ALARO-0 Experience in TURKISH STATE METEOROLOGICAL SERVICE

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Content

- Operational Use of ALARO at TSMS
- Comparison of ALARO Experiments
- Comparison of ALARO with Other Models
- Conclusion





Operational Use of ALARO-0 at TSMS

Operational Model (cy38t1bf3)

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







Harmony Verification Tool





grib/bufr files directly

• WRF outputs added locally



STATIONS







Experiments

- ALARO 36t1 •
- ALARO 38t1 bf3
- ALARO 38t1 bf3

- (Hydrostatic) (Previous Operational)
- (Non-Hyd.)
- (Hyd + VFE) → (Operational)
- ALARO 38t1 bf3 (Hyd + VFE + IFS data)

Test Period : 1-31 May 2013





Selection: ALL_ALL using Selection: ALL_ALL 54 stations 54 stations Period: 20130501-20130531 T2n Hours: {00} Used {00} + 003 006 ... 072 Window: 24h T2n 2000 23 2000 RMSE 36t1_hydro 36t1_hydro RMSE 38t1bR_nhydro 38ttbf3_nhydro 22 RMSE 38t1bf3_bydco_vfe 38t1bf3_Nydro_vfe 1800 MSE 38t1bf3 huded vie 1F4 38t1bf3_hvdro_vfe_IFS 3 BIAS 36t1 hydro OBS 21 BIRS 38t1bf3_nhydro 1600 1800 CASES BIAS 38t1bf3_hydro_vfe 8-BIAS 38t1bf3_hydro_vfe_IFS -8-20 2 1400 19 A-- A-- A 1600 1200 1 18 υ, c) A-A-A-A-A deg 1000 👸 deg 17 £ 0 0.0 1400 800 16 600 -1 15 1200 400 14 -2 200 13 -3 1000 12 ß 20 50 70 27/04 04/05 11/05 25/05 Ø 10 30 40 60 80 18/05 01/06 Forecast length Date









MSLP RMSE and BIAS Average

MSL Pressure Time Series









10m Wind Speed RMSE and BIAS Average

10m Wind Speed Time Series





Scatter Plots Of 2m Temperature







Scatter Plots of MSLP







Scatter Plots Of 12 Hr. Precipitation







RMSE and BIAS Profiles

Temperature

8 stations Selection: ALL_ALL Temperature Period: 20130501-20130531 Statistics at 00 UTC Used {00} + 12 24 36 48 60 72

Geopotential

8 stations Selection: ALL_ALL Height Period: 20130501-20130531 Statistics at 00 UTC Used {00} + 12 24 36 48 60 72







Comparison of ALARO Experiments Upper Level RMSE and BIAS Scores

Temperature 500hPa

850 hPa







Models

- ALARO 38t1 bf3
- WRF
- ECMWF (IFS)

(Hyd + VFE / 4.5 km / 60 L) (Non-Hyd. / 4.5 km / 46 L (Surf-100 hPa))

Verification Period: 1 January – 30 April 2014





2m Temp RMSE and BIAS Average for all Stations

JANUARY







2m Temp. Time Series











MARCH

MSLP RMSE and BIAS Average for all Stations



JANUARY





MSLP Time Series











10 m Wind Speed RMSE and BIAS Average for all Stations







10m Wind Speed Time Series

MARCH











Scatter Plots Of 2m Temperature (January)







2m Temp. Scatter Plots For ANKARA











WRF

Scatter Plots Of 2m Temperature (March)







2m Temp. Scatter Plots For ANKARA











Scatter Plots Of 2m Temperature (April)





OBS T2n

ALARO-1 Working Days 12-14 May 2014, ZAMG, Vienna

OBS T2n

OBS T2n



Scatter Plots Of MSLP (January)

ALARO





ECMWF-IFS



MSLP Scatter Plots For ANKARA











WRF









ALARO



WRF

Scatter Plots Of MSLP (April)

ALARO





ECMWF-IFS



MSLP Scatter Plots For ANKARA





Scatterplot for 17128 Mslp [hPa] Period: 2014040438 Used [00] + 003 006 ... 072







Scatter Plots Of 10m. Wind Speed (January)



10m Wind Speed Scatter Plots For ANKARA







Scatter Plots Of 10m. Wind Speed (March)



Scatterplot for 17128 U10n [n/s] Period: 20140301-20140331 Scatterplot for 17128 U10m [m/s] Period: 20140301-20140331 Used [00] + 003 006 ... 072 Scatterplot for 17128 U10n [n/s] Period: 20140301-20140331 Used {003 + 003 006 ... 072 Used [00] + 003 006 ... 072 16 5 10 25 10 25 ٠ ٠ U18n U18h U10n . <u>*</u> i ALR. EFS . 4 6 8 10 2 2 4 6 8 10 Ø 2 6 8 10 Ø 4 OBS U10n OBS U10m OBS U10n





Scatter Plots Of 10m. Wind Speed (April)





OBS U10n

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ALARO-1 Working Days 12-14 May 2014, ZAMG, Vienna

OBS U10m

OBS U10m



MARCH

TEMPERATURE

RMSE and BIAS Profiles

JANUARY



7 stations Selection: ALL_ALL

No cases

200

250

10

15 20 25 30

48 60 72

350

RHSE HRF

CASES

RHSE ALR

BIAS HRF BIAS IFS 400

-0-

300

Height Period: 20140115-20140131 Statistics at 00 UTC Used {00} + 12 24 36

150

0 5

50

100

200

300

400

690

70(

800

900

1000

-20 -15

hPa

100



APRIL



GEOPOTENTIEL 7 stations Selection: ALL_ALL



7 stations Selection: ALL_ALL Height Period: 20140401-20140430 Statistics at 00 UTC Used {003 + 12 24 36 48 60 72





-10 -5



Conclusion

2m Temperature

- Negative Bias
- but over estimated especially temperature below -5 degrees,

MSL

- Better than cy36t1
- Overestimated

10 meter wind speed



Upper level

- Better than cy36t1
- High RMSE of Humidity at Low Levels

•http://212.175.180.126/verif



