ALARO-1 Experience in TURKISH STATE METEOROLOGICAL SERVICE

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ALARO Working Days
12-14 September 2016, Brussels, Belgium

CONTENT

- ALARO-1 at TSMS
- Verification reports
- Case Study-1 (Flash Flood)
- Case Study-2 (Helicopter Crash)

Operational Use of ALARO-1 at TSMS

Operational Model (cy40t1bf05)

- Resolution : 4.5km/60L (655x355)
- Runs : 00/06/12 (72hrs), 18(60hrs)
- Time Step : 180sec
- Coupling : ARPEGE
- Orography : Mean
- Grid : Linear
- No Assimilation

HPC Systems at TSMS

SGI Altix 4700

- 512 core based Intel Itanium2 each at 1.67 GHz.
- Total Peak performance 3.4 TFlops
- Total memory 1 TB
- 2 Login, 2 Services Nodes and
  3 Xeon based postprocessing Nodes
- 30 TB Disk Storage

SGI UV 2000

- 256 core based Intel Xeon E5
  each at 2.4 GHz.
- Total Peak performance 2.5 Tflops

New HPC (2017)

- At least 4000 compute core (X86_64)

Observation Network

1237 AWOS

+

72 Airport AWOS

+

78 Marine AWOS

=

1387 AWOS

15 C-Band Radar

1 X-Band Radar

2 Marine Radar

+

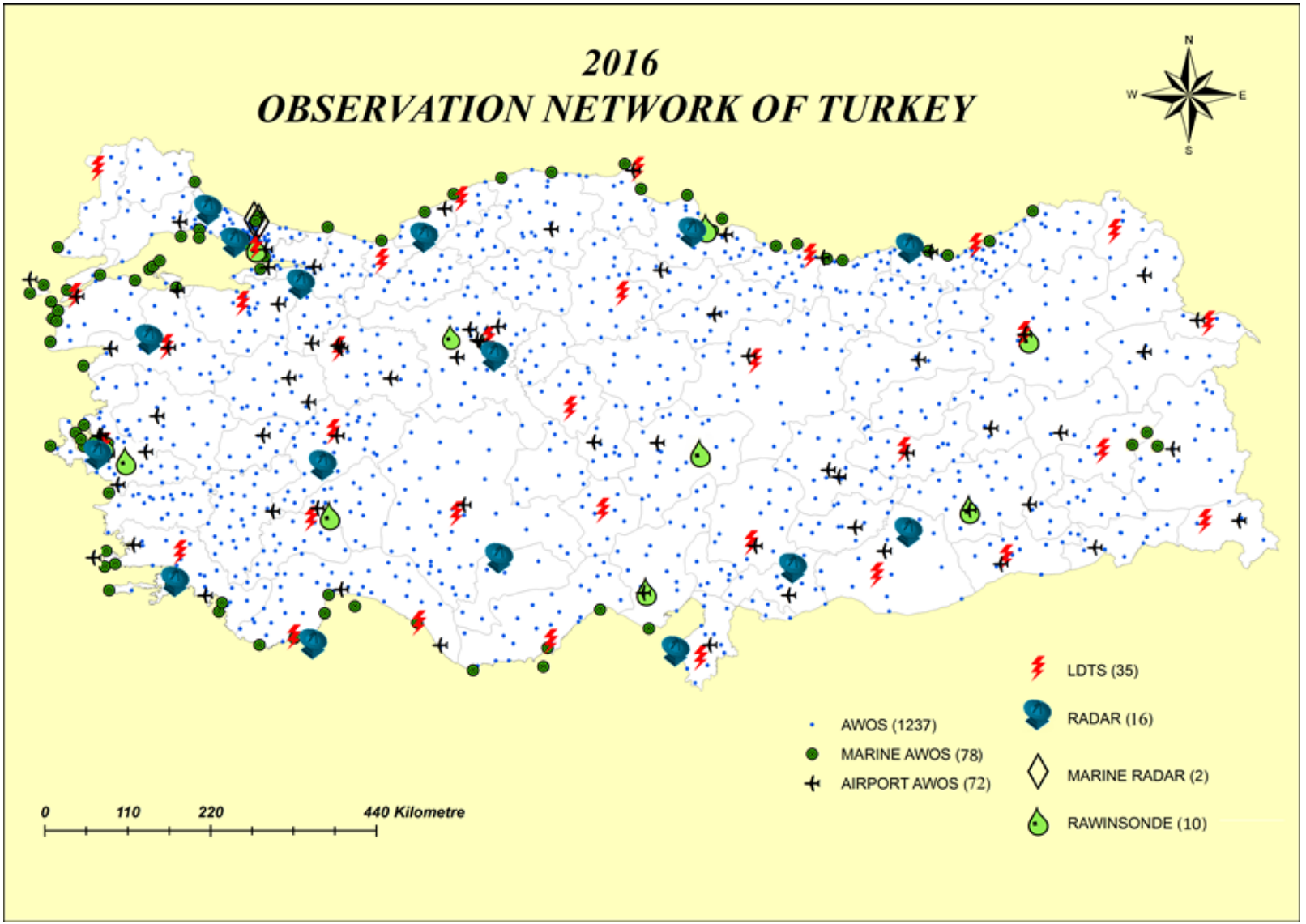
10 Upper Air Station

+

35 LDS

=

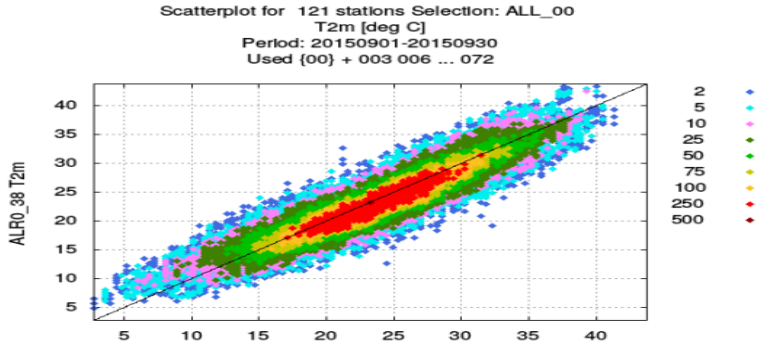
1450 Observation Systems

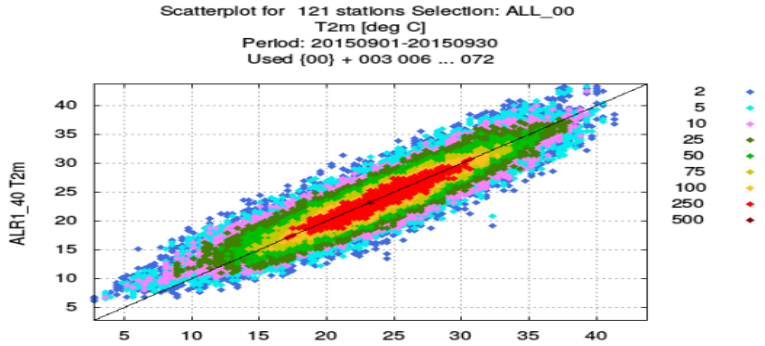

2016
OBSERVATION NETWORK OF TURKEY
N
W
E
S
LDTS (35)
RADAR (16)
MARINE RADAR (2)
RAWINSONDE (10)
AWOS (1237)
MARINE AWOS (78)
AIRPORT AWOS (72)
0
110
220
440 Kilometre

Verification Reports

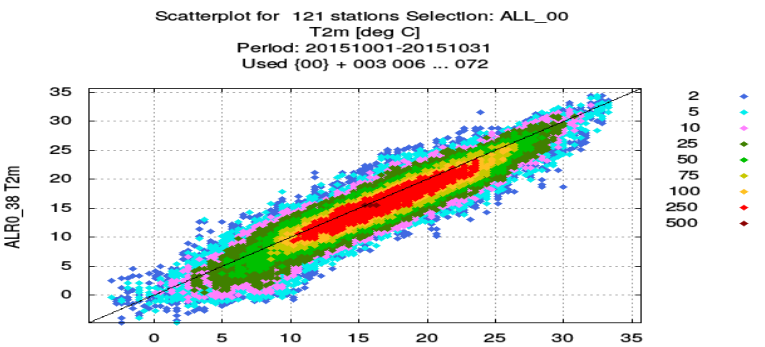
AUTUMN SEASON (T2)

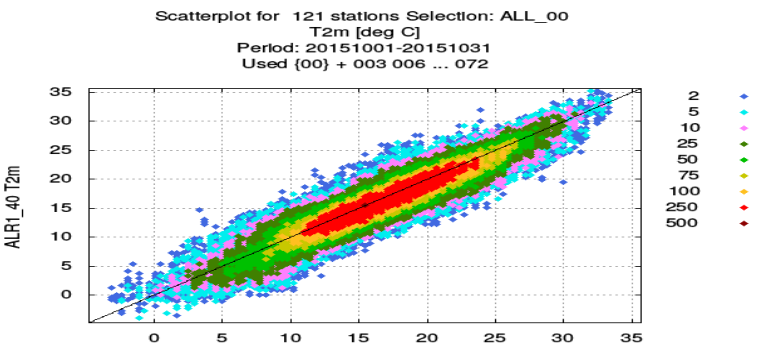
September



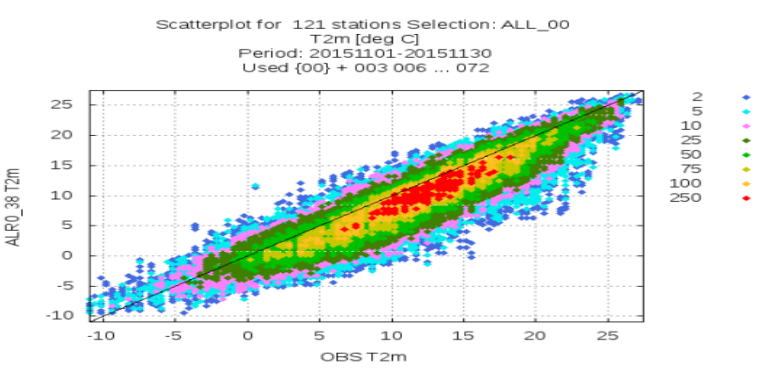


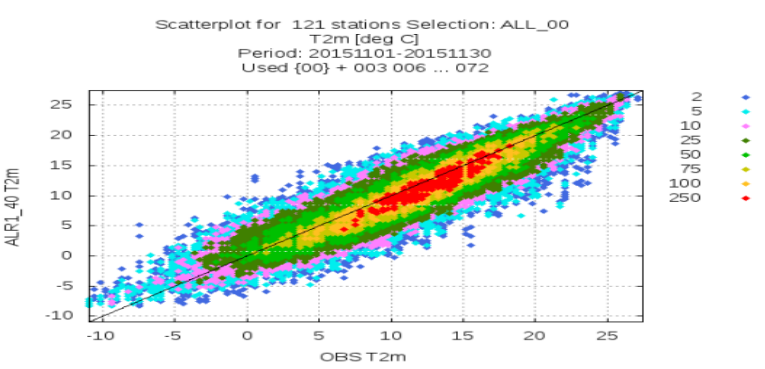
October





November





Verification Reports

During Autumn Season,

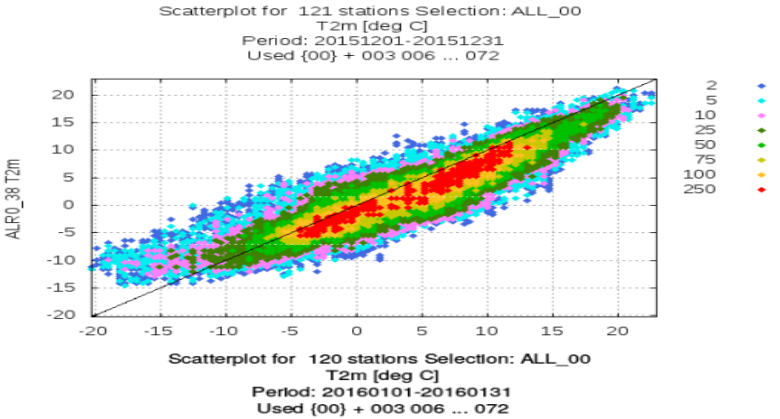
- For ALR0 Cy38, the general trend forecasting of T2 is underestimate. With decreasing temperature, ALR0 Cy38 is getting overestimate more.

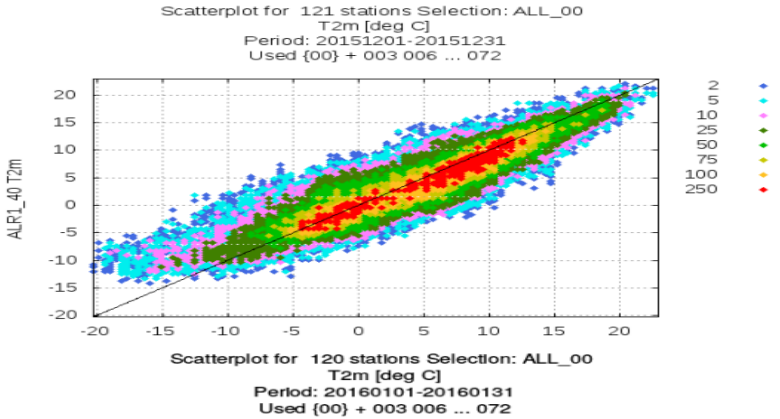
- In ALR1 Cy40, T2 values are higher than T2 in ALR0 Cy38 and shows more fix scatter graphs.

Verification Reports

WINTER SEASON (T2)

December





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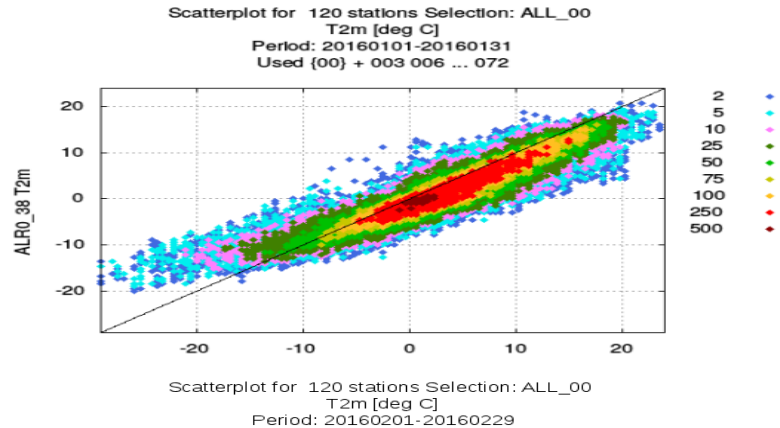
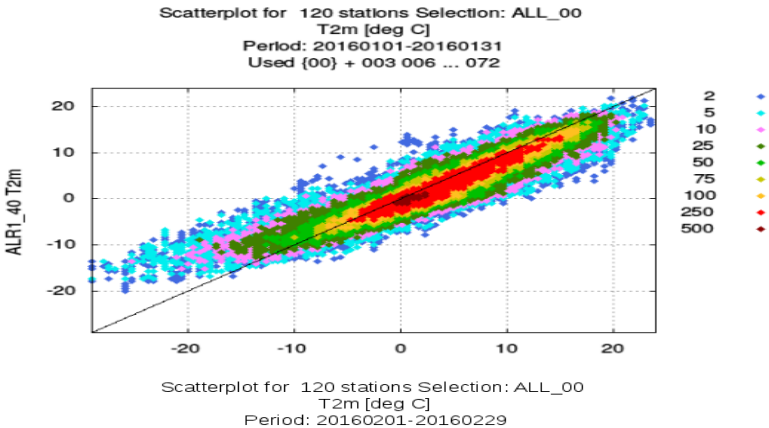
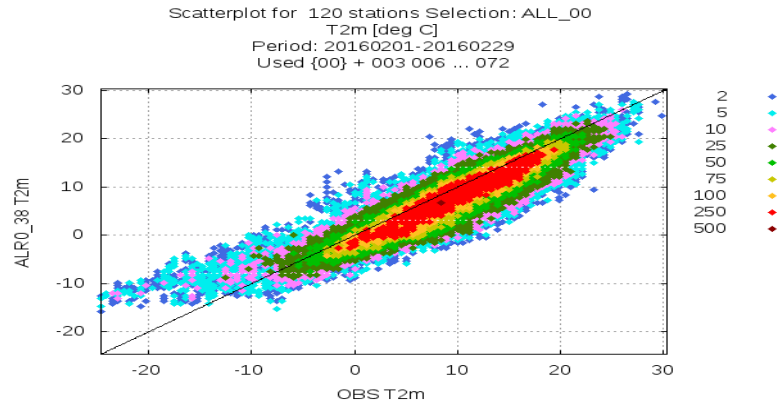
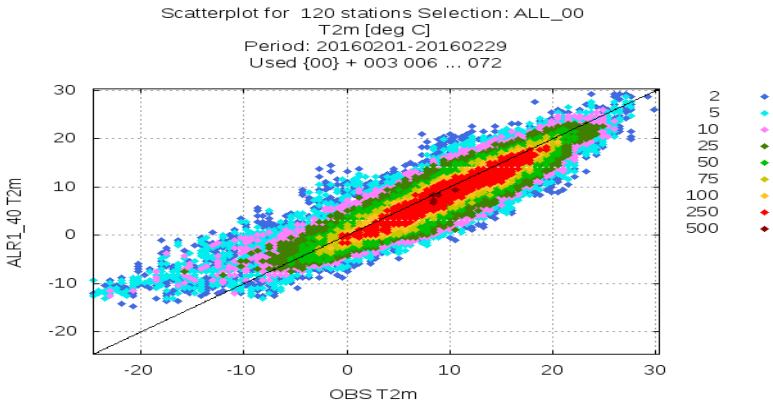




February





Verification Reports

During Winter Season,

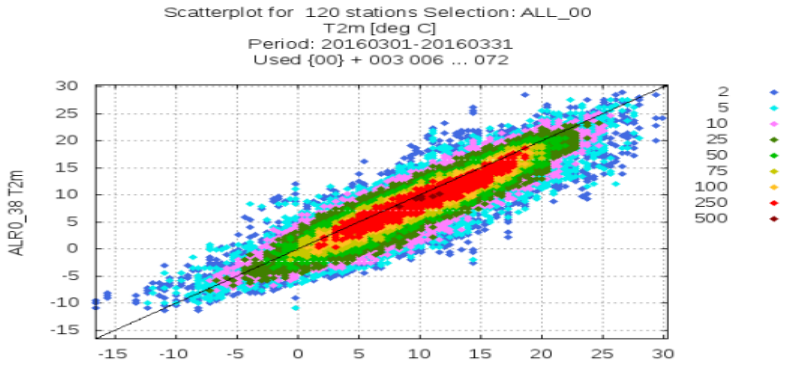
- ALR0 and ALR1 both illustrate overestimate results for T2 where it is under zero degree.

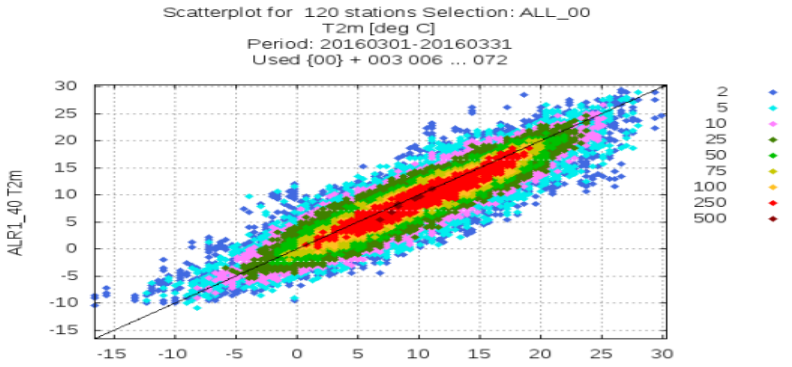
- In both case, while temperature is getting lower, its prediction is getting higher and shows grossly overestimate results.

Verification Reports

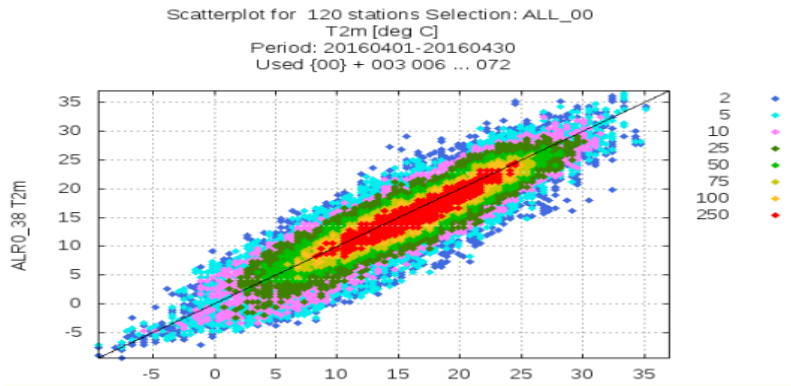
SPRING SEASON (T2)

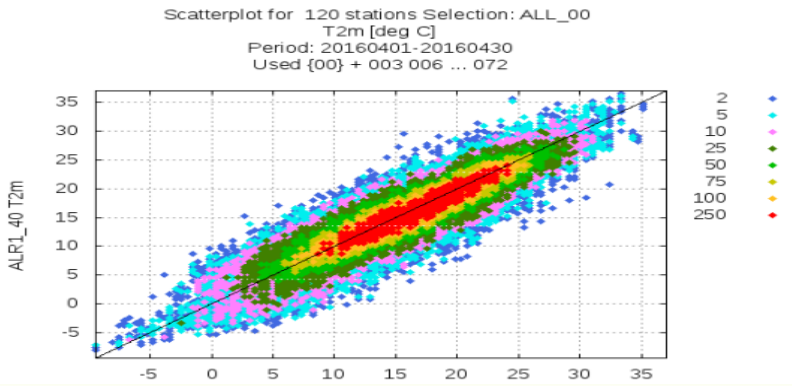
March



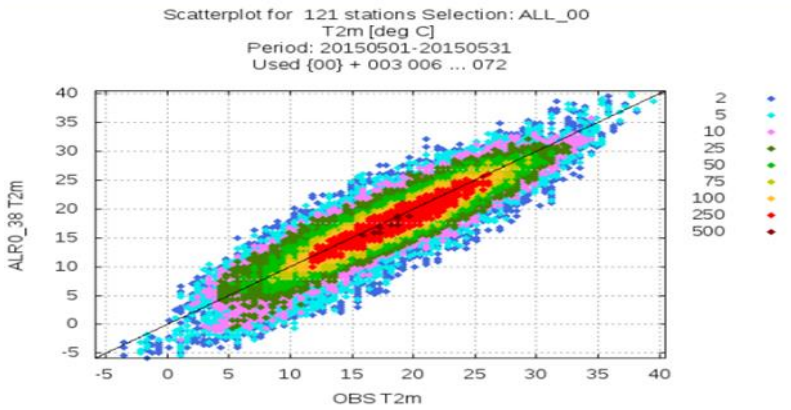


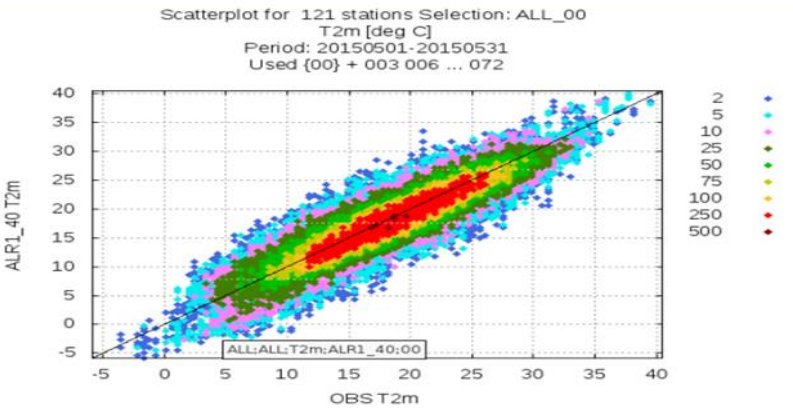
April





May





Verification Reports

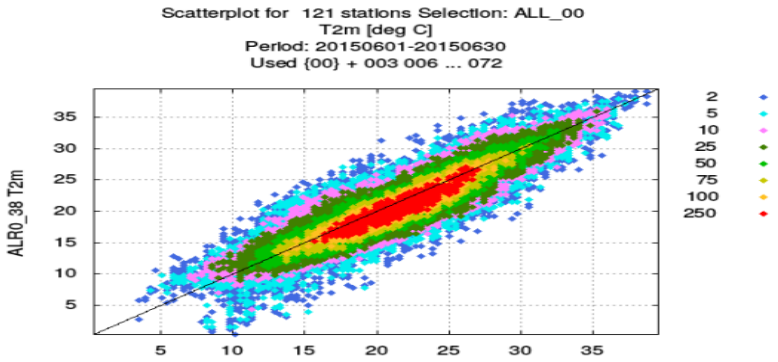
During Spring Season,

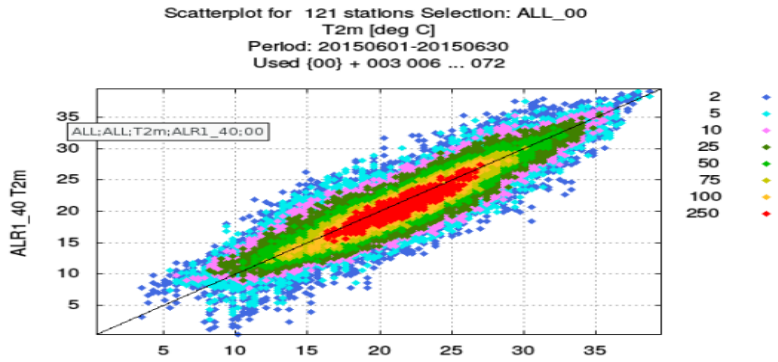
- There is no big difference between ALR0 and ALR1.
- In May, both models show similar trend by underestimating low temperatures.

Verification Reports

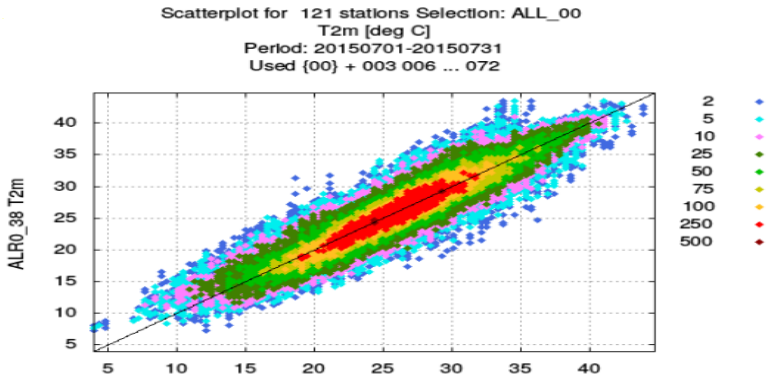
SUMMER SEASON (T2)

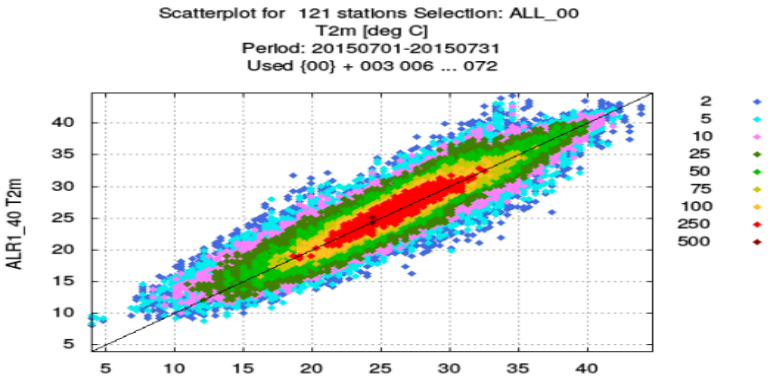
June



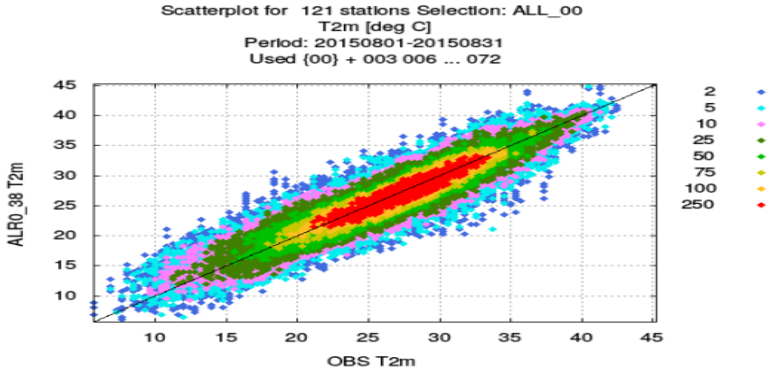


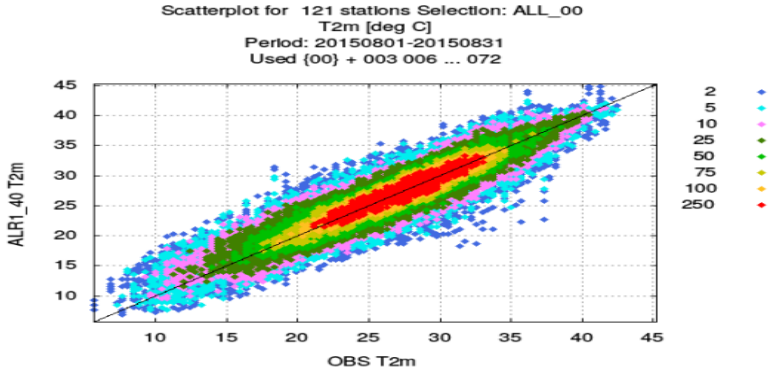
July





August

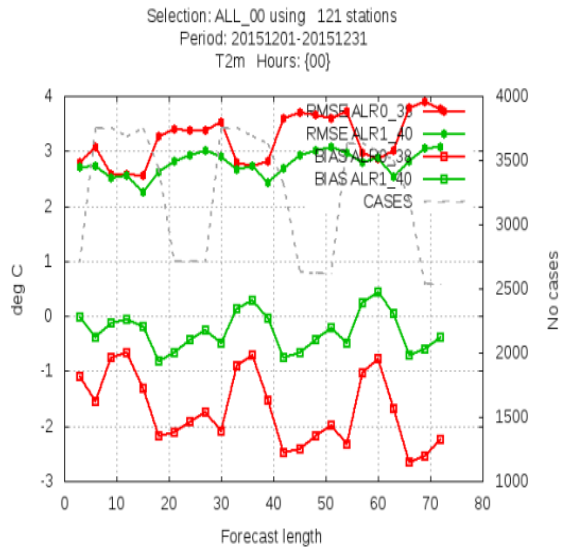


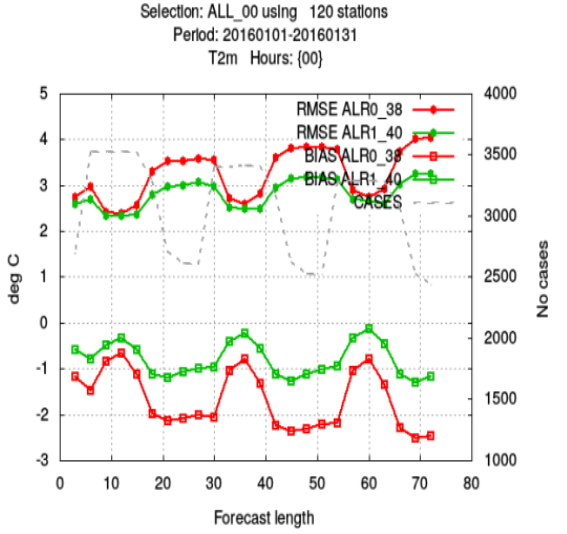


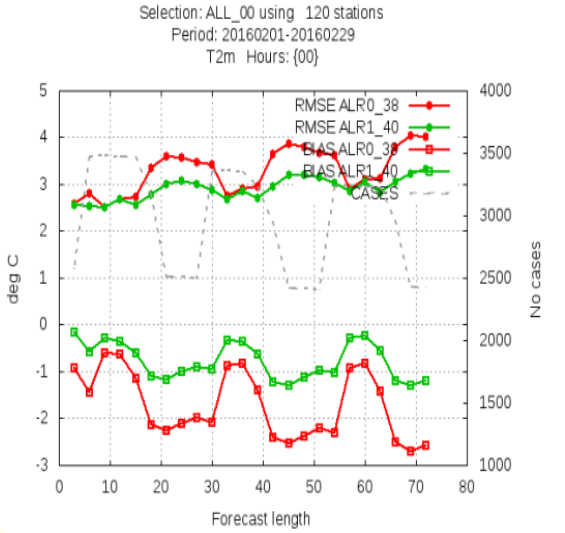
Verification Reports

WINTER&SUMMER SEASON (T2) RMSE & BIAS

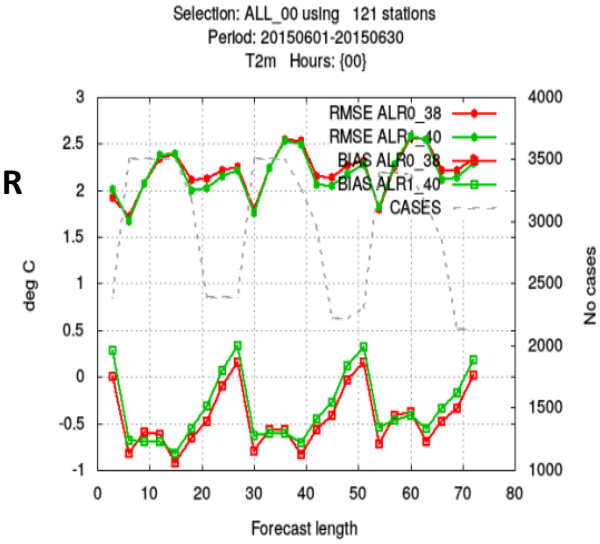
WINTER

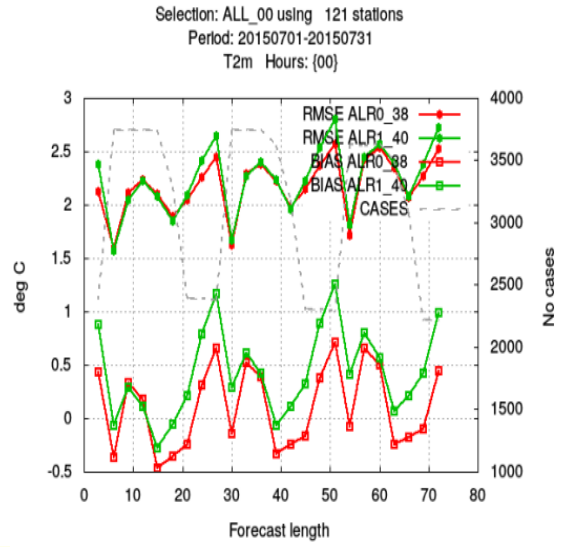


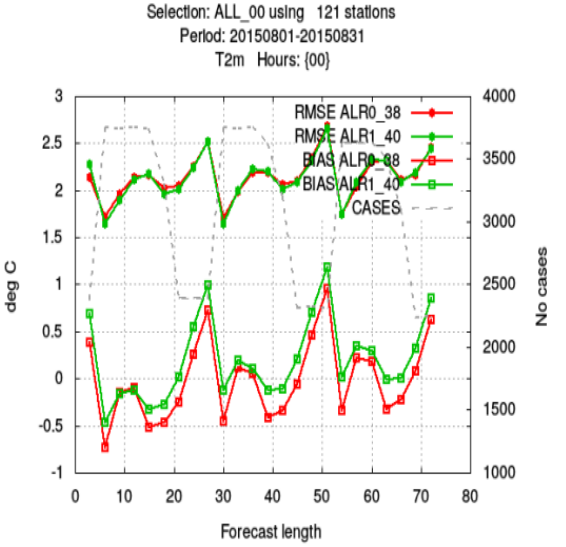




SUMMER







Results

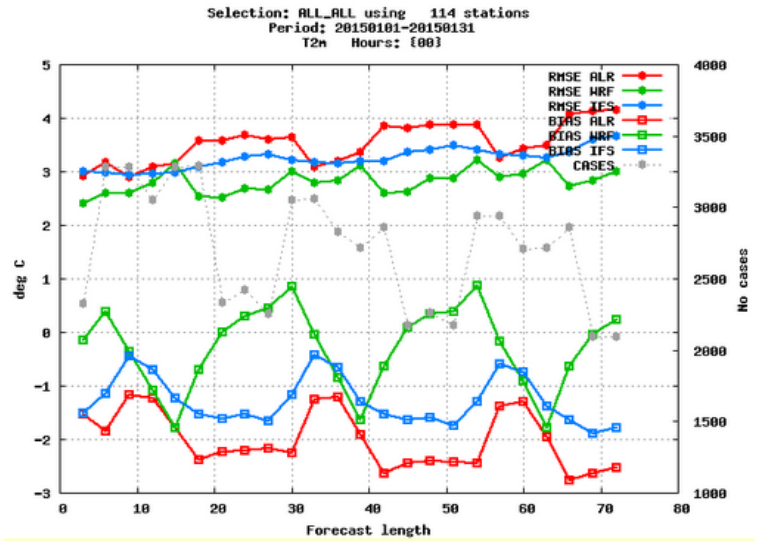
- ALR1 has better BIAS and RMSE results than ALR0.

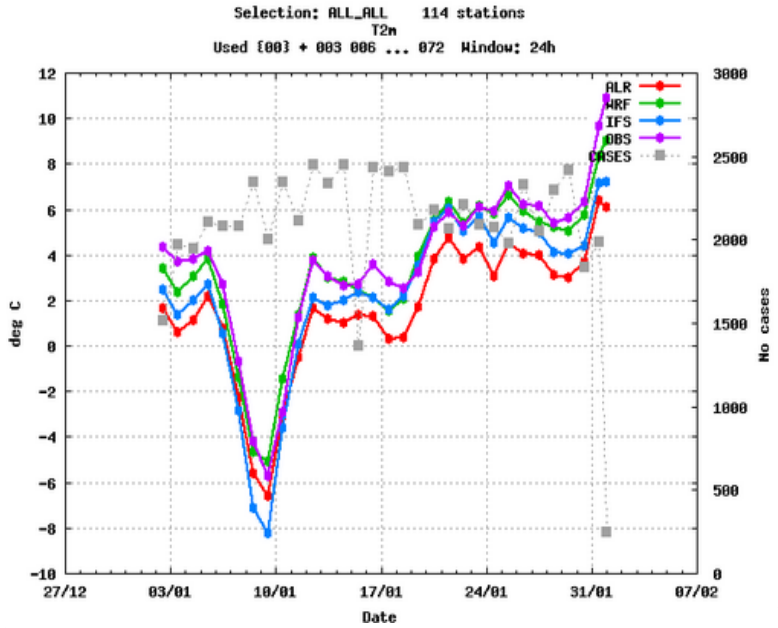
- During winter, the differences between errors of two models are greater than during summer.

- Regarding the daily period, during night time ALR0 errors diverges from ALR1 ones by getting worst. (in the night time the number of observations decrease)

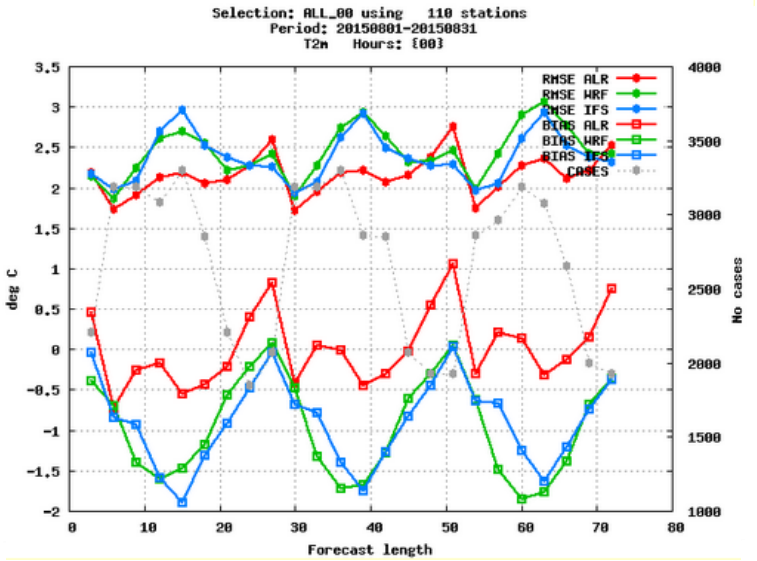
Verification Reports

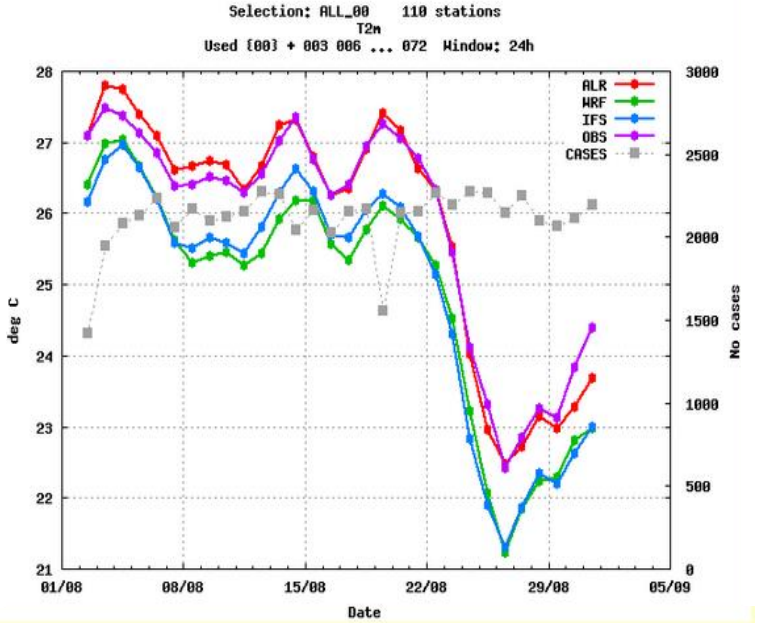
T2 (January)





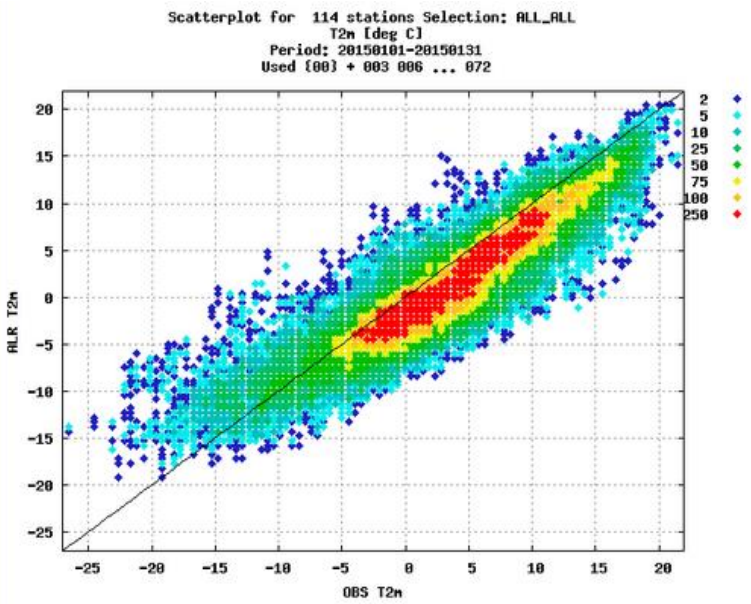
T2 (August)

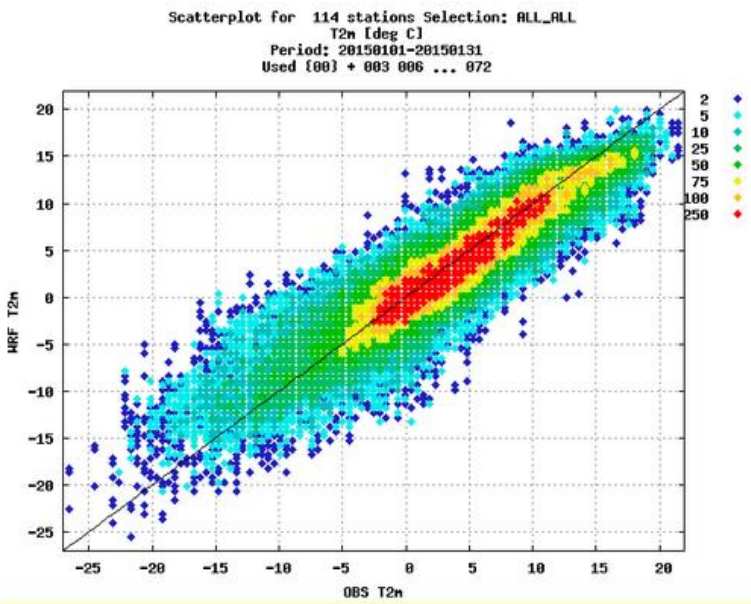




T2 (January)

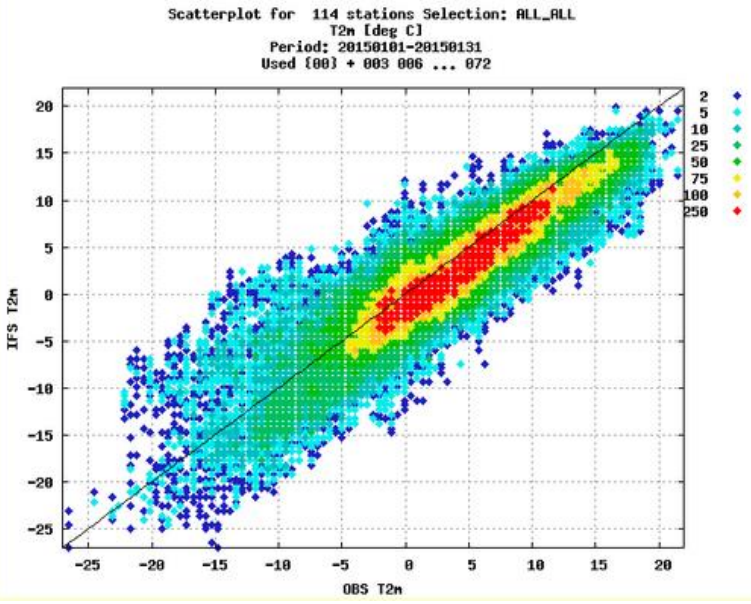
ALR





WRF

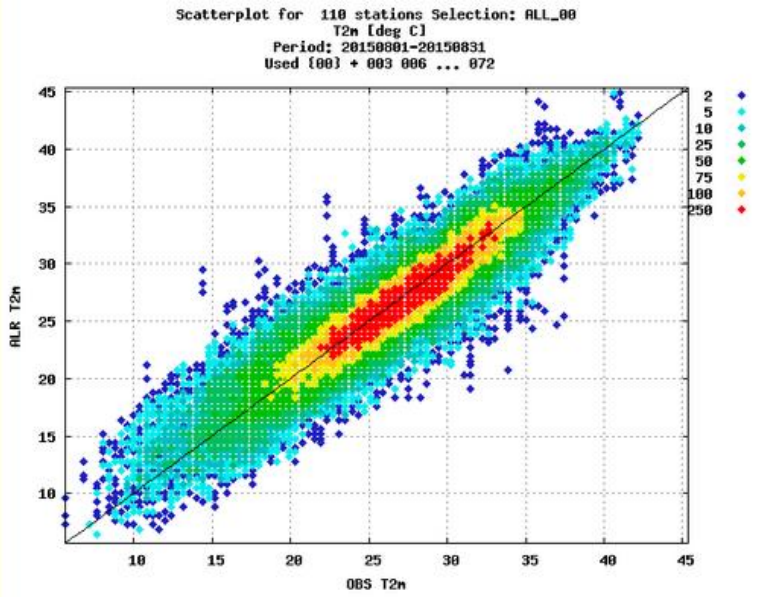
IFS



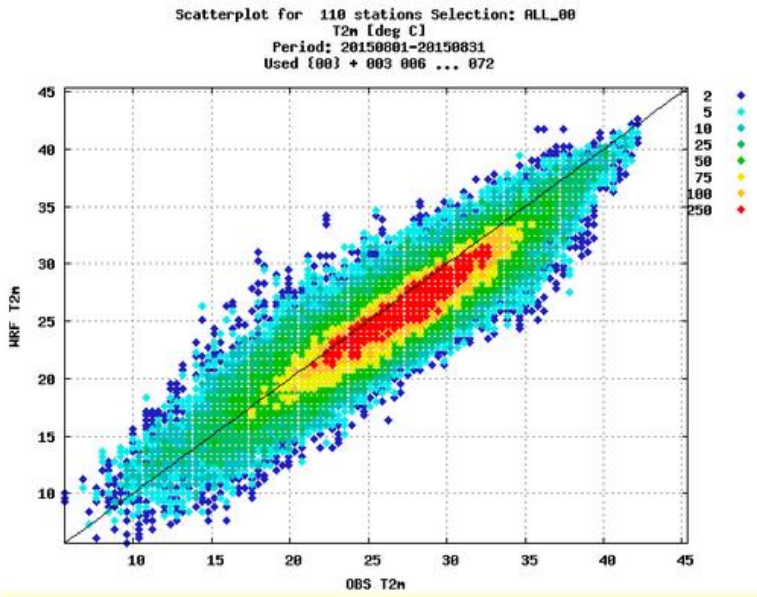
In winter; ALR, IFS and WRF show overestimate results under zero degree. In general WRF is slightly better than others.

T2 (August)

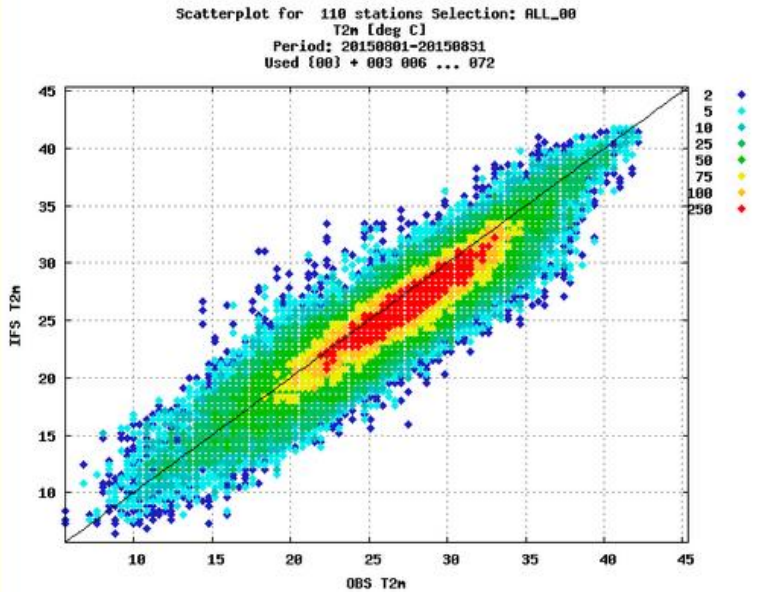
ALR



WRF

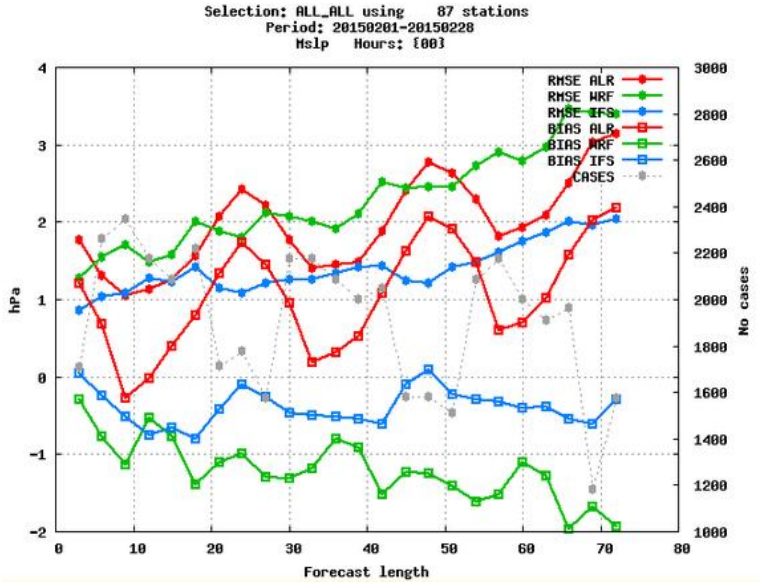


IFS

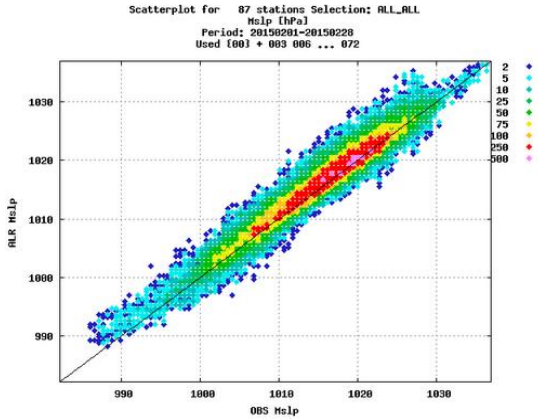


In summer, all models could be seen capture the observations well.

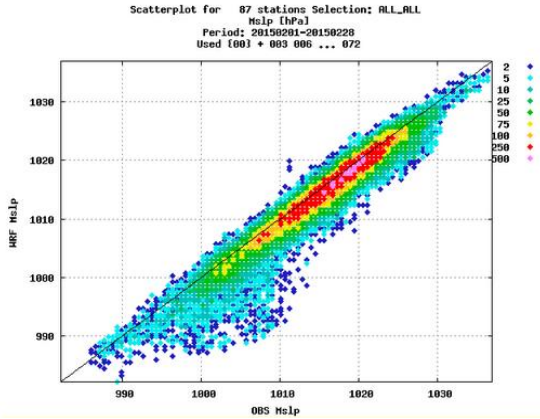
MSLP (February)

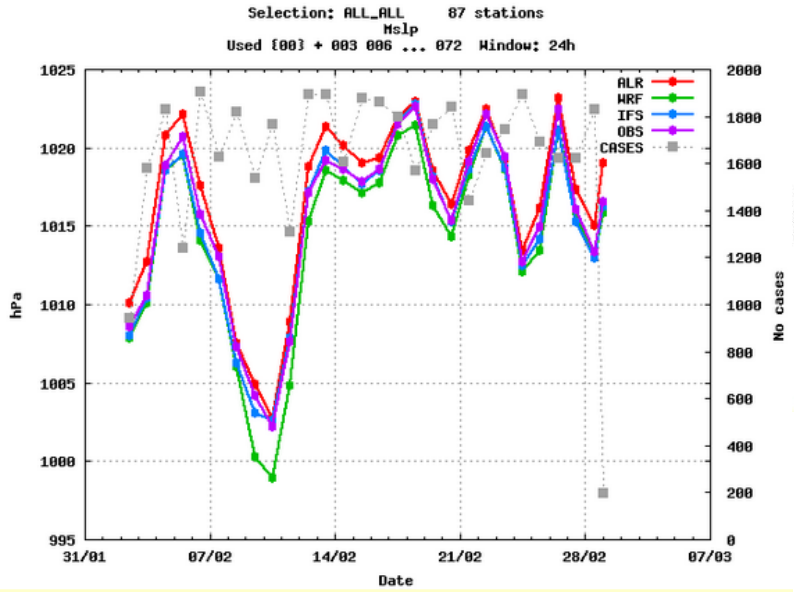


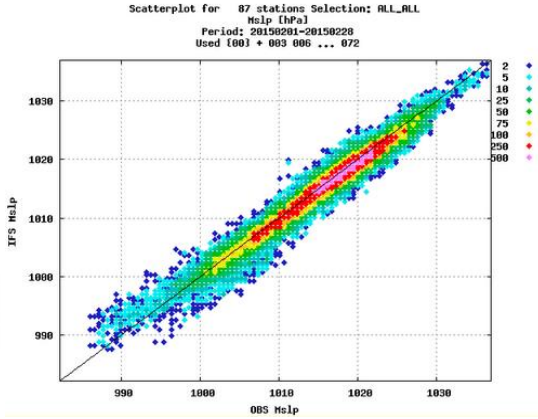
ALR



WRF

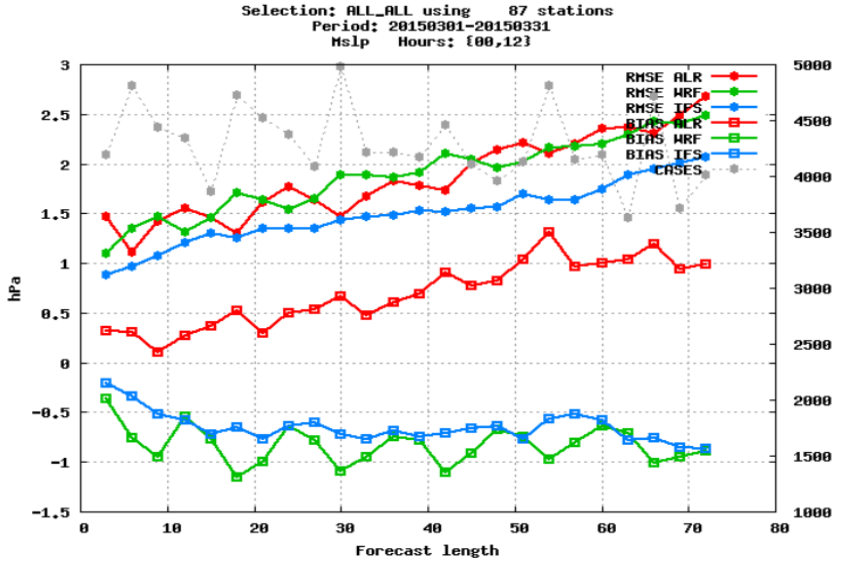


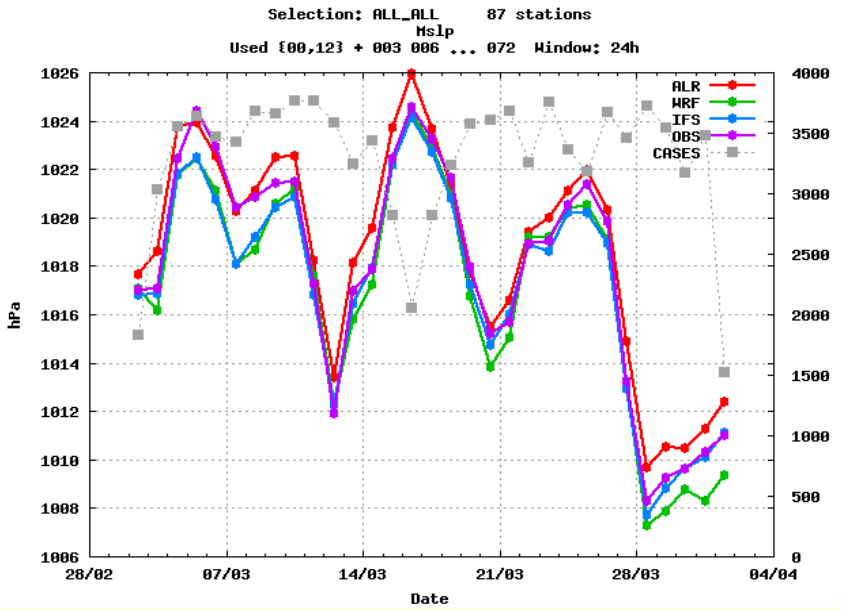




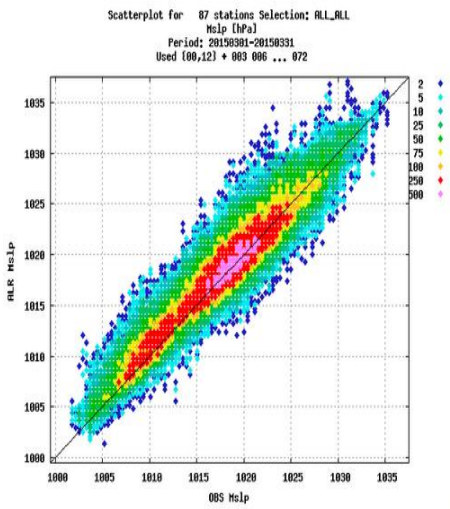
IFS

MSLP (March)

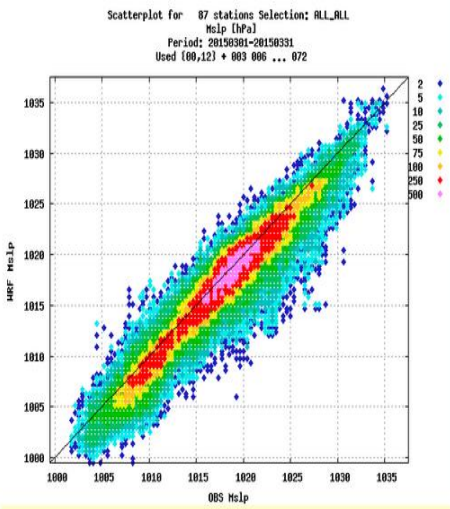


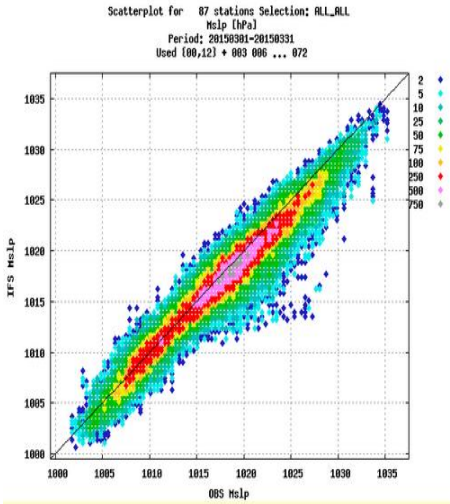


ALR



WRF

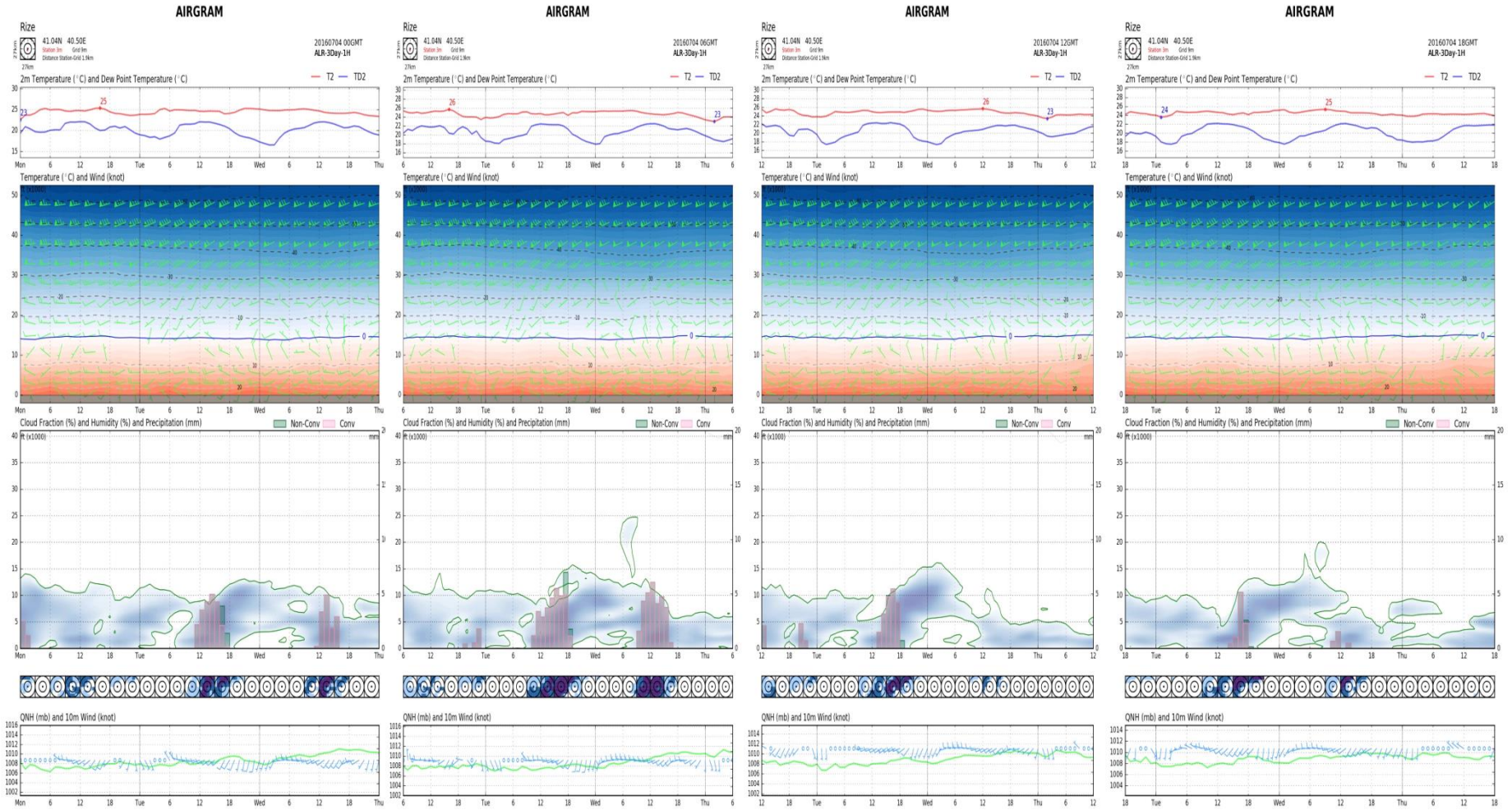




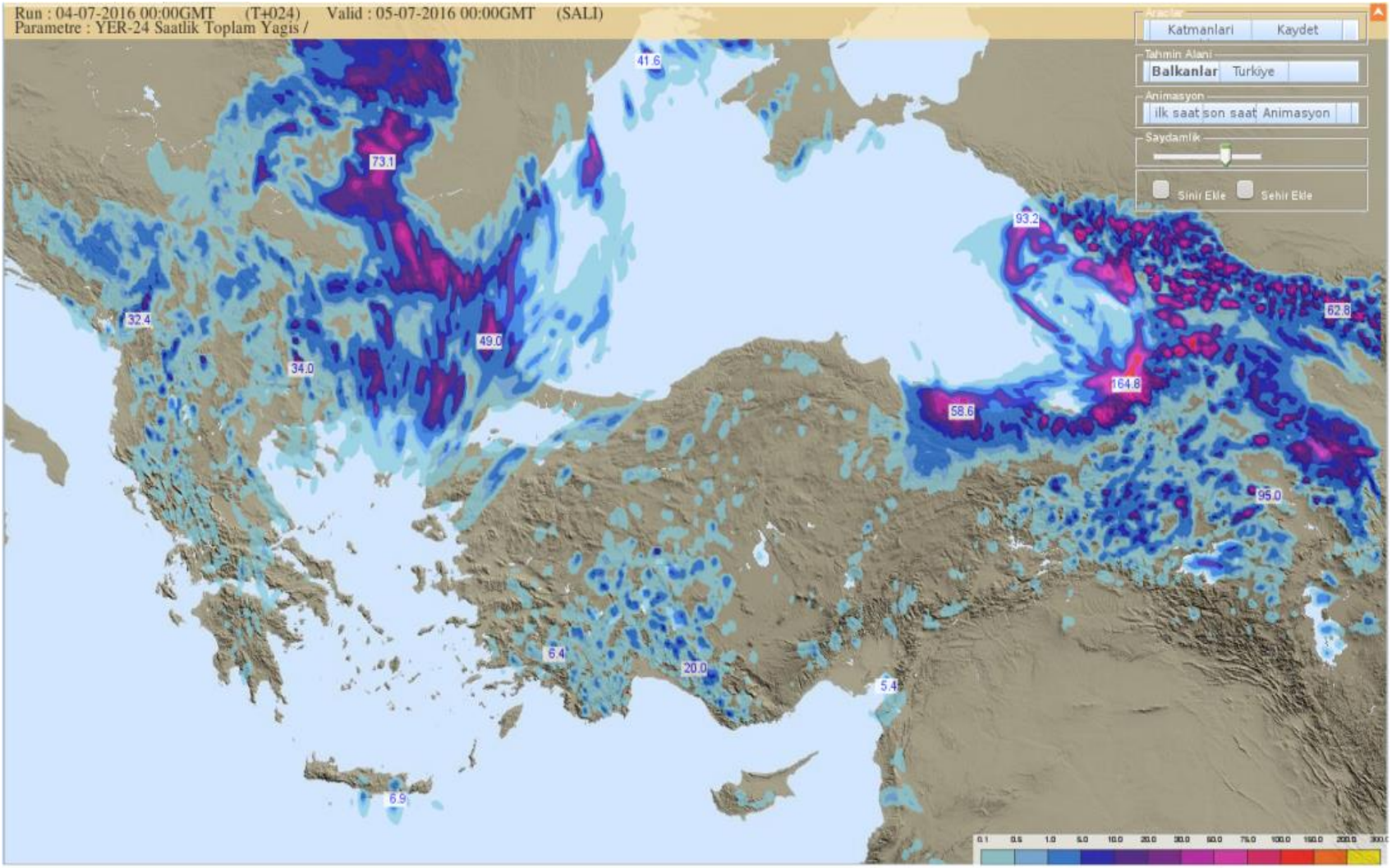
IFS

ALR is more sensitive than other models according to the numbers of observations.

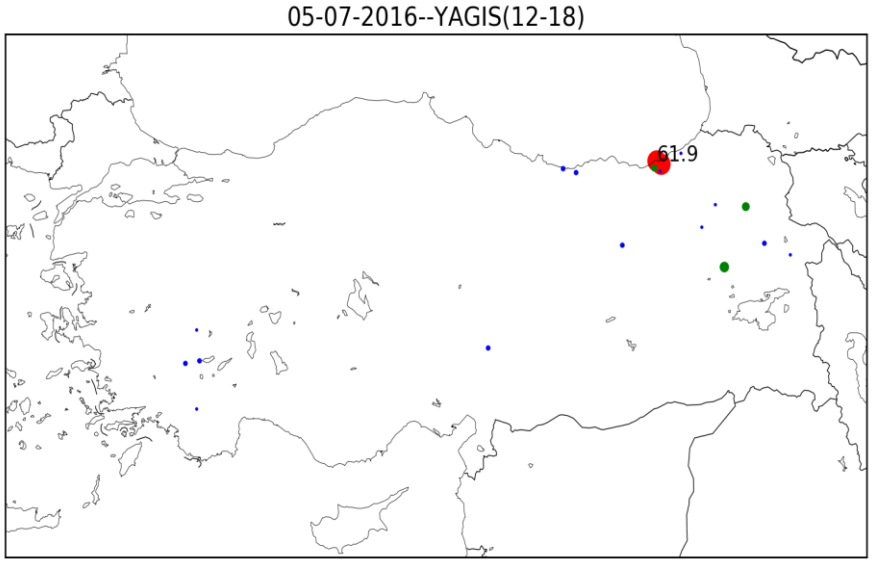
CASE STUDY-1: Rize-Flash Flood (04-05 July 2016)

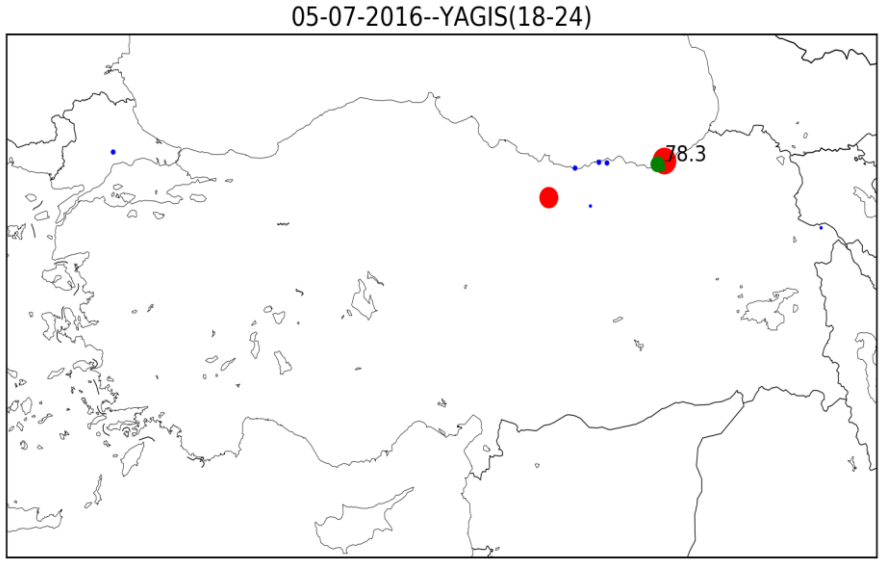


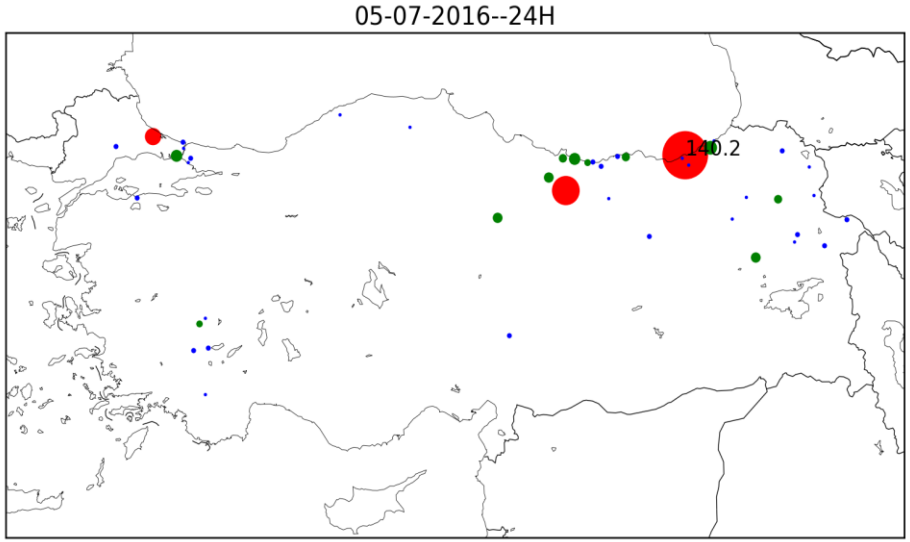
Rize-Flash Flood



Rize-Flash Flood





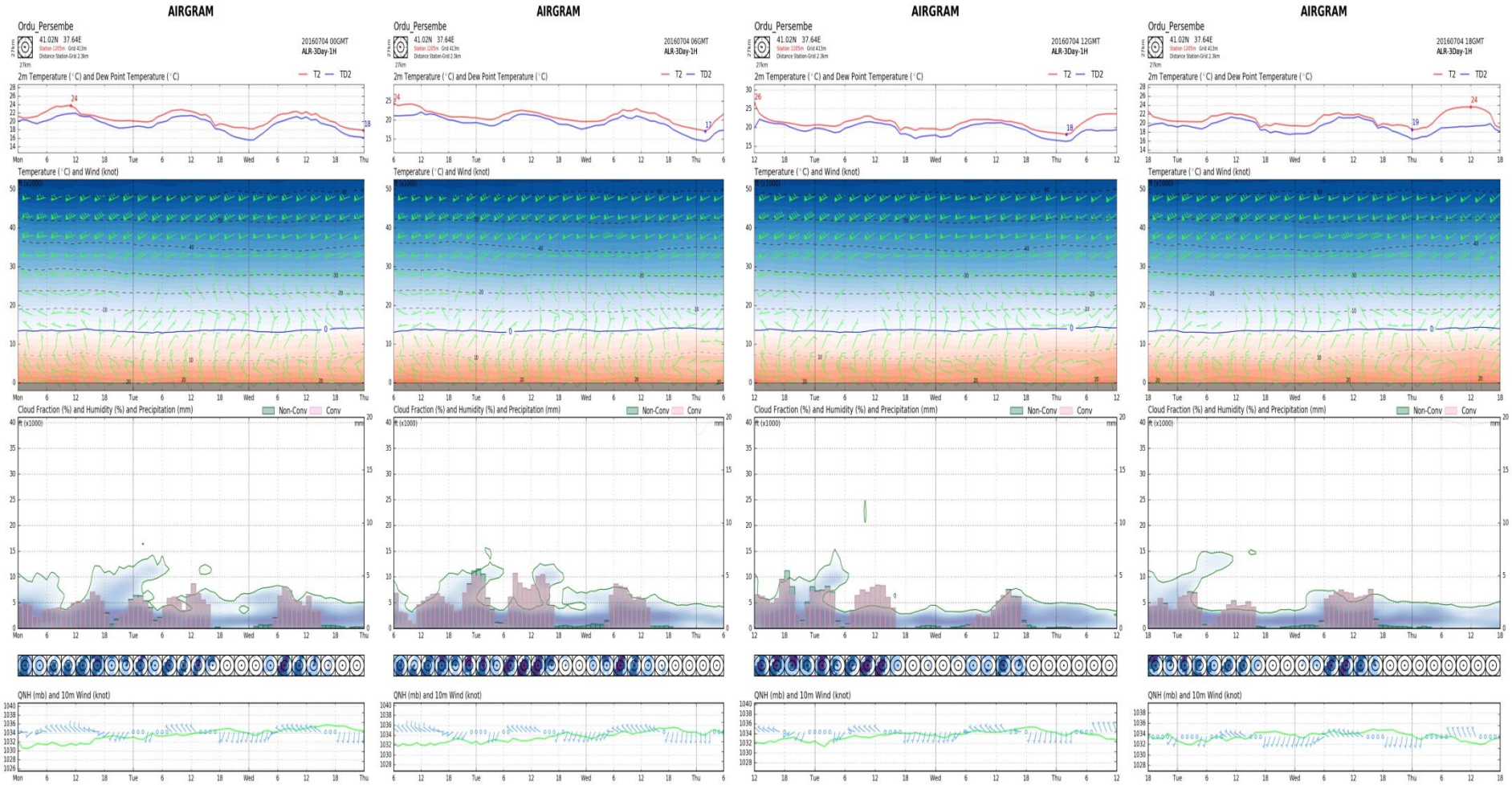


> 50mm

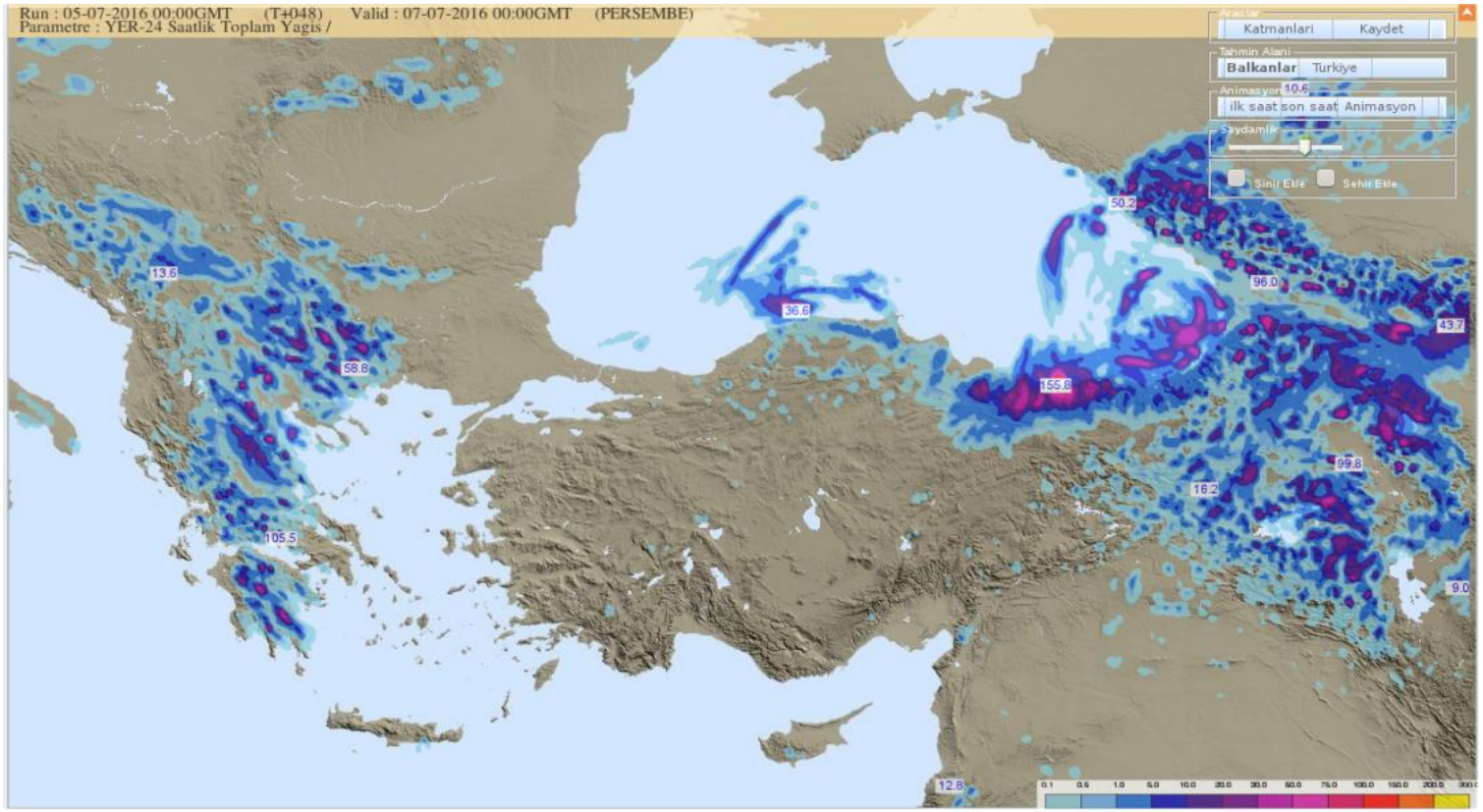
20-50mm

< 20mm

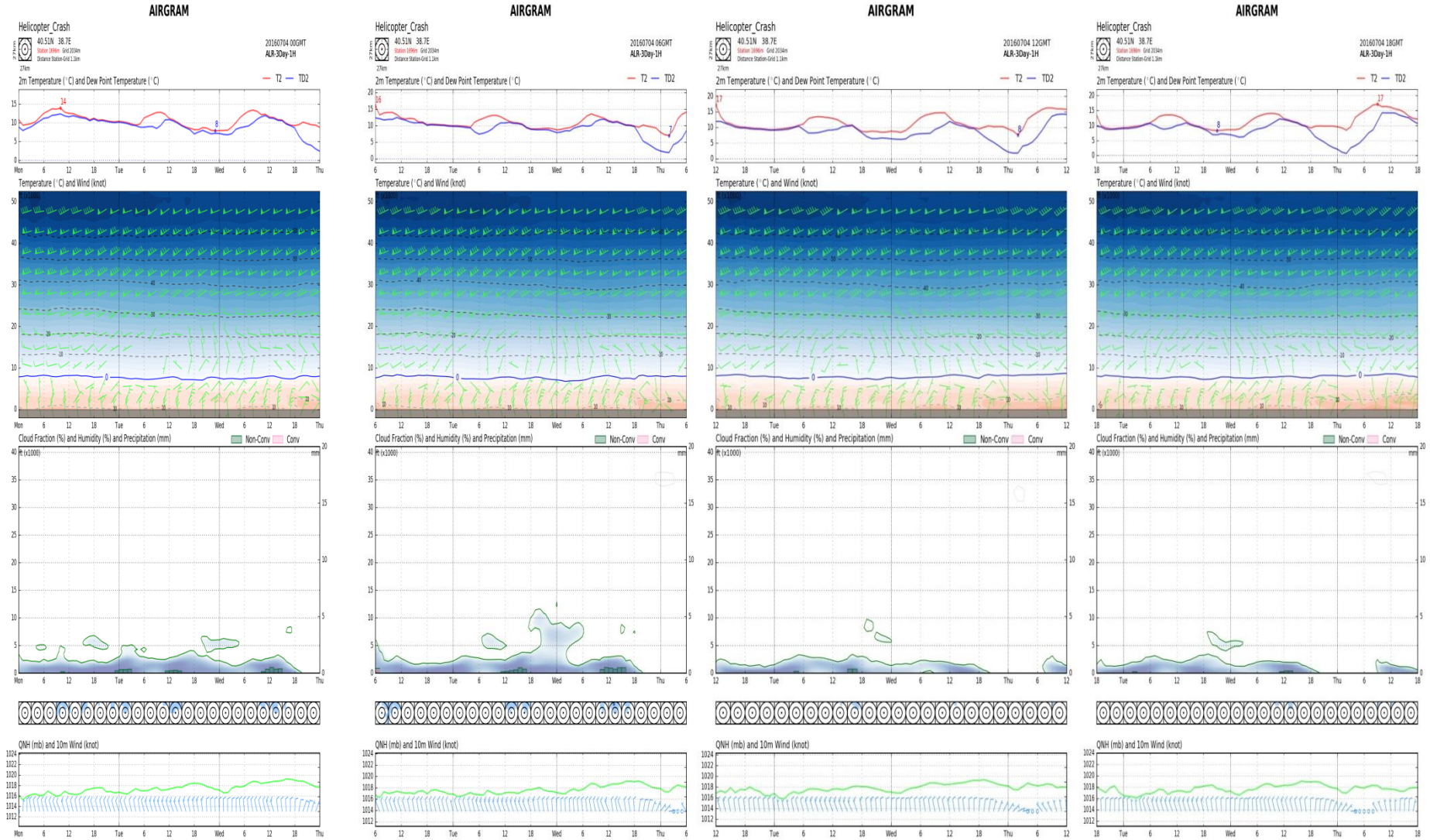
CASE STUDY-2: Ordu-Flash Flood (04-05 July 2016)



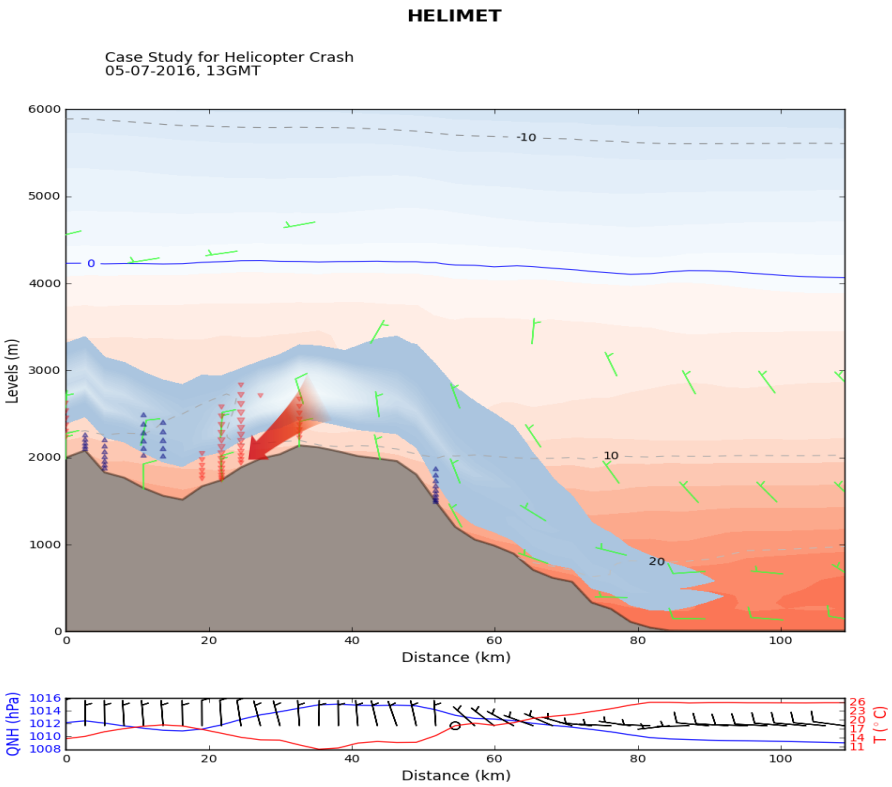
Ordu-Flash Flood

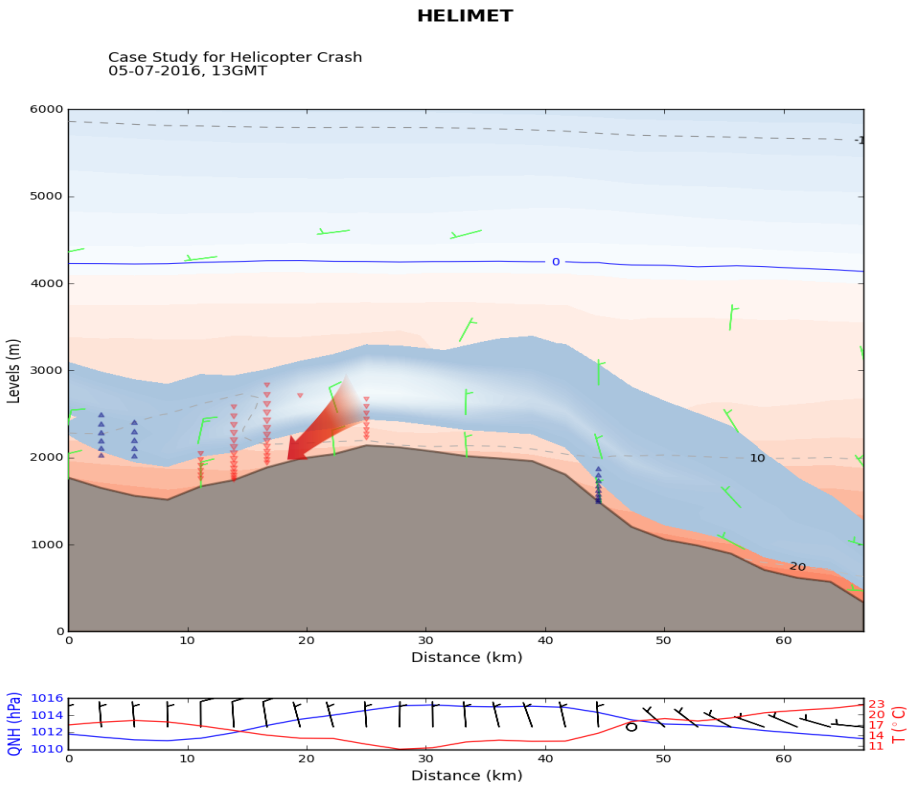


CASE STUDY-2: Tohumluk-Helicopter Crash (05 July 2016)



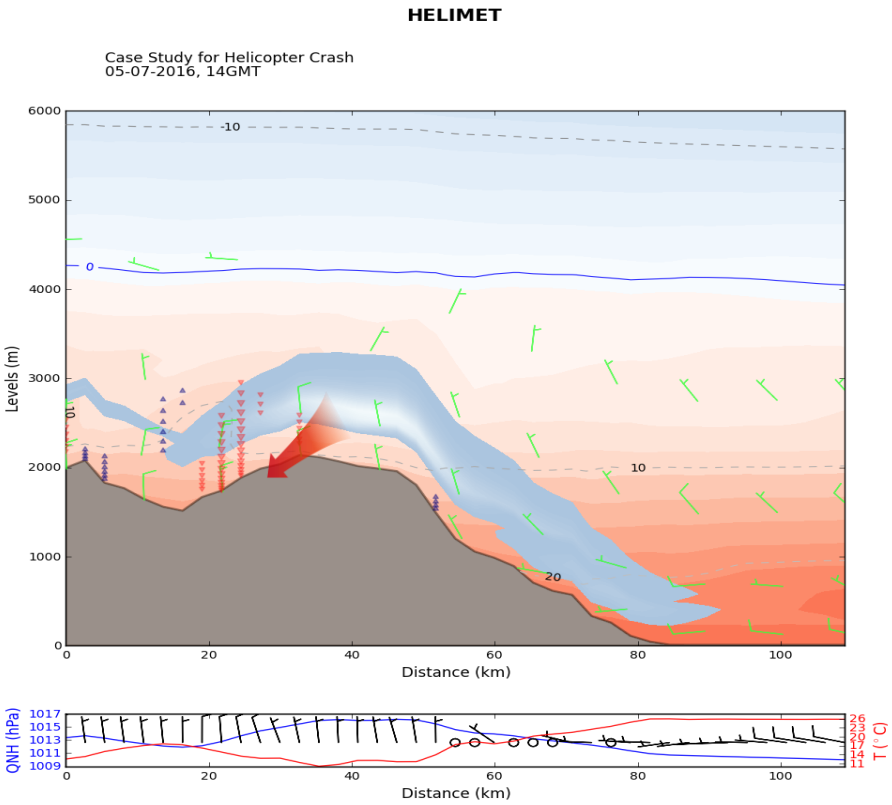
Tohumluk-Helicopter Crash

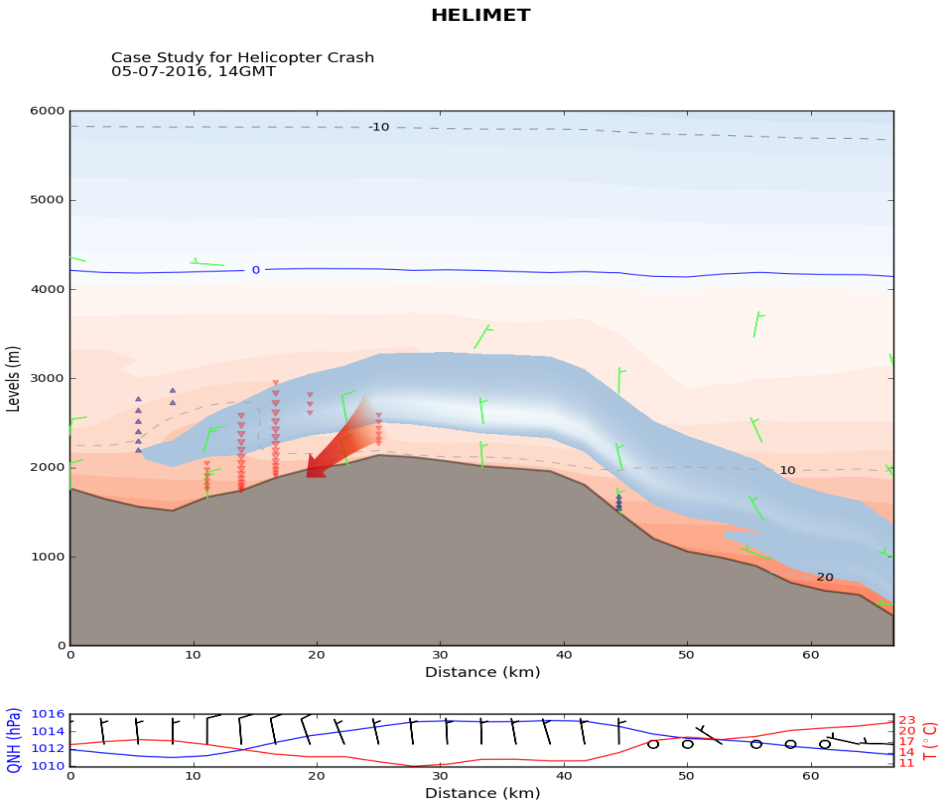




13-GMT

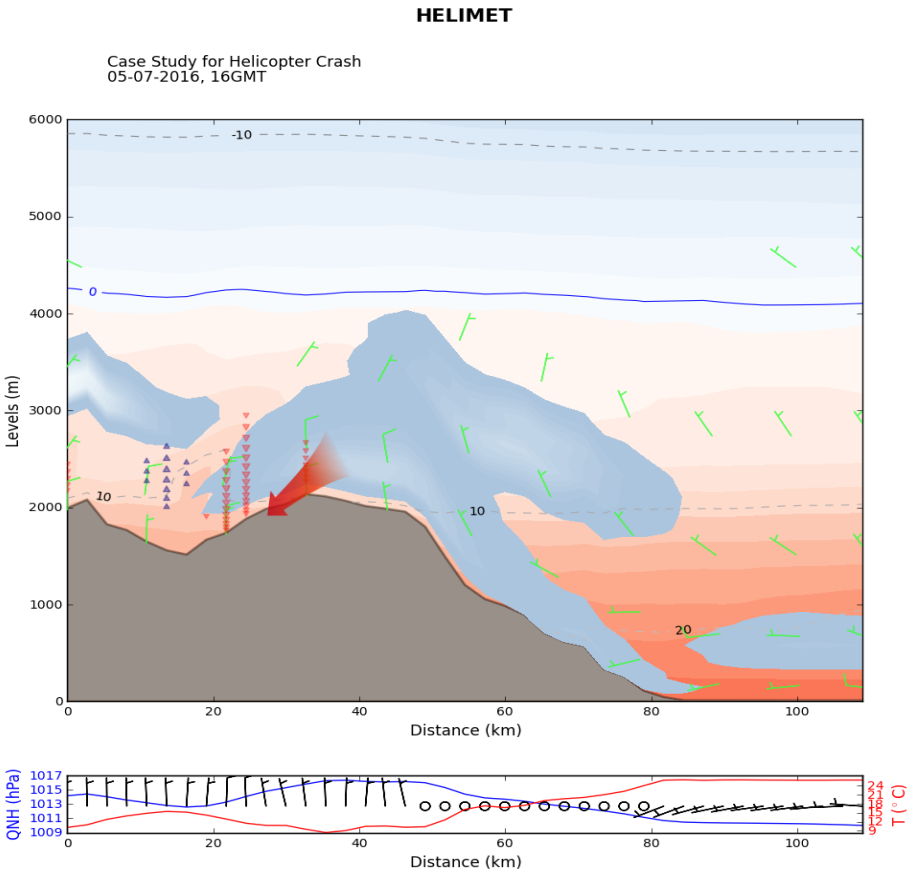
Tohumluk-Helicopter Crash

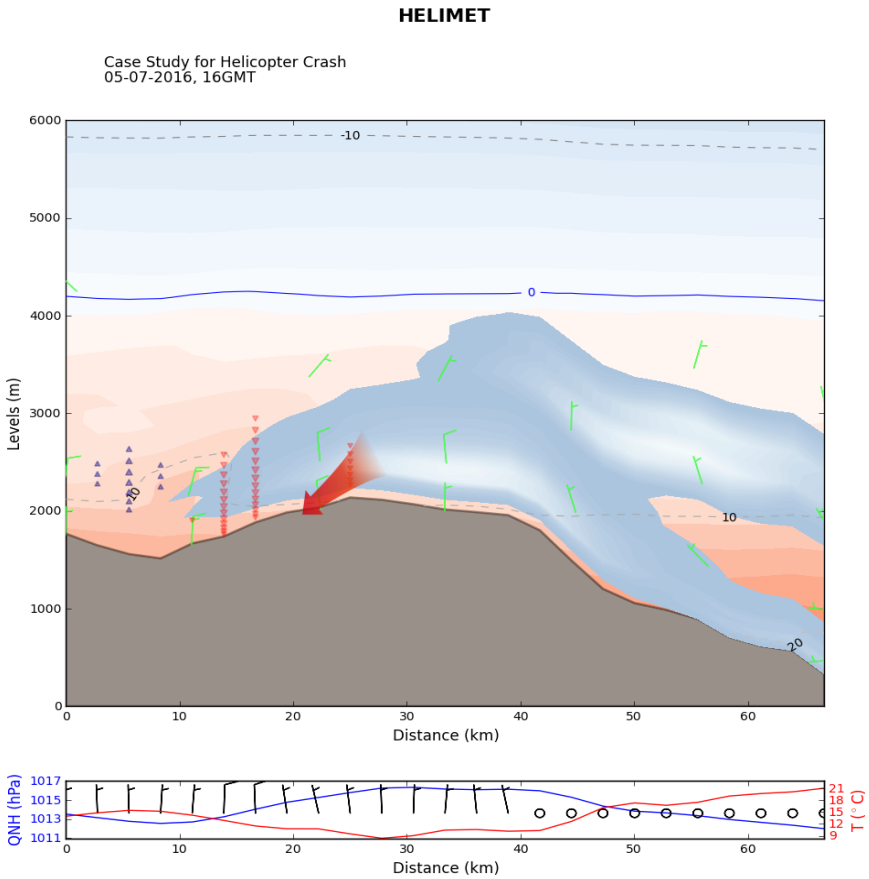




14-GMT

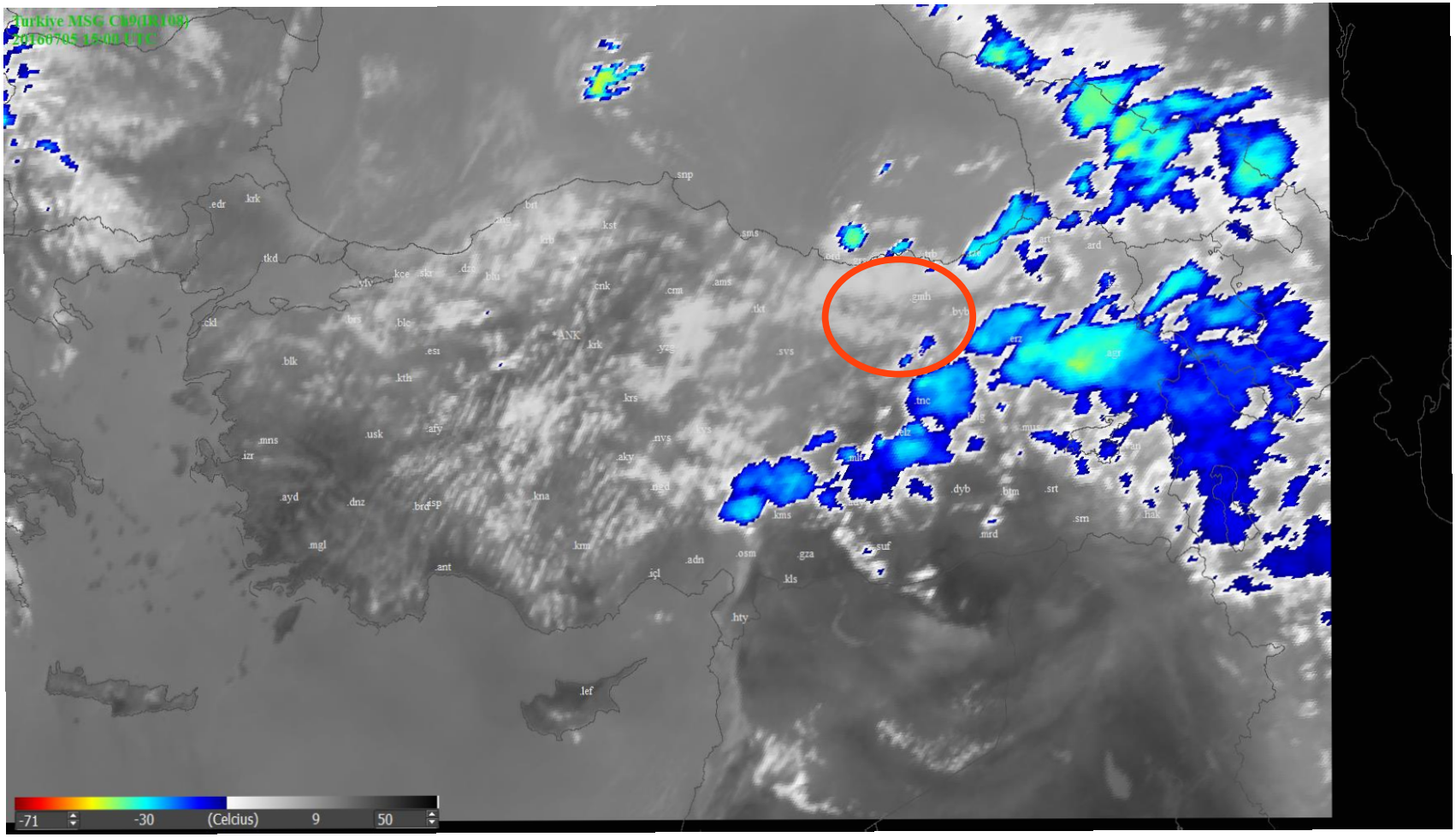
Tohumluk-Helicopter Crash





15-GMT

Tohumluk-Helicopter Crash



Top Cloud Temperature
(15GMT)

THANK YOU