ALADIN Related Activities in TURKEY

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Alper GÜSER, Tayfun DALKILIÇ, Fatih KOCAMAN, Canberk KARADAVUT, Duygu ÜSTÜNER, Emine SAY, Duygu AKTAŞ, Ünal TOKA (sht@mgm.gov.tr)

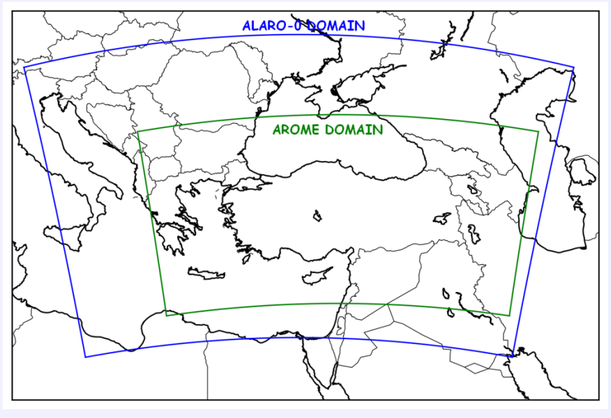
Operational Configurations

ALARO-TURKEY

Current operational suite:
Model version: cy38T1bf3

Model geometry:
- 4.5 km horizontal resolution
- 450 X 720 grid points
- 60 vertical model levels
- Quadratic spectral truncation
- Lambert projection

Forecast settings
- Digital filter initialization
- 180 sec time-step
- Hourly post-processing
- 4 runs per day at 00, 06, 12 UTC (up to t+72) and 18 UTC (up to t+60).
- Coupling with ARPEGE LBC files at every 3 hours



Pre-Operational Suite
ALARO-1 cy40t1_bf05

AROME-TURKEY

Pre-operational suite:
Model version: cy38t1

Model Geometry:
- 2.5 km horizontal resolution
- 512 X 1000 grid points
- 60 vertical model levels
- Linear spectral truncation
- Lambert projection

Forecast settings
- Digital filter initialization
- 60 sec time-step
- Hourly post-processing
- 1 run per day at 00 UTC up to 48 hourly forecast
- Coupling with ARPEGE LBC files at every 3 hours

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
- Total memory 1 TB
- 10TB SAS, 30TB SATA Disk

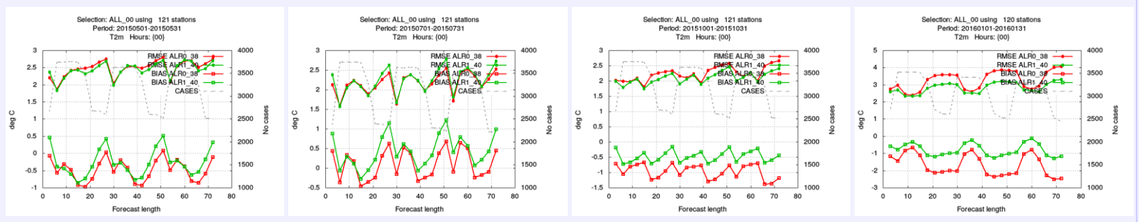
ALARO-0 vs ALARO-1

TSMS re-run both ALARO-0 (cy38t1) and ALARO-1(cy40t1) at 00 GMT for yearly period between April-2015 and February-2016.

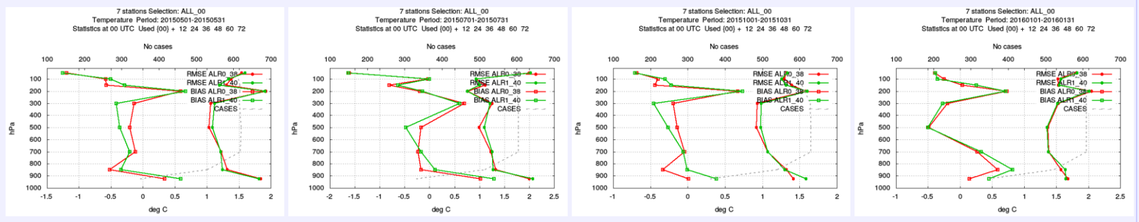
121 Turkish synoptic stations used for verifications.

May 2015 | July 2015 | October 2015 | January 2016

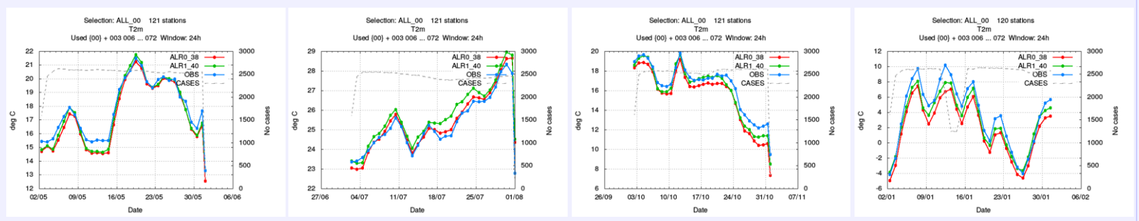
2m Temperature BIAS and RMSE



Temperature BIAS and RMSE Profiles



2m Temperature Time Series

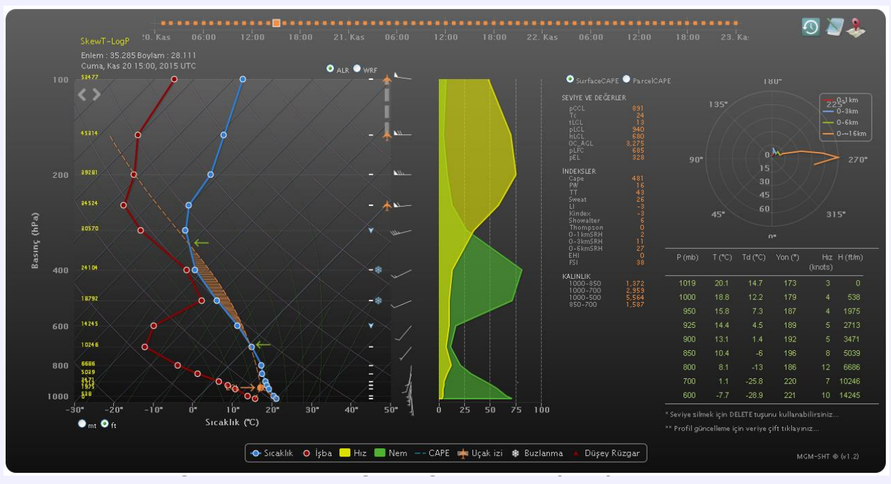


2m Dew Temperature Time Series

Interactive SkewT-LogP Diagram Application

Interactive SkewT – LogP Project, which enables the user to plot the Temp diagram of any given point when clicked on google based map. The diagrams are produced based on WRF and ALARO models. In the project, open source codes and softwares were used and code improvements were done by Turkish Aladiners.

User-friendly SkewT diagrams are produced for the given point instead of generating this diagram for every point in the map and user can make alteration on the diagram. In this context, the computer resources are used more efficiently. Therefore, it was a necessity to switch to interactive applications.



(http://212.175.180.126/skewt/index.html)

This application generates the following parameters: Temperature, Dew-Point, Velocity, Humidity, CAPE, Contrail, Icing, Vertical Wind, Instability Indices, Thickness. The parameters such as, icing, contrail and vertical wind are calculated to be used for aviation purpose. “Surface CAPE” and “Parcel CAPE” identify the CAPE values calculated by different calculation methods.

For each pressure level, temperature, dew-point temperature, wind speed and direction and the height of the pressure level are shown in a table. The application allows the user to make changes in values and atmospheric profile. After the modifications, all instability indices are recalculated.

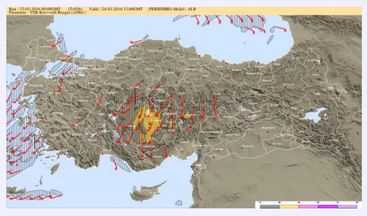
In addition, the application has hodograph feature. Wind shear is plotted in 0-1, 0-3, 0-6, 0-16 km height ranges on the hodograph.

Case Study for Wind Gust over Turkey

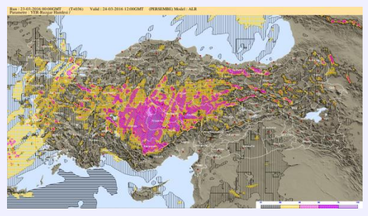
On March 23th and 24th 2016, high winds caused damages across Aegean and central region of Turkey. Wind gusts of up to 95 knot led to trees falling, cancellations of flights and ferries.

TSMS Analysis and Forecast Department issued strong wind and dust storm warning bulletin for central Anatolian region two days before events.

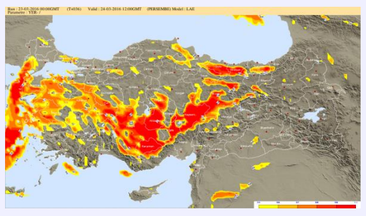
The actual case study was based on the comparisons of 23.03.2016 00GMT run of ALARO-1 (4.5km), AROME (2.5km) and ALADIN-LAEF(11km), (T+36) 10m Wind gust forecasts against observation data which was collected from more than 1000 automatic stations.



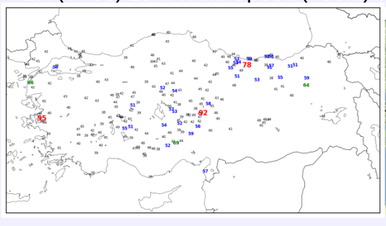
ALR (T+36) 10m Wind Speed (>30kt)



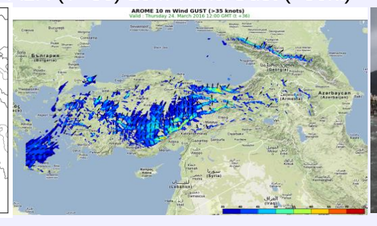
ALR (T+36) 10m Wind Gust (>30kt)



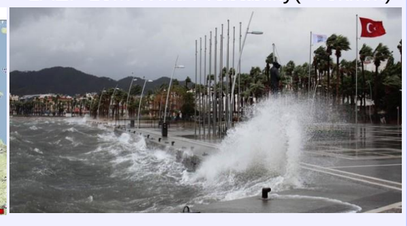
LAEF 10m Wind Probability(>70km/h)



24.3.2016 Max Wind Sp Obs.(>40kt)



AROME T+36 Wind Speed (>35kt)



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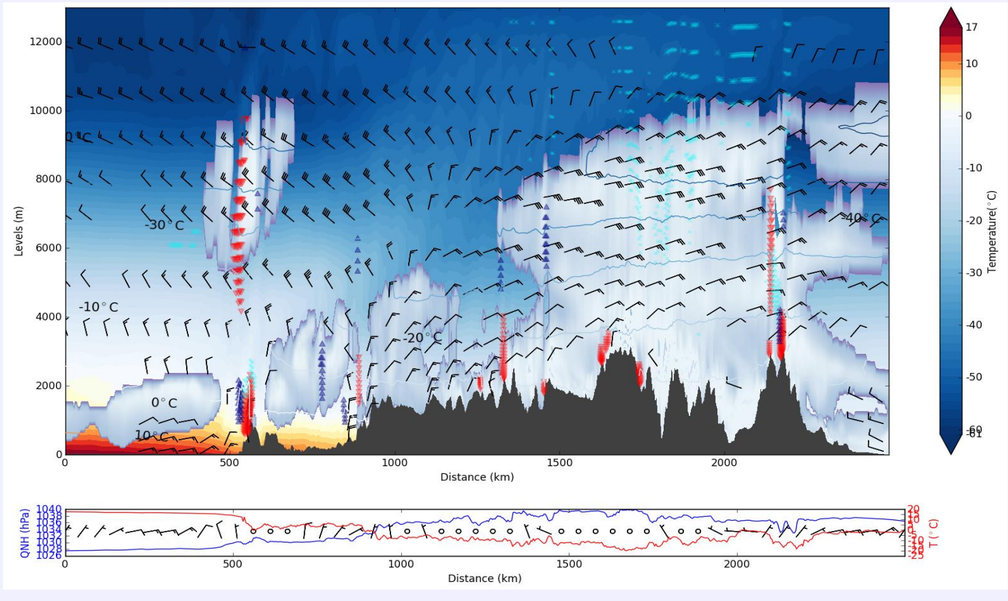
Interactive Page Study for National Aviation Activities

According to the need of national aviation, an interactive page study is started to develop. This study will enable pilots to get cross section map between departure and arrival points. On the map, the horizontal axes illustrates flight distance (in km) and the vertical one shows levels from surface to selected level (in km). The outputs generating from the operational AROME model consist of temperature, wind direction and speed, vertical velocity, cloud fraction, QNH, topography. In addition of these parameters, the parameter of ice severity is generated from liquid water content. This user friendly study will give a chance pilots to create their own map with selected parameters. The study is still in the process.



Ankara, April 2016