



NWP Related Activities in TURKEY



25th ALADIN Workshop & HIRLAM All Staff Meeting 2015, 13-17 April 2015, Helsingør, DENMARK

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Operational Configurations

ALARO-0 TURKEY

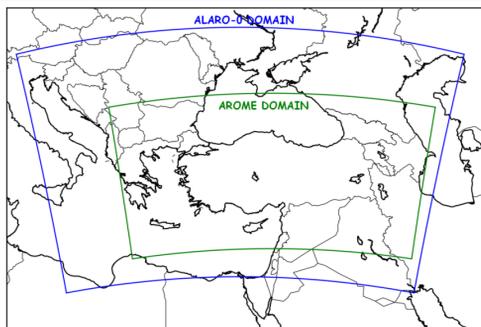
Current operational suite:
Model version: cy38T1bf3

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



AROME-TURKEY

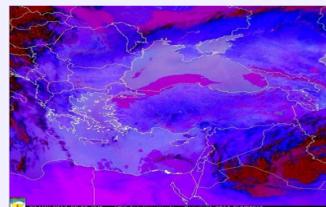
Pre-operational suite:
Model version: cy38t1

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



MSG Fog (06.30 GMT)



AROME Fog Forecast (06.00GMT)

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



Interactive Web Page

TSMS is using a web-based visualization tool which aims to give interactive services that provide parameterized graphical products to authorized users. The framework is designed to use Magics++ with python (sometimes Fortran) for generating products. Also Java, php and ajax used for interface



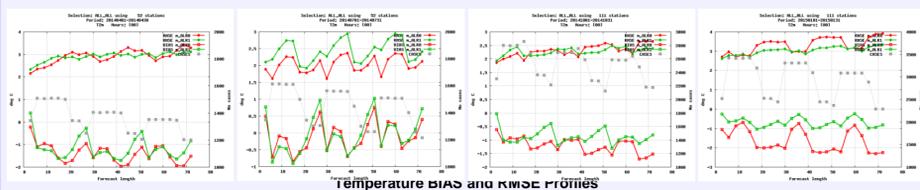
ALARO-0 vs ALARO-1

ALARO-1 with new radiation scheme ACRENEB2 and turbulence scheme TOUCANS announced at the beginning of February 2015. TSMS run both ALARO-0 and ALARO-1 at 00 GMT for 4 months (Apr.2014, Jul.2014, Oct.2014 and Jan.2015) for comparison of the results at different seasons.

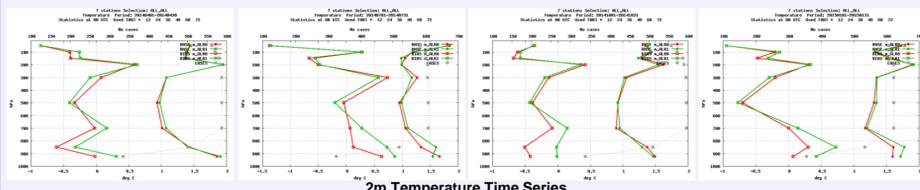
Harmonie Verification Tools used for obtaining monthly verification results.

April 2014 July 2014 October 2014 January 2015

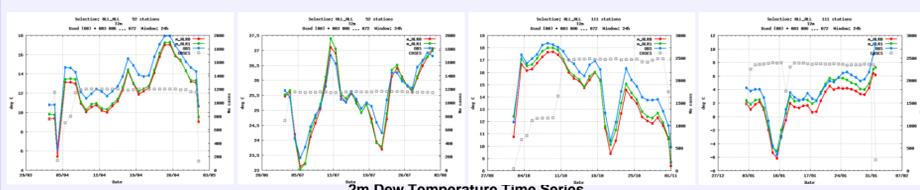
2m Temperature BIAS and RMSE



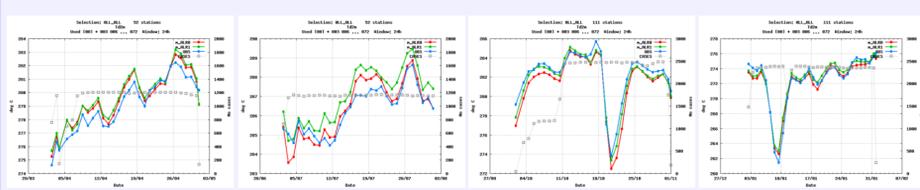
Temperature BIAS and RMSE Profiles



2m Temperature Time Series



2m Dew Temperature Time Series

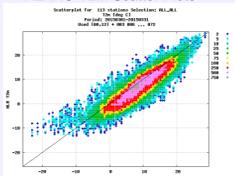


2m Dew Temperature Time Series

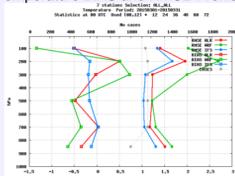
Verification Studies

Besides ALARO, IFS and WRF outputs added to Harmonie Verification Tools for monthly verifications and comparison of the models. Also existence and contingency tables are producing for 24 hourly total precipitations with different scores (HIT, BIAS, POD, FAR, TS, KSS) and thresholds for all models

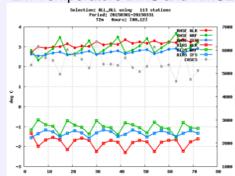
ALARO T2M Scatter Plots



Temperature BIAS and RMSE Profiles



2M Temperature BIAS and RMSE



SCORES

HIT = (a+d)/(a+b+c+d)
BIAS = (a+b)/(a+c)
POD = a/(a+c)
FAR = b/(a+b)
TS = a/(a+b+c)
KSS = POD - F

ANKARA T+24 Total Prec. Scores and Contingency Table (ALARO-0 / 00GMT)

		Obs		HIT		BIAS		POD		FAR		TS		KSS	
		Yes	No	0.75	1.32	0.85	0.35	0.58	0.54						
For	Yes	111	61												
	No	19	135												

FLASH FLOOD GUIDANCE SYSTEM (FFGS)

The guidance system installed at TSMS systems cooperation with WMO, US-AID/OFDA, HRC and NOAA. The system provides information on rainfall and hydrologic response, the two important factors in determining the potential for a flash flood.

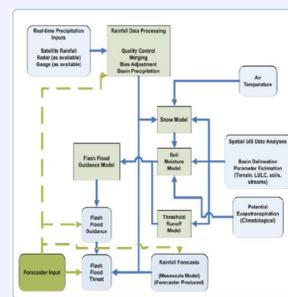


Figure 1. FFGS Technical Components

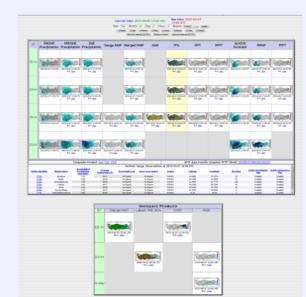


Figure 2. FFGS Forecaster Interface Console

Threshold Runoff Model (drainage network characteristics) that is computed once for each sub-basin. Estimated precipitation from several sources like satellites, radar as available, and gauges as available are input into a snow model (Snow-17) which estimates snow water equivalent (SWE) and MELT that is inputted into soil moisture accounting model (SAC-SMA) to estimate upper level soil moisture (soil water deficit). Then, the Flash Flood Guidance model is used to estimate the amount of rainfall that is required to cause bankfull flow for a given at the outlet of each sub-basin taking into account of current soil moisture conditions. The Flash Flood Threat is the amount of rainfall of a given duration that is greater than the Flash Flood Guidance value for a basin; meaning that it is the difference between the Flash Flood Guidance value for a given duration and over a basin and the corresponding estimated or forecast precipitation for the same duration and basin.

Precipitation Products

- RADAR Precipitation- TSMS Radar Network,
- MWGHE Precipitation- Satellite based Microwave adjusted Global HydroEstimator Precipitation(NOAA/NESDIS)
- GHE Precipitation-Satellite based Global Hydro Estimator Precipitation (NOAA/NESDIS)
- Gauge MAP-Mean Areal Precipitation based on available gauge data only,
- Merged MAP-Mean Areal Precipitation based on radar, MWGHE or GHE precipitation and gauges
- ALADIN Forecast-ALADIN (ALARO-0) LAM forecast precipitation,
- FMAP-Forecast Mean Areal Precipitation based on ALARO-0 quantitative precipitation forecasts

Warning Products

- ASM- Average Soil Moisture,
- FFG - Flash Flood Guidance,
- IFFT- Imminent Flash Flood Threat,
- PFFT-Persistence Flash Flood Threat,
- FFFT-Forecast Flash Flood Threat.

Snow Products

- Gauge MAT-Gauge Mean Areal Temperature based on available temperature gauges,
- Latest IMS SCA-Fraction of area with snow cover,
- SWE-Snow Water Equivalent,
- MELT-Snow Melt.

22.11.2013 Marmaris Flash Flood Case Study

