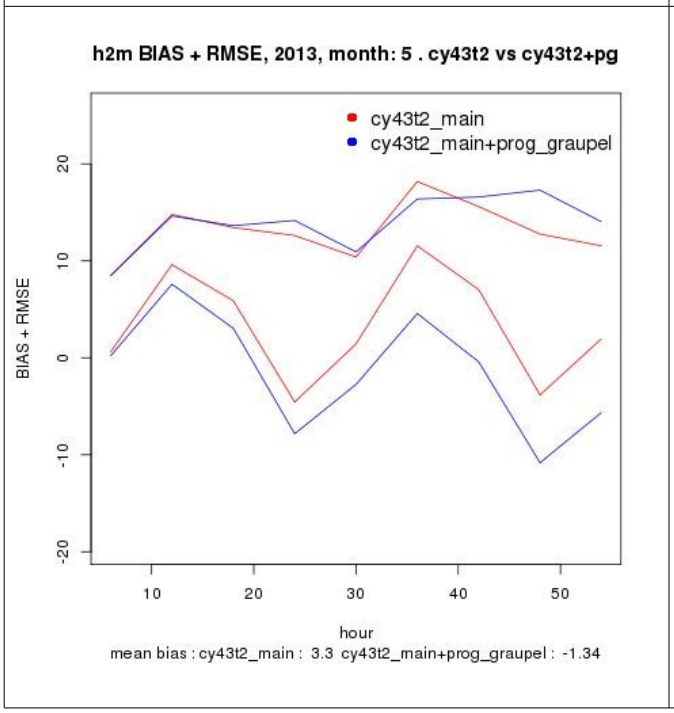
12 hours precipitation scores for 2013

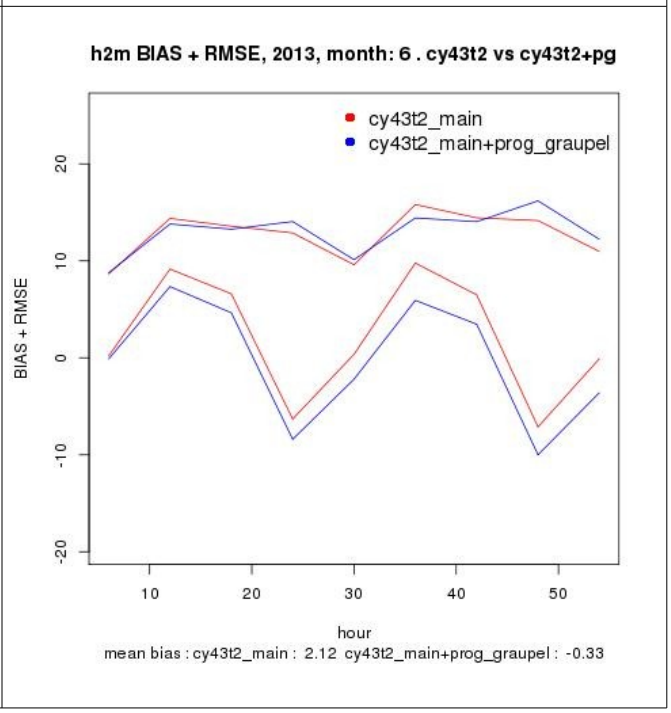

h2m BIAS + RMSE, 2013, month: 1 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
20
10
0
-10
-20
10
20
30
40
50
hour
mean bias : cy43t2_main : 2.63 cy43t2_main+prog_graupel : 0.27

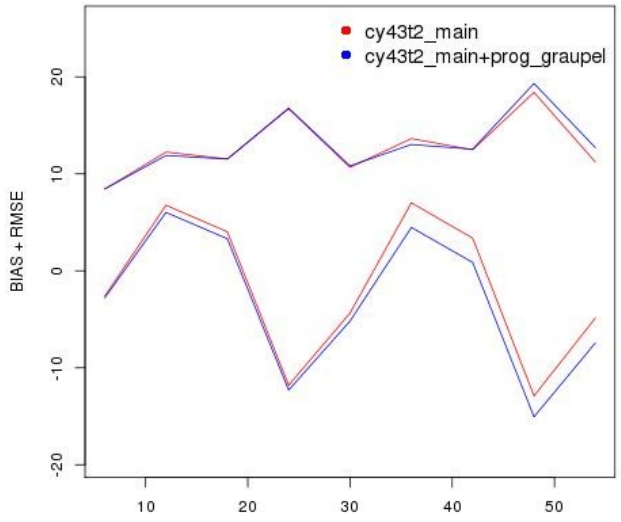

h2m BIAS + RMSE, 2013, month: 2 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
20
10
0
-10
-20
10
20
30
40
50
hour
mean bias : cy43t2_main : 3.27 cy43t2_main+prog_graupel : 1.05

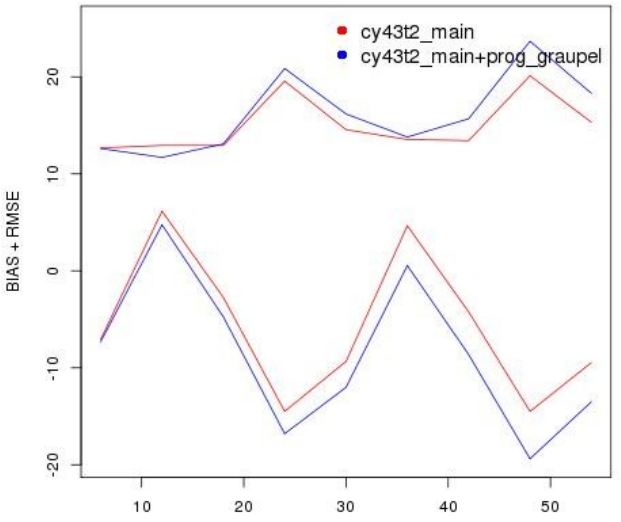

h2m BIAS + RMSE, 2013, month: 3 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 3.17 cy43t2_main+prog_graupel : -1.33

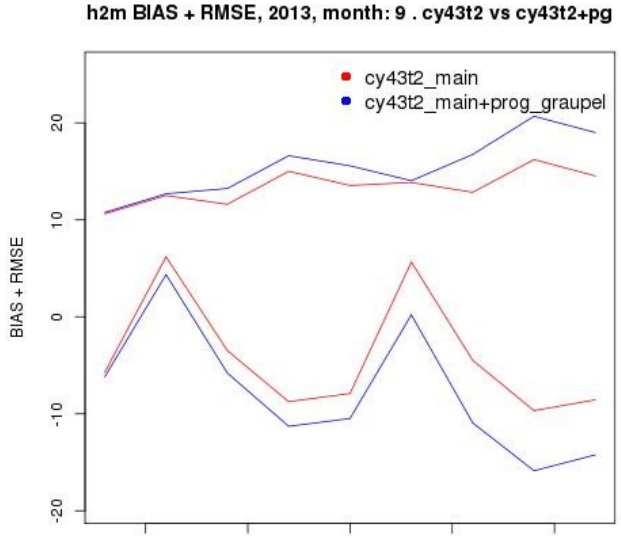

h2m BIAS + RMSE, 2013, month: 4 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 7.38 cy43t2_main+prog_graupel : 3.32

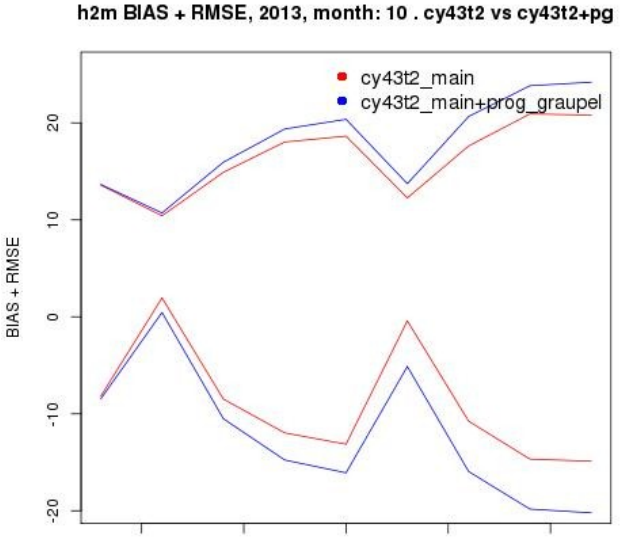

h2m BIAS + RMSE, 2013, month: 5 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 3.3 cy43t2_main+prog_graupel : -1.34

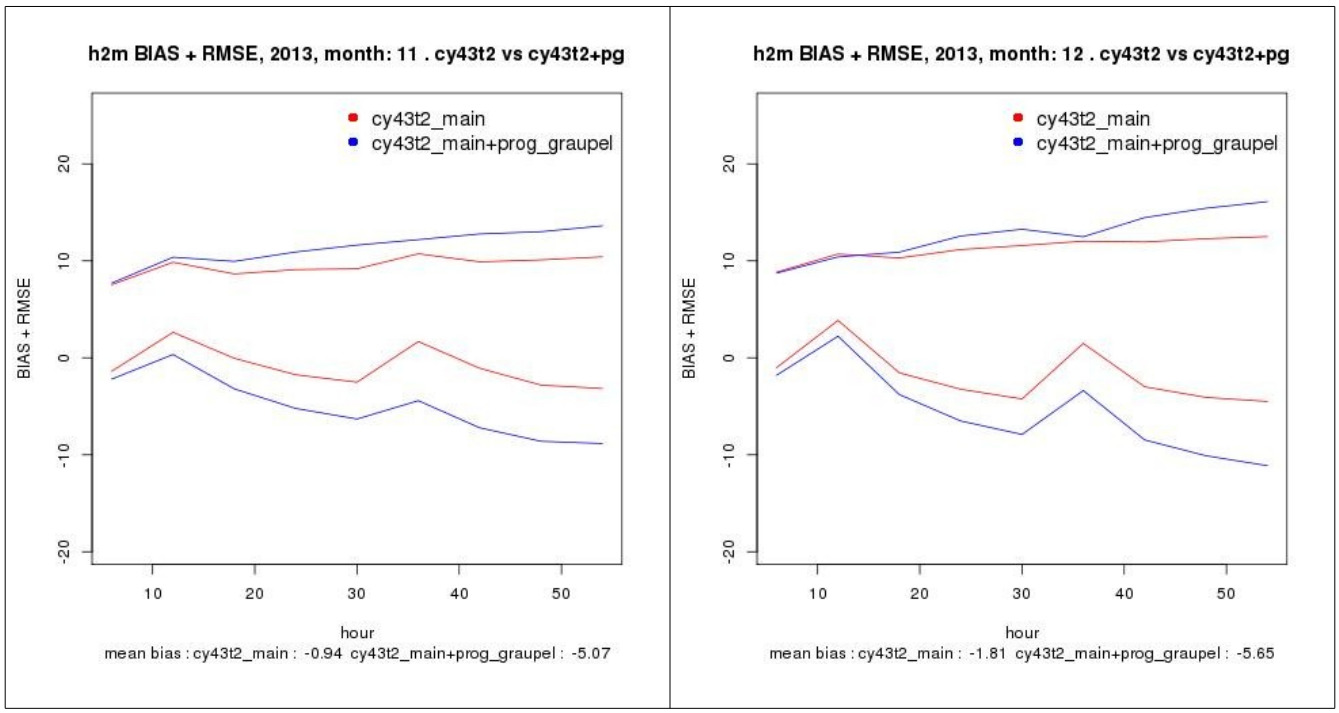

h2m BIAS + RMSE, 2013, month: 6 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 2.12 cy43t2_main+prog_graupel : -0.33


h2m BIAS + RMSE, 2013, month: 7 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -1.71 cy43t2_main+prog_graupel : -3.12

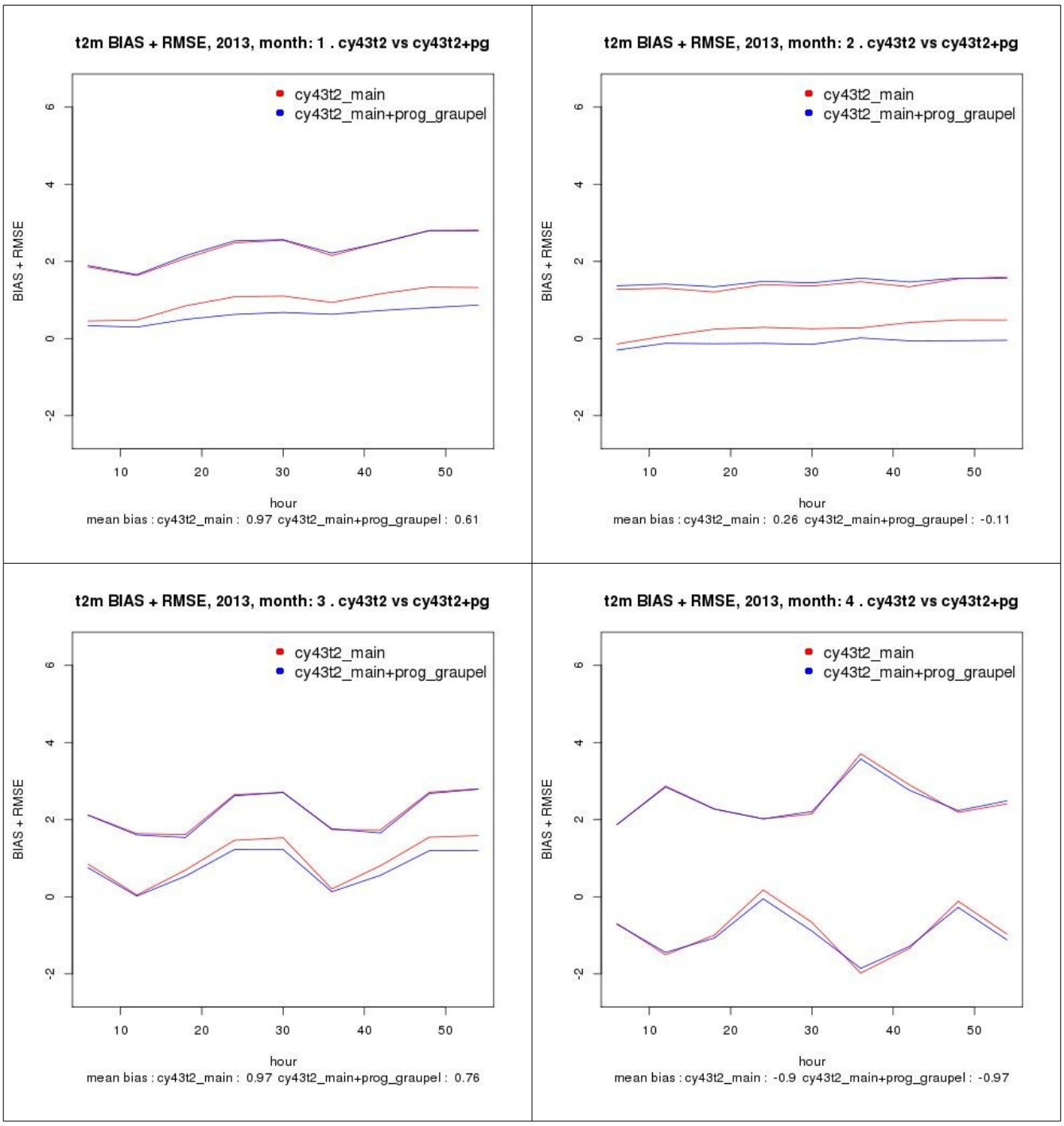

h2m BIAS + RMSE, 2013, month: 8 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -5.67 cy43t2_main+prog_graupel : -8.57

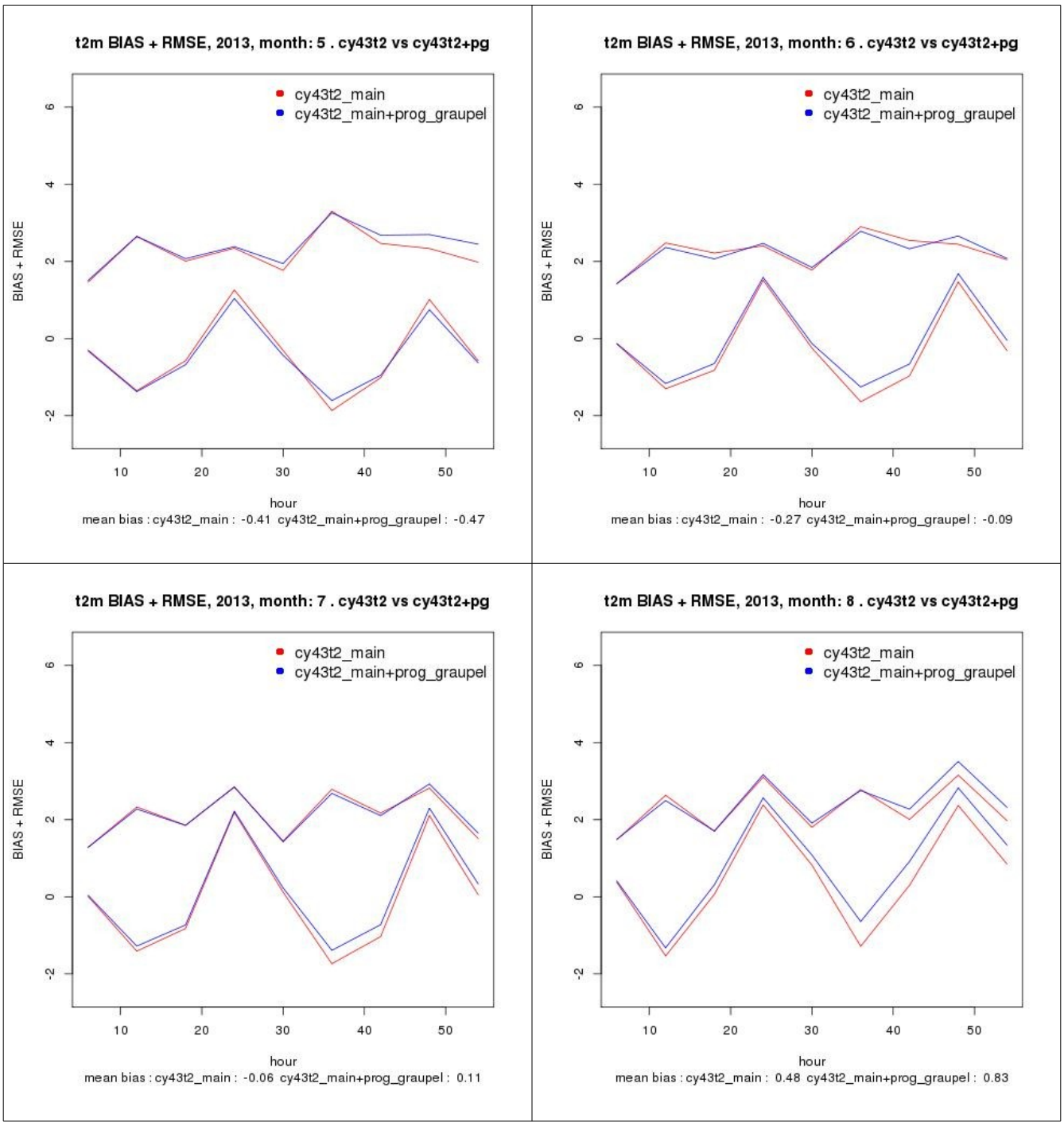

h2m BIAS + RMSE, 2013, month: 9 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -4.08 cy43t2_main+prog_graupel : -7.81

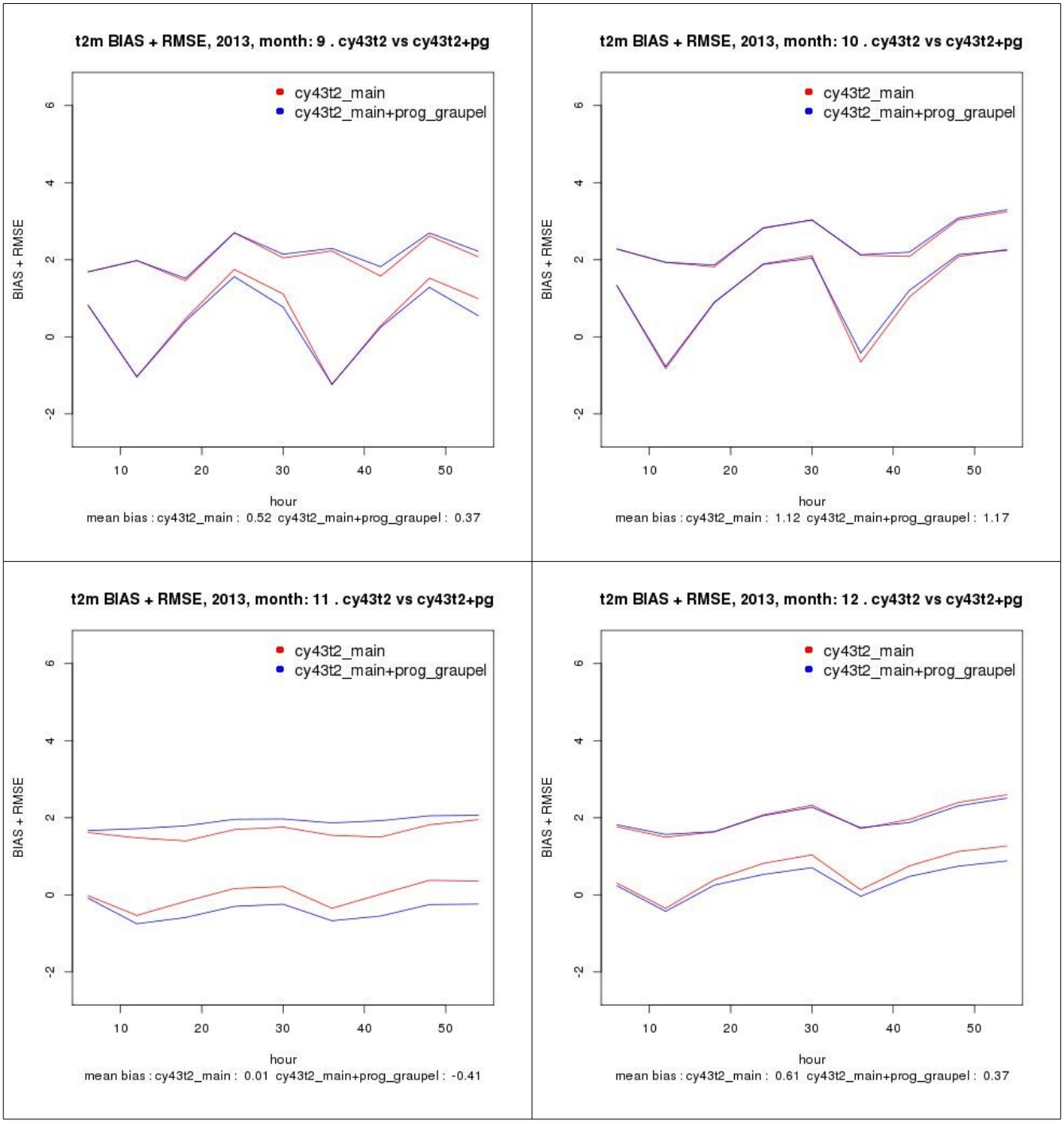

h2m BIAS + RMSE, 2013, month: 10 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -8.95 cy43t2_main+prog_graupel : -12.28



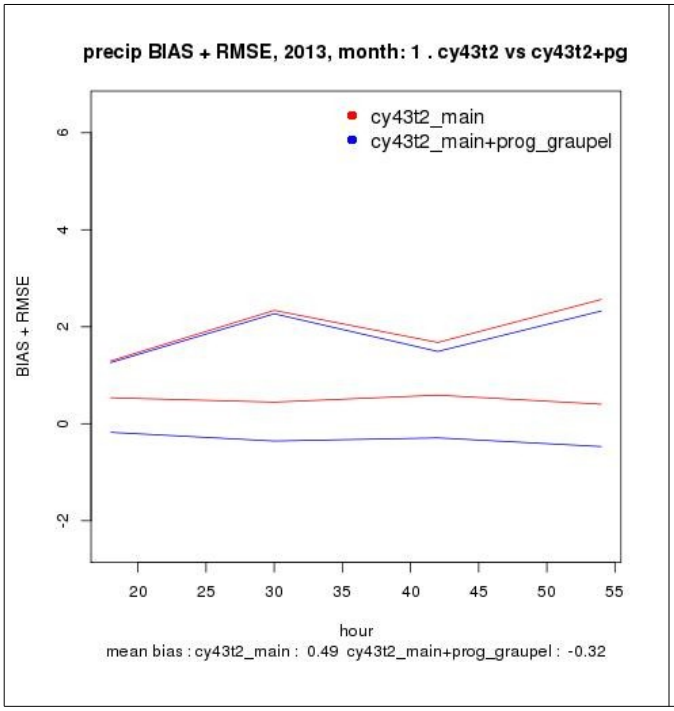
h2m scores for every month in 2013

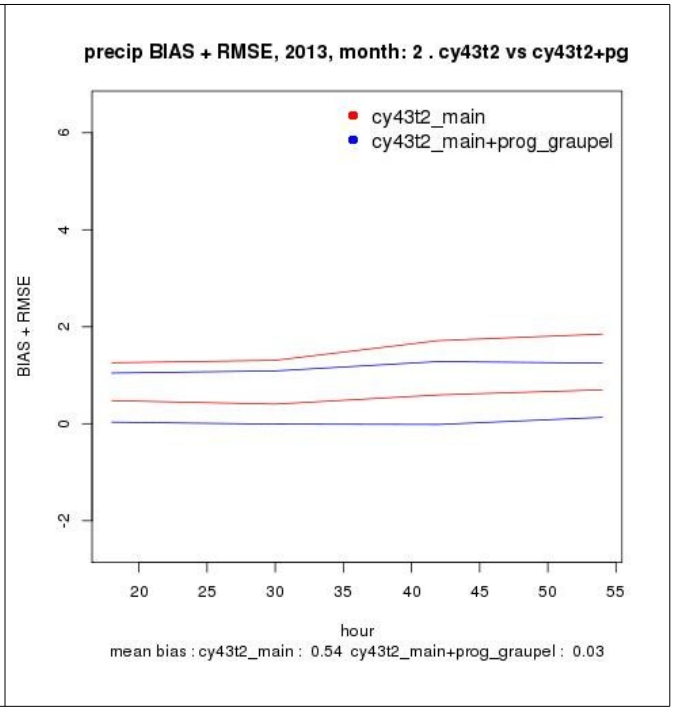

t2m BIAS + RMSE, 2013, month: 1 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.97 cy43t2_main+prog_graupel : 0.61
t2m BIAS + RMSE, 2013, month: 2 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.26 cy43t2_main+prog_graupel : -0.11
t2m BIAS + RMSE, 2013, month: 3 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.97 cy43t2_main+prog_graupel : 0.76
t2m BIAS + RMSE, 2013, month: 4 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.9 cy43t2_main+prog_graupel : -0.97

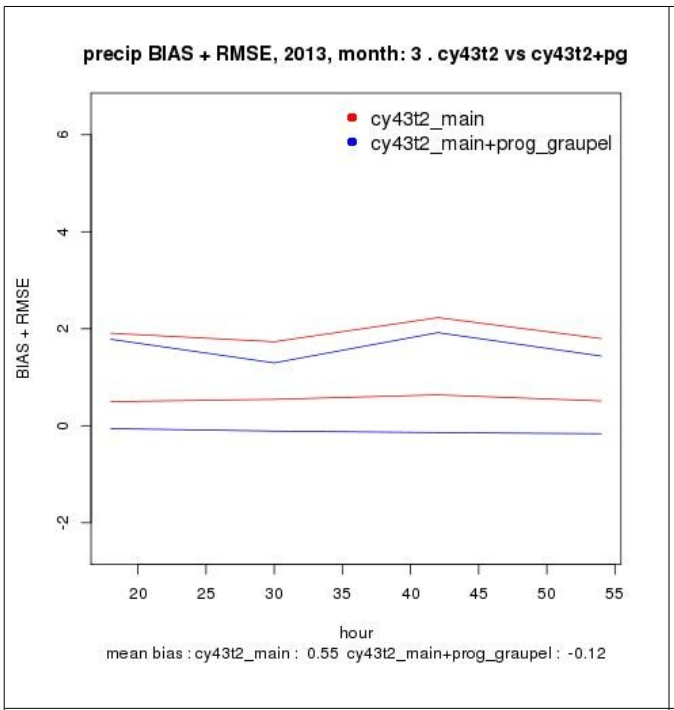

t2m BIAS + RMSE, 2013, month: 5 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.41 cy43t2_main+prog_graupel : -0.47
t2m BIAS + RMSE, 2013, month: 6 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.27 cy43t2_main+prog_graupel : -0.09
t2m BIAS + RMSE, 2013, month: 7 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.06 cy43t2_main+prog_graupel : 0.11
t2m BIAS + RMSE, 2013, month: 8 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.48 cy43t2_main+prog_graupel : 0.83

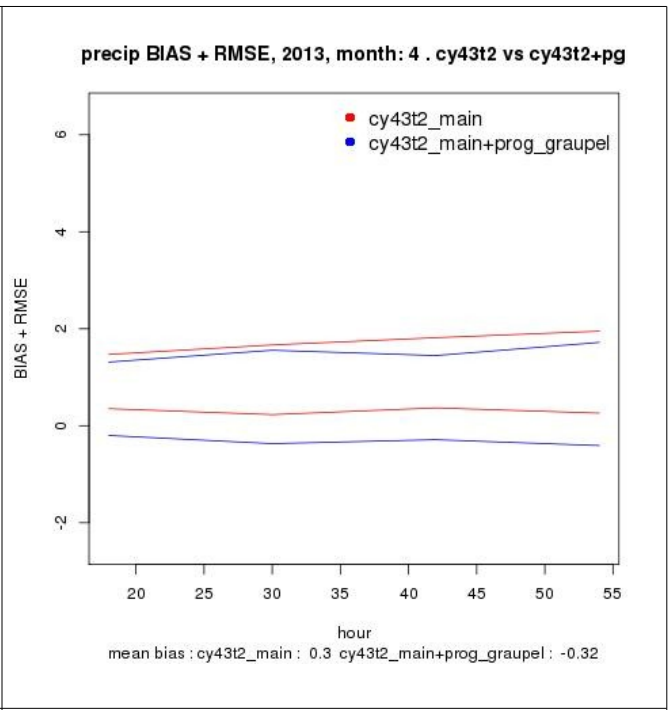


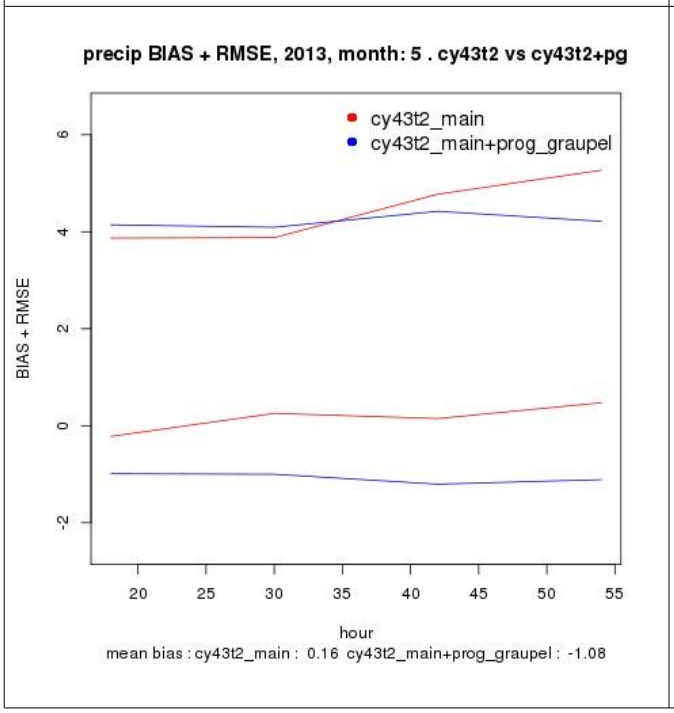
t2m scores for every month in 2013

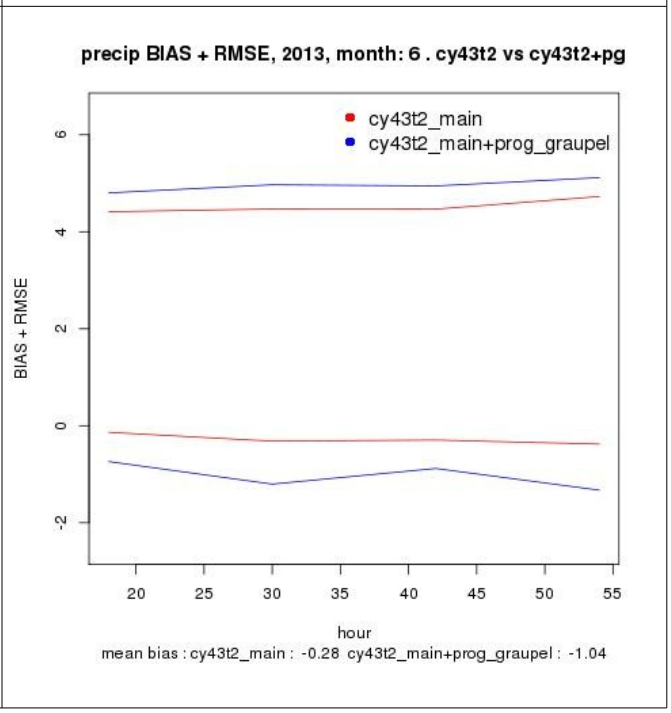

precip BIAS + RMSE, 2013, month: 1 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.49 cy43t2_main+prog_graupel : -0.32

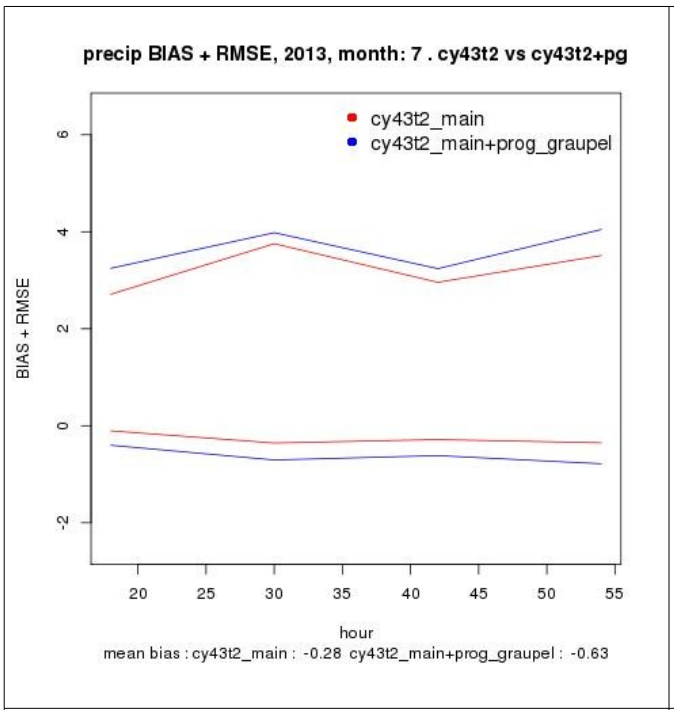

precip BIAS + RMSE, 2013, month: 2 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.54 cy43t2_main+prog_graupel : 0.03

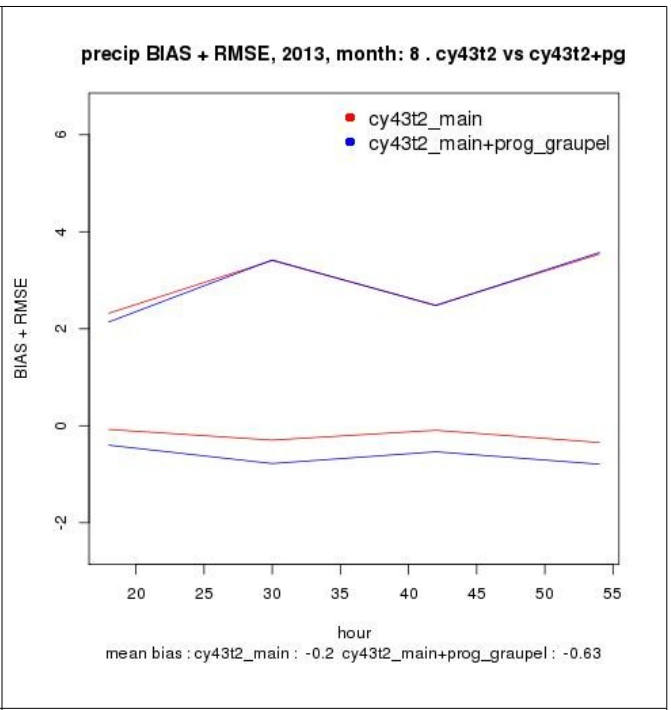

precip BIAS + RMSE, 2013, month: 3 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.55 cy43t2_main+prog_graupel : -0.12

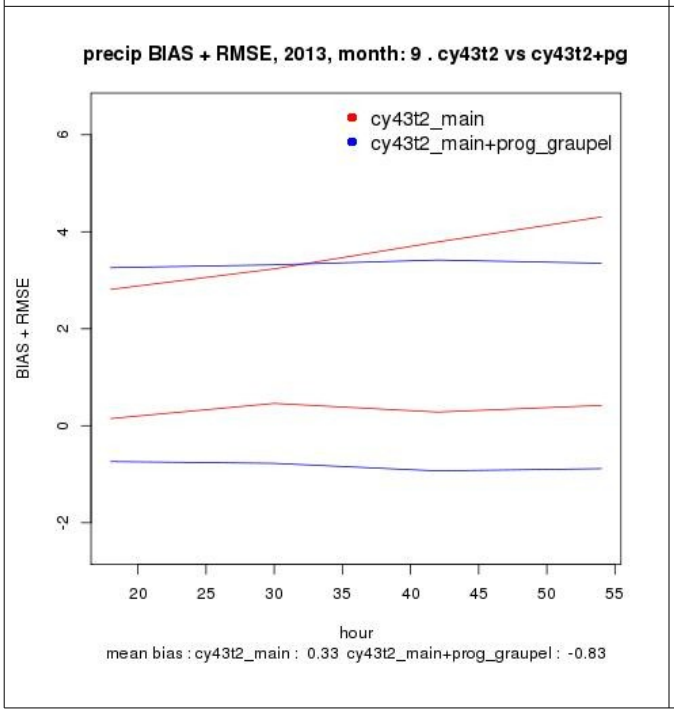

precip BIAS + RMSE, 2013, month: 4 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.3 cy43t2_main+prog_graupel : -0.32

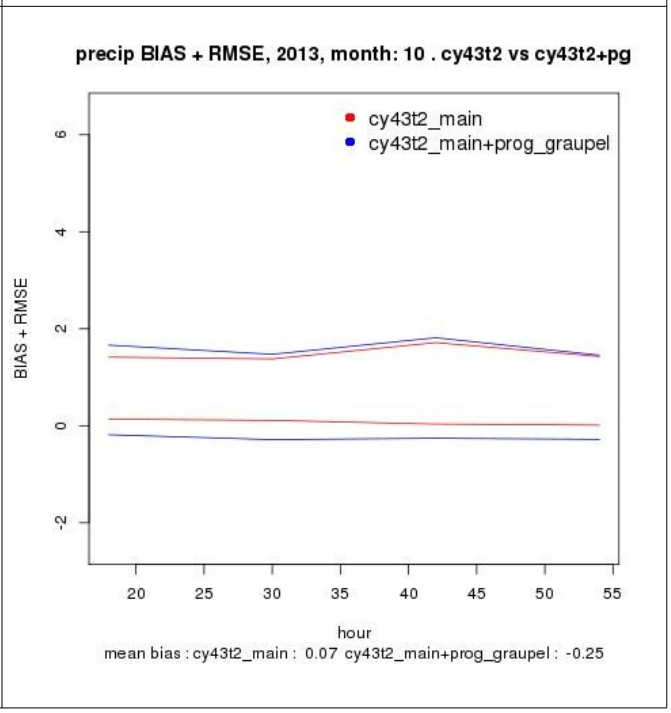

precip BIAS + RMSE, 2013, month: 5 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.16 cy43t2_main+prog_graupel : -1.08

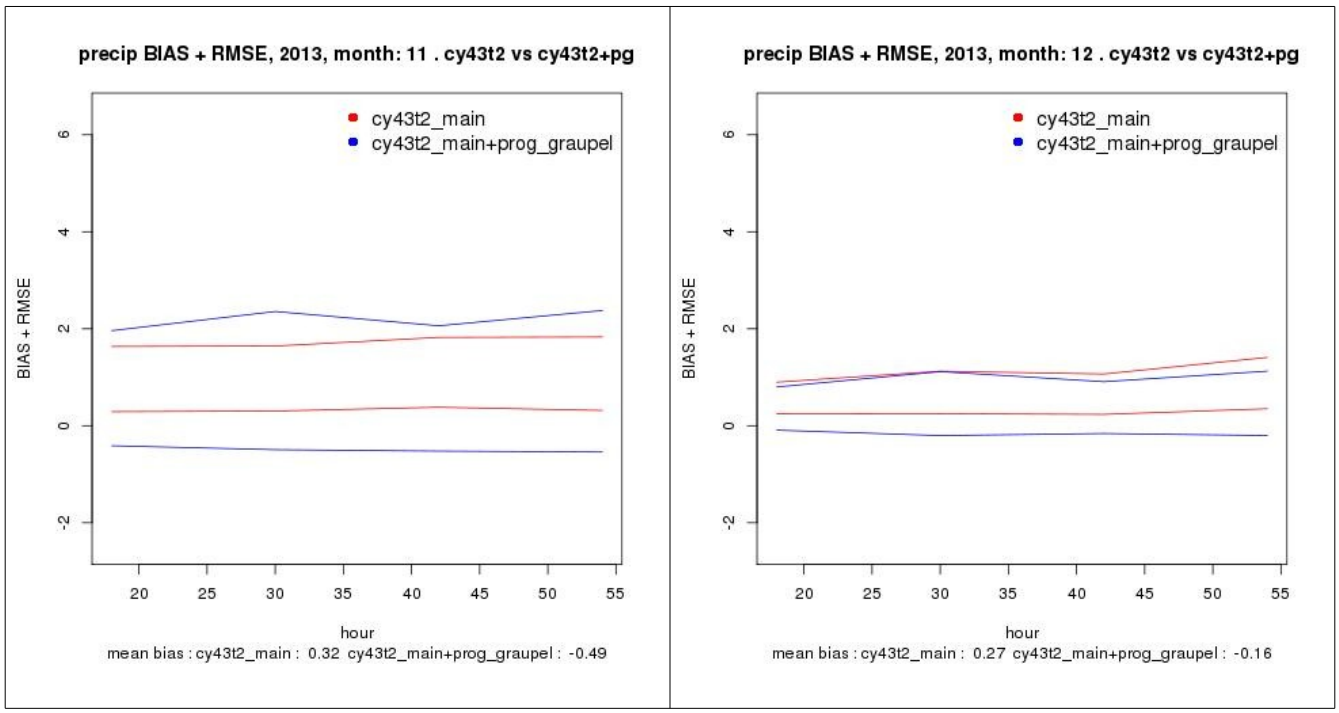

precip BIAS + RMSE, 2013, month: 6 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.28 cy43t2_main+prog_graupel : -1.04


precip BIAS + RMSE, 2013, month: 7 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.28 cy43t2_main+prog_graupel : -0.63


precip BIAS + RMSE, 2013, month: 8 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : -0.2 cy43t2_main+prog_graupel : -0.63


precip BIAS + RMSE, 2013, month: 9 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.33 cy43t2_main+prog_graupel : -0.83


precip BIAS + RMSE, 2013, month: 10 . cy43t2 vs cy43t2+pg
cy43t2_main
cy43t2_main+prog_graupel
BIAS + RMSE
hour
mean bias : cy43t2_main : 0.07 cy43t2_main+prog_graupel : -0.25



12 hours precipitation scores for every month in 2013