ALADIN in TURKEY

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ALADIN-TURKEY

➢ Current operational suite:
Model version: cy32T3

Model geometry:
• 10 km horizontal resolution
• 259 X 389 grid points
• 46 vertical model levels
• Linear spectral truncation
• Lambert projection

Forecast settings
• Digital filter initialization
• 415 sec time-step
• Hourly post-processing
• 2 runs per day (00 and 12 UTC) with 48 hours forecast lengths.
• LBC coupling at every 3 hours
• Transfer ARPEGE LBC files from Meteo France (Toulouse) via Internet

New ALADIN forecast domain
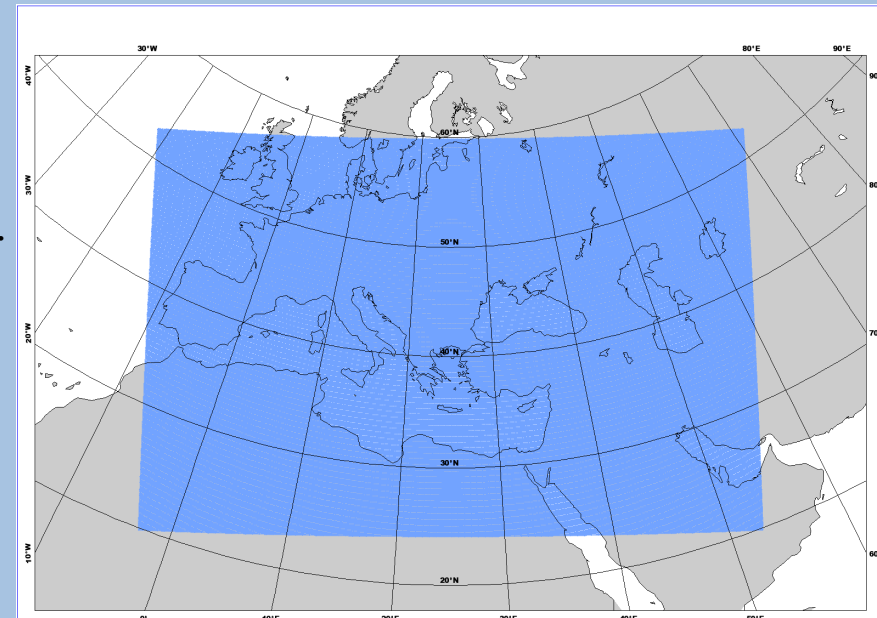
➢ Operational suite at new computer system

Migration
• Model version cy33T1
• 620X 410 grid points
• 8 km horizantal resolution
• 60 vertical model levels
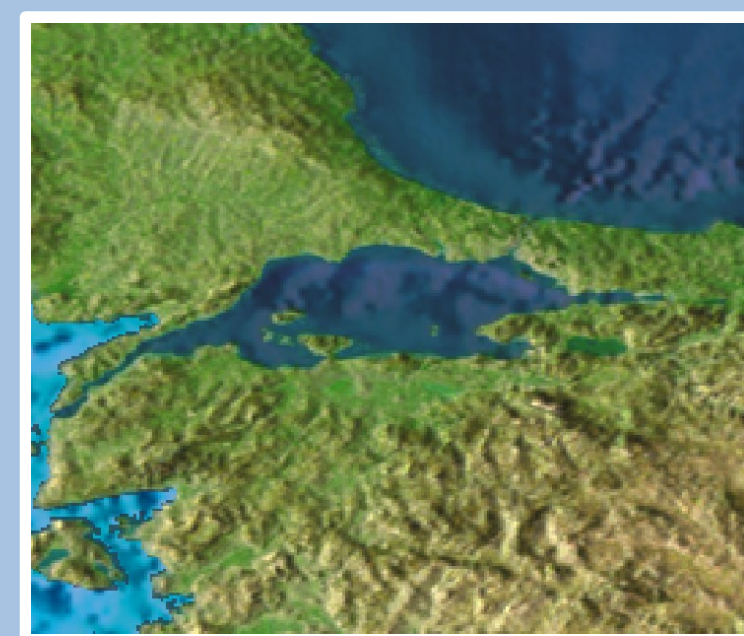• Range the forecast 72 hours
• 4 runs per days

Extension
• ALARO-0 with or without 3MT
• AROME for Istanbul

Arome-Istanbul domain

➢ Post-Processing
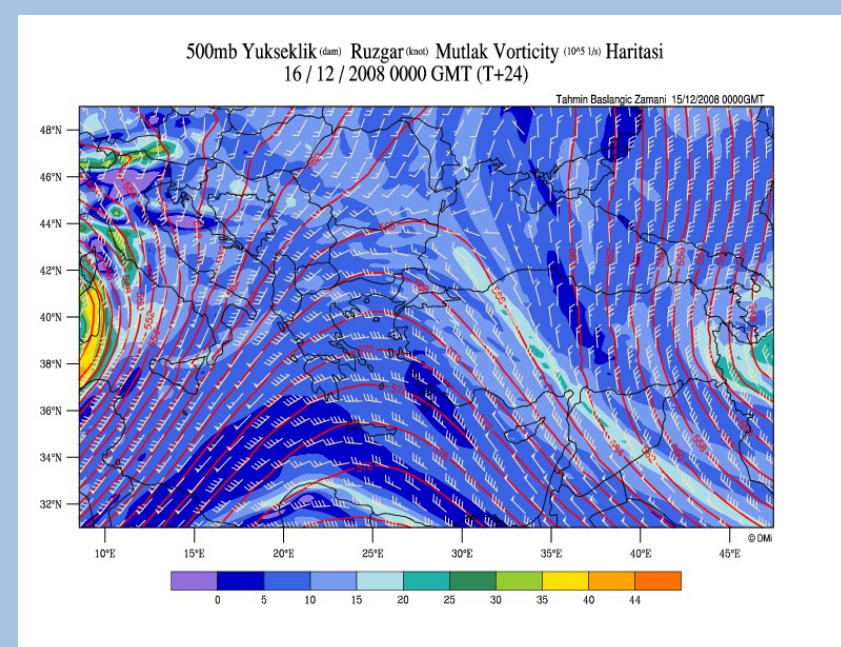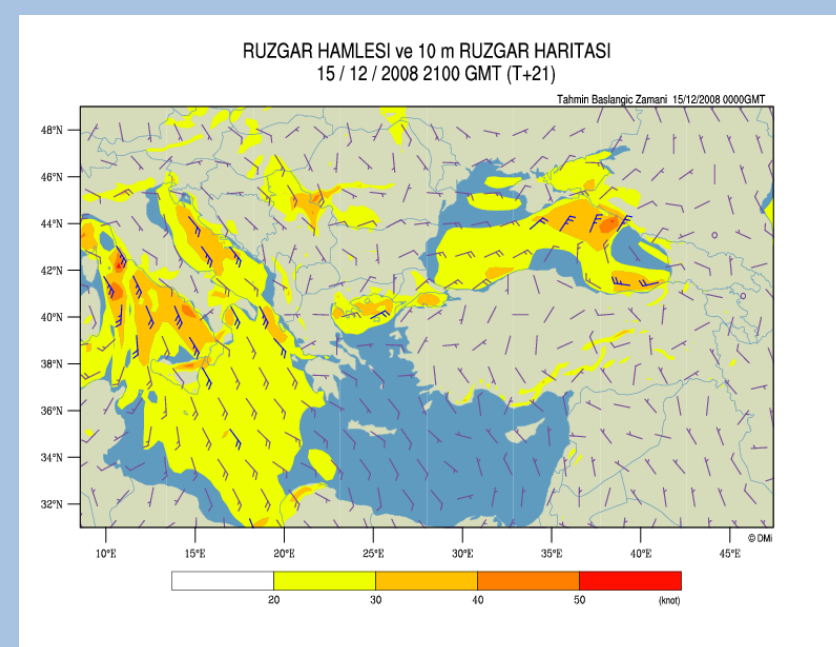TSMS is used NCL for mapping of ALADIN. We are also testing magics++ with VMS for interactive map server system.

Forecast maps of ALADIN, prepared with NCL.

Highways Weather Forecast System

Turkey is a mountainous country, highways lie in a range of altitudes extending from sea level up to 2500 m. It is crucial to provide an accurate forecast for the maintenance staff of these highways. The Highways Weather Forecast System (KHTS) was designed to develop an effective and friendly display system to driver and passengers for planning their travel. KHTS, if fully implemented, will deliver timely road weather information and disseminated to the public as a way of improving safety and service quality of the highway system, or a way of helping travelers make proactive, safe and efficient travel decision. The same road weather information also used by General Directorate of Highways for highway maintenance.

The Highways Weather Forecast System Version 2 is based ALADIN and MM5 models. The parameters forecasted for this system are; the 2m temperature, wind relative humidity, the total cloud cover, the precipitation, the precipitation type. This parameters are given for each route section which have been delimitated by two criteria, their altitude and could be driven part per hour.
For each road section parameters calculated using grid points around the route section. Severe weather forecasts of selected grid points are used as section forecast.

Screen shoot of KHTS. Web address is http://yol.dmi.gov.tr/YOL/Script/otoyol.php .

KHTS was built using a mixture of open source and proprietary software. System was implemented using php and ajax technology.

Future
The quality of the forecast seems to be good. The clients are satisfied. Number of visitors of site is 600.000 in 2008. The road surface temperature, snow depth and snow cover will be added the system.
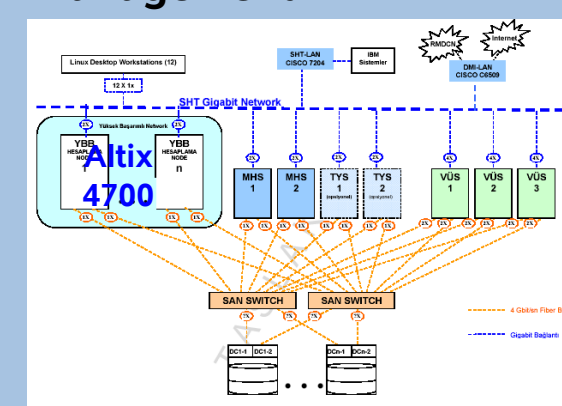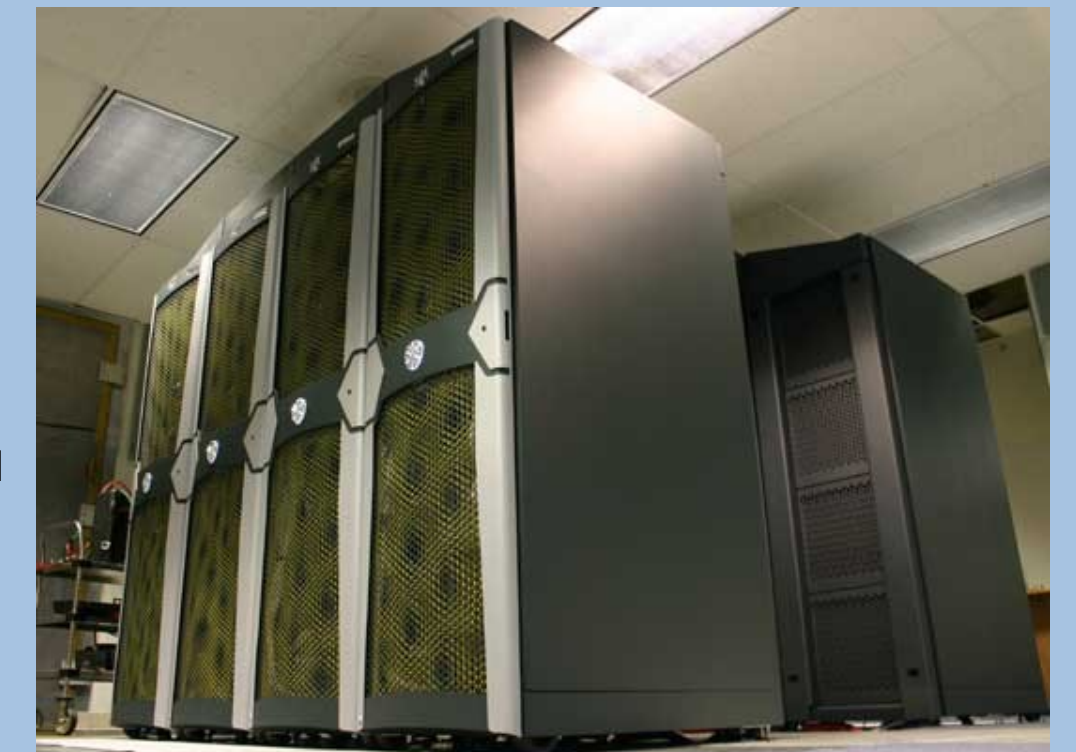
NEW HPC SYSTEM

The Current HPC system that is on operational service since 2003, will be replaced with a new in 2009 through a bid procurement that was completed in 2008. The New HPC system's peak performance is about 42 times bigger (3.4 Tflops) than the current system. Installation is expected to be completed in May-2009.

SGI Altix 4700

• 512 core based Intel Itanium2 Montvale
• Clock speed of processors: 1.67 GHz.
• Total Peak performance 3.4 TFlops
• Total memory 1 TB
• Total Disk Space: 20 TB
• 7 service node for login, post-processing and management

HPC system topology

Observation Quality Control Procedures used in TSMS

Various quality control procedures are applied in Turkish State Meteorological Service to ensure the validity of the observations. Currently, predefined control tests are operationally used to determine the legality of the hourly synoptic observations gathered from the 125 sites all around Turkey are flagged. The control procedures for each test and the flag types are explained below in details.
Flagging Procedure (Modified from Shafer *et al.*, 1999)

Flag Value	Status	Brief Description
0	Good	Datum has passed all QA Test
1	Suspect	There is concern about accuracy of datum
2	Warning	Datum is very questionable
3	Failure	Datum is unstable

1. RANGE TEST
• Test is used to see if data is in acceptable range
• The **RANGE LIMITS** are obtained by;
   - Climatological Records
   - Instrumental Limitations
Procedure:
IF Obser > LimUpper **OR** Obser < LimLower **THEN** Observation. is flagged as "**Failure**"

2. STEP TEST
• Test is used to see if increment/decrement between the following two observation is in acceptable range
• The MAX STEP ALLOWANCE amount is obtained by;
      -Personal expertise
      -Instrumental Limitations, Literature
Procedure:
   IF |Obserj,t-Obserj,t-1| > (Max Step)j **THEN** Obserj,t & Obserj,t-1 are flagged as "**Warning**"

3. PERSISTANCE TEST
• Test is used to determine the damaged instruments or those stuck at a particular reading
      ΔT : Time window for a parameter
      Δ = MAX(ΔT) - MIN(ΔT)
Procedure:
IF Δ < ΔThreshold **THEN** Obseri of ΔT are flagged as "**Warning**"
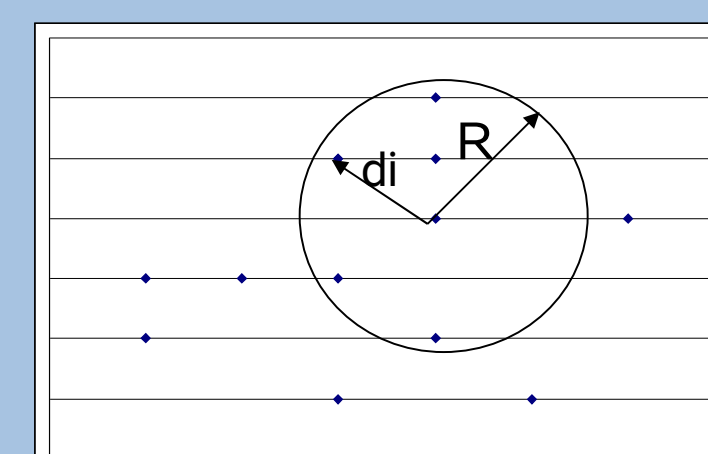**IF** ΔThreshold <Δ < 1.5*ΔThreshold **THEN** Obseri of ΔTare flagged as "**Suspect**"

4. LIKE INSTRUMENT TEST
• Test is used to compare the pair of similar parameters at different hights(such as wind at 2 and 10 m)
Δ = |PH1-PH2|
ΔHFThreshold :10
Procedure:
IF ΔHF > ΔThreshold **THEN** PH1& PH2 are flagged as "**Suspect**"
IF ΔHF > 2* ΔThreshold **THEN** PH1& PH2 are flagged as "**Warning**"

5. AREAL TEST

$$Z_e = \frac{\sum_{i=1}^{m} w(d_i)z_i}{\sum_{i=1}^{m} w_i}$$

$$\Delta = \frac{Z_e - Z_o}{\sigma}$$

Z_e : Estimated value
Z_o : Observed value
σ : Variance of m obser.

$$w(d_i) = e^{-4\left(\frac{d_i}{R}\right)^2}$$

Procedure:
IF Δ > 2*σ THEN Zo is flagged as "Suspect"
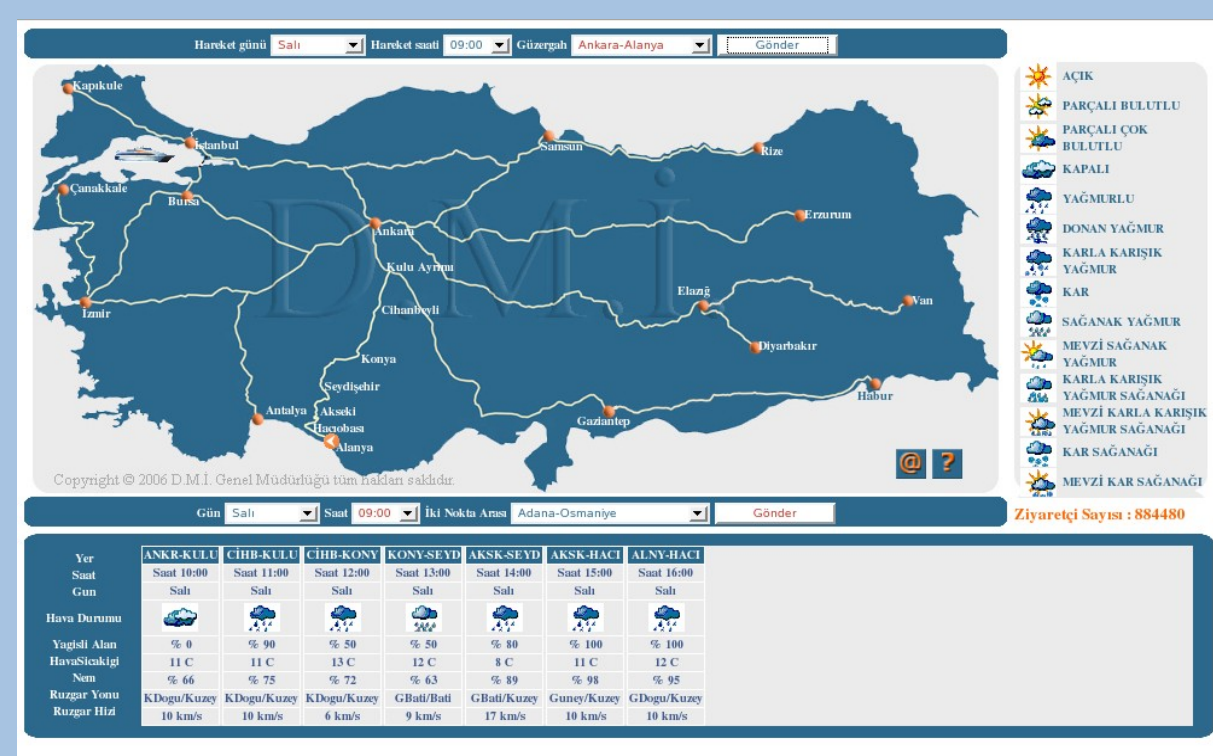**IF** Δ > 3*σ THEN Zo is flagged as "Warning"

Future Work :
All the predefined tests mentioned above and some additional alternative tests are in consideration to set same type of quality control system design for the data gathered from AWOS (Automated Weather Observation Station) sites. The ongoing project is almost done and the same study is planned to be extended to cover the climate data as well.