WORLD WEATHER WATCH TECHNICAL PROGRES REPORT ON THE GLOBAL DATA-PROCESSING SYSTEM FOR THE YEAR 2003

ISLAMIC REPUBLIC of IRAN

Islamic Republic of Iran Meteorological Organization (IRIMO)
P.O. Box 13105-461
Tehran, Islamic Republic of Iran
Web: http://www.irimet.net/

This report summarises the global data processing system activities carried out at the numerical weather prediction section of **IRIMO** weather forecasting centre.

1. Summery of highlights

The numerical weather prediction system has stepped into operational phase at the **IRIMO** in the recent years. There are some major events during 2003 which are listed below:

- Calibration and tuning of the MM5 modelling system over Iran for operational weather forecasts,
- Running of ARPS model for some test cases mainly for research purposes,
- Quality control of the received data from GTS.

2. Computing facilities

- Main computer : ES/9000
- PC : 50 pentium4, 20 pentium3, laser printers

3. Data and products from GTS in use

3.1 Data in use:

- SYNOP + SYNOP / SHIP : 1800
- TEMP + TEMP / SHIP : 140

3.2 Products in use

- GRID KWBC : 200
- GRID EGGR : 200
- GRID ECMWF : 200

- GRIB ECMWF : 1400
- GRIB EGRR : 1400

4. Data input system

Fully automated system

5. Quality control system

- Automated quality control of incoming data based on horizontal consistency check for SYNOP messages and hydrostatic control for TEMP messages.
- Also incoming data are checked against NWP products.

6. Monitoring of the observing system

- Surface observation and upper air data are monitored on national level.
- Regional monitoring(1_5&1-15 october) is done automatically every year.

7. Forecasting system

The MM5 modelling system is operationally launched once a day (0000GMT), providing 102 hours forecast.

7.1 System runs schedule

The forecasting system at the NWP section of **IRIMO** is based on MM5 model, which is launched once a day (0000GMT), providing 102 hours forecast. The initial and boundary conditions are downloaded via internet from NOAA (AVN output).

7.2 Medium - range forecasting system (4 – 10 days)

- N/A

7.2.1 Data assimilation , objective analysis and initialisation

- N/A

7.2.2 Forecast model

- There is no medium - range forecasting model which is integrated at the **IRIMO**.

7.2.3 Numerical weather prediction products in use

- The numerical weather prediction products in use are as follows:

EGGR:

Wind + T (00 – 48)	MSLP, 850, 700, 500, 300, 250, 200
H (00 – 48)	850, 500, 700, 300, 200, 150, 100
H (00 – 120)	500
RH (00 – 30)	850, 700, 500

KWBC:

Wind + T (00 – 24)	850, 700, 500, 300, 250, 200
H (00 – 48)	1000, 500

ECMWF:

P (00 – 120)	MSLP
H (00 – 120)	500

Daily outputs of MM5 run at the IRIMO forecasting centre:

- P MSLP
- H, WIND, H 850 hPa
- H 500 hPa
- RH, WIND, H 700 hPa
- Precipitation, precipitable water, water content
- Vertical velocity, relative vorticity, advective vorticity at 850, 700 and 500 hPa
- $\Delta\theta_w$ (850, 700)
- $\Delta\theta_w$ (850, 500)
- $\Delta\theta_w$ (700, 500)

7.2.4 Operational techniques for application of the NWP products

- N/A

7.3 Short – range forecasting system (00 – 72h)

7.3.1 Data assimilation, objective analysis and initialisation

- N/A

7.3.2 Model

The MM5 modelling system was adopted for operational short – range (up to 3 days) forecasts over Iran. The model configuration is as follows:

- Dynamics : None – hydrostatic with three dimensional Coriolis force
- Main prognostic variables : u, v, w, T, p, and q
- Central point of the domain : 38N, 48E
- Number of horizontal grid points :115 and 95 grid points for x, y respectively
- Horizontal grid distance : 40 km
- Number of vertical levels : 23 half sigma levels
- Horizontal grid system : Arakawa B grid
- Time integration scheme : Time – Splitting
- Physical parameterisations :
  - Blackadar PBL scheme
  - Betts-Miller convection scheme

7.3.3 Numerical weather prediction products :

- Geopotential height, horizontal wind vector, vertical motion, temperature, relative humidity and vorticity at some pressure levels.

7.4 Specialised forecasts

- N/A

7.4.1 Assimilation, objective analysis and initialisation

- N/A

7.4.2 Models

- Two models are currently in use at the forecasting centre of **IRIMO** : MM5 modelling system adopted for prediction of mesoscale systems affecting weather over Iran and used for operational short-range weather forecasts, ARPS model applies mainly for research and development purposes.

7.4.3 Numerical weather products

- Same as 7.3.3

8. Verification of prognostic products

- The model outputs are compared against the observations in some post event studies for different types mesoscale systems in different seasons.
- Also all forecasts issued at the forecasting centre are routinely verified against the local observations locally (28 provinces) and the results are gathered in the forecasting centre.

9. Future lines of 2004

- Make use of cluster of PC's for advanced operational purposes.
- Adopting the ETA model over Iran for the prediction of mesoscale weather disturbances.