

Progress Report on Global Data Processing System For 2002

ISRAEL METEOROLOGICAL SERVICE

1. Summary of Highlights

- During 2002 a considerable effort was devoted to further development of the forecasters interface through Intranet.
- Use of tools through Intranet was enabled to Real Time on-line users.
- A quasi-operational run of regional model with increased horizontal (about 13km) and vertical (30 layers) resolutions has been tested.
- The NWP Server was upgraded at the end of the year - a new SGI O300, 8 cpu, was installed.

2. Equipment in Use

2.1 operational equipment

| Computer | Memory (MB) | Operating system |
|--------------------------------|-------------|------------------|
| 1xSGI O300 server, 8 cpu | 2048 | IRIX 6.5.18 |
| 1xSGI Origin 200 server, 1 cpu | 512 | IRIX 6.5.13 |
| 1xSGI Origin 200 server, 1 cpu | 256 | IRIX 6.5.13 |
| 1xSGI O2 workstation | 64 | IRIX 6.3 |
| 3xSGI INDY workstations | 64 each | IRIX 6.2 |
| 4xSGI INDY workstations | 32 each | IRIX 6.2 |

Total disc storage is about 135 GB (including external SCSI RAID)

External devices:

- 1 Roland DPX-2700 plotter
- 1 Roland DPX-3600 plotter
- 1 Dataproducts CI-500e line dot matrix printer

One of the Origin 200 computers is used as a database server and the other is used as a communication server, while O300 is used mainly for NWP operational and research activities.

2.2 Communications

- ETHERNET
- Point to point links
- National Frame Relay network
- Frame Relay link to RTH Offenbach (64 Kb)
- Internet (1Mbps)

3. Data and Products from GTS in Use

3.1 Data

Data from the northern hemisphere supplied by RTH Offenbach.

3.2 Products

A number of products received in a 24-hour period:

| | |
|-------------------|----------------|
| GRID KWBC | 32 bulletins |
| GRID EGRR | 920 bulletins |
| GRID EDZW | 1106 bulletins |
| GRIB EDZW | 150 bulletins |
| GRIB EGRR | 26 bulletins |
| GRIB ECMF | 182 bulletins |
| CDF in T.4 format | 90 charts |

4. Data Input System

Fully automated. INFORMIX DBMS is used for the data management.

5. Quality Control System

No change.

6. Monitoring

No change.

7. Forecasting System

7.1 System run schedule

| <u>Time (UTC)</u> | <u>System running</u> |
|-------------------|-------------------------------|
| 01:40 | 00 UTC preliminary analysis |
| 02:00 | 00 UTC MM4 forecast (00h-24h) |
| 03:05 | 00 UTC HRM forecast (00h-78h) |
| 03:40 | 00 UTC main analysis |
| 06:10 | 00 UTC WAM forecast (00h-48h) |
| 10:40 | 00 UTC final analysis |
| 13:40 | 12 UTC preliminary analysis |
| 14:00 | 12 UTC MM4 forecast (00h-24h) |
| 15:05 | 12 UTC HRM forecast (00h-78h) |
| 15:40 | 12 UTC main analysis |
| 18:10 | 12 UTC WAM forecast (00h-48h) |
| 22:40 | 12 UTC final analysis |

MSL pressure analysis is carried out every 3 hours with cut-off of 0:40 and 2:40 hrs.

7.3 Short-range forecasting system.

There is no essential change in MM4 model run which is still used for a preliminary guidance.

7.3.2 HRM Model

1. Operational model - Rotated spherical grid, mesh size=0.25° (~ 27 km), Arakawa C-grid. Hybrid vertical coordinates, 20 layers.

2. Hereby are the characteristics of a new regional model used quasi-operationally.
Experimental model (from October 2000) - Geographical coordinate system, mesh size=0.125° (~ 13 km), Arakawa C-grid. Hybrid vertical coordinates, 30 layers.

Analysis and forecast data of GME from DWD are used as initial and lateral boundary data for both models.

7.3.3 The products of short-range models run

The products are: sea level pressure, geopotential, temperature, wind and relative humidity at 1000, 975, 950, 925, 900, 850, 700, 500 and 300 hPa.

Surface level: temperature, max/min temperature, wind, relative humidity, cloud amount and accumulated 6-hours precipitation. All operational model products are predicted for 6 to 78 hours with output every 6hr.

The operational model runs twice a day based on 00 UTC and 12 UTC.

The graphical output products of the operational model produced by GRADS with temporal resolution of 2hr, available on the Intranet, are: sea level pressure, geopotential, temperature, wind, relative humidity, cloud amount and accumulated 2-hours precipitation.

Surface level model products for 40 main localities are available with temporal resolution of 1 hour.

Backward trajectories for some specific sites, as well as forward trajectories from the main coal burning power plants, are also available.

8. Verification of prognostic products

HRM(IR) main verifications against analysis for the region (27E-37E,28N-40N)

| RMS error of mean sea level pressure (hPa) | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 24h | 1.4 | 1.4 | 1.4 | 1.4 | 1.2 | 1.1 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.4 |
| 48h | 1.7 | 1.8 | 1.9 | 1.7 | 1.3 | 1.5 | 1.9 | 1.8 | 1.3 | 1.2 | 1.5 | 1.7 |
| 72h | 2.2 | 2.1 | 2.3 | 2.2 | 2.1 | 1.8 | 2.5 | 2.4 | 1.8 | 1.6 | 1.9 | 2.3 |
| RMS error of geopotential height at 500 hPa (m) | | | | | | | | | | | | |
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 24h | 11 | 14 | 10 | 12 | 12 | 10 | 9 | 8 | 9 | 11 | 9 | 10 |
| 48h | 19 | 20 | 15 | 17 | 14 | 13 | 12 | 13 | 10 | 10 | 10 | 13 |
| 72h | 27 | 21 | 24 | 19 | 18 | 15 | 16 | 15 | 14 | 16 | 21 | 21 |
| RMS error of temperature at 850 hPa (C°) | | | | | | | | | | | | |
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 24h | 1.0 | 1.1 | 1.3 | 1.3 | 1.2 | 1.2 | 1.1 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 |
| 48h | 1.1 | 1.3 | 1.5 | 1.6 | 1.6 | 1.7 | 1.4 | 1.3 | 1.4 | 1.4 | 1.2 | 1.1 |
| 72h | 1.3 | 1.6 | 1.9 | 2.1 | 2.0 | 1.9 | 1.5 | 1.5 | 1.7 | 1.6 | 1.4 | 1.2 |

The verifications for the experimental model with resolution 0.125° show minor differences from the operational HRM model, but the quality of the precipitation forecast is essentially higher.

In **wave forecasting** a regional “WAM” model was used.

WAM is a third generation spectral model restricted to the Eastern Mediterranean domain from 30° N to 39° N and 15° E to 37° E with resolution of 0.25° latitude and 0.25° longitude.

9. Plans for the future

- Further Improvement of the regional model in collaboration with DWD.
- Further development and improvement of the experimental regional model, to become the new operational model.
- An ongoing improvement of the forecasters tools.