WWW TECHNICAL PROGRESS REPORT ON THE GLOBAL DATA-PROCESSING AND FORECASTING SYSTEM (GDPFS), AND THE ANNUAL NUMERICAL WEATHER PREDICTION (NWP) PROGRESS REPORT FOR THE YEAR 2005

ISRAEL METEOROLOGICAL SERVICE

1. Summary of Highlights

Major developments in GDPS in 2005 are as follows:

- A new SGI Origin 350 server was installed to upgrade database management at the IMS. Along with the server upgrading a new TP9100 storage array was installed to replace the old RAID 5 storage device.

- The AMDAR reports in the area of Europe and the Middle East were incorporated in the operational data processing.

- BUFR decoding / encoding software was developed in the 1st version.
ECMWF BUFR ver.000270 software was used as a basic routines library.
Starting on October 2005, all the bulletins supplied by the IMS to the GTS are packed into BUFR code and transmitted along with the TAC bulletins.

- BUFR bulletins containing AMDAR and ground data received at IMS are processed by the IMS data processing system.

2. Equipment in Use

2.1.1 Operational equipment

The IMS computing backbone is provided by SGI Origin 350 Unix server having 2 cpus (used for database management) , SGI Origin 200 Unix server having 2 cpus (used for communications tasks) and SGI Origin 300 Unix server having 8 cpus (used for NWP – operational and research activities).
All run under Irix, system version 6.5 .
4 SGI Indy and O2 workstations are used for software development.
A TP9100 storage array provides disc storage of 1 TB.

Peripheral equipment includes 2 IBM Infoprint 1357, laser A3 color printers used mainly for charts printing and 1 Dataproducts CI-500e line dot matrix printer for long reports printing.

2.1.2 Software in use at IMS

The main data bases, a real-time data base and an archive data base, are using INFORMIX 3.1.

The core computer environment is mainly Unix. The operational software is written mostly in Fortran 77 and Fortran 90, Java, Perl and Unix shell language. The WEB technology is used for the Intranet site development.
An Intranet site provides a working environment for the local and remote users.

A few systems are developed in the Windows environment using Power Builder software.

2.2 Communications

- No major changes.

3. Data and Products from GTS in Use

3.1 Data

Data from the northern hemisphere supplied by RTH Offenbach.

3.2 Products

3.2.1 Products received from GTS

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

GRIB EGRR	1018	bulletins
GRIB EDZW	1330	bulletins
GRIB ECMF	364	bulletins
CDF in T.4 format	158	charts

3.2.2 Products received from other sources

Gridded products in GRIB code from:
- DWD HRM.
- UKMO HRM.
- NCEP MRF model.
- MM5 model from Tel-Aviv University

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

Time (UTC)	System running
01:40	00 UTC preliminary analysis
02:50	00 UTC IMS HRM forecast (00h-78h)
03:30	00 UTC quasi-operational WAM forecast (00h-72h)
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
14:50	12 UTC IMS HRM forecast (00h-78h)
15:30	12 UTC quasi-operational WAM forecast (00h-72h)
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.

7.3.2 Regional Forecasting Model

No change.

7.3.3 The products of short-range models run.

No change.

7.3.4 Wave model

In order to change the status of the new wave model from quasi-operational to operational, the following verification process has been adjusted for operation.
In this verification we compare the model derived wave heights interpolated for three Focal points on the Israeli coast where waves are measured constantly by wave gauges off the ports of Haifa, Hadera and Ashdod.

The wave model is operated for prediction periods of 12, 24, 36, 48, 60 and 72 hours, and the comparisons are done for the hours 00 and 12 GMT.
The statistical variables calculated are mean absolute error (MAE), standard error (STDE) and scatter index (SI) (standard deviation of the errors divided by the mean measurement).
In the following 3 tables we present the statistical variables for Haifa, for March – October.

Table1: MAE of wave heights (cm) in Haifa

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
12h	20	21	23	19	23	24	23	32
24h	21	24	24	21	23	25	24	31
36h	21	26	26	23	23	25	25	32
48h	21	26	27	22	24	25	26	32
60h	23	28	26	25	23	26	26	32
72h	23	25	29	27	23	27	29	33

Table2: STDE of wave height (cm) in Haifa

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
12h	3	4	2	2	1	1	3	4
24h	5	4	2	3	2	1	4	4
36h	5	4	3	3	2	2	4	5
48h	5	5	3	3	2	2	4	5
60h	6	5	3	4	3	2	5	6
72h	9	6	3	4	3	2	6	6

Table3: SI of wave height (%) in Haifa

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
12h	28	24	17	20	12	13	22	28
24h	29	25	17	20	12	13	22	27
36h	30	26	19	21	12	13	23	28
48h	31	32	22	23	13	14	23	32
60h	36	32	22	23	15	15	28	34
72h	32	38	23	22	16	15	27	36

8. Verification of prognostic products

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

RMS error of mean sea level pressure (hPa)

	IR (0.25°)								IH (0.125°)			
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
24h	1.4	1.5	1.2	1.2	1.3	0.9	1.0	1.1	0.9	1.0	1.0	1.2
48h	1.9	1.9	1.8	1.7	1.5	1.3	1.5	1.8	1.3	1.1	1.4	1.6
72h	2.6	2.4	2.3	2.1	2.3	2.0	1.9	2.3	1.6	1.2	1.9	1.8

RMS error of geopotential height at 500 hPa (m)

	IR (0.25°)								IH (0.125°)			
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
24h	13	13	10	10	11	8	7	7	8	9	9	10
48h	20	20	17	16	13	11	10	10	9	12	15	16
72h	29	25	25	20	16	15	13	13	12	17	16	19

RMS error of temperature at 850 hPa (°C)

	IR (0.25°)								IH (0.125°)			
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
24h	1.1	1.3	1.0	1.3	1.3	1.1	1.1	1.2	1.2	0.9	0.9	1.0
48h	1.3	1.6	1.6	1.7	1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.3
72h	1.6	1.9	2.0	2.1	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.7

9. Plans for the future

- Further improvement of the regional model in collaboration with DWD.
- An ongoing improvement of the users' tools.
- Development of a verification scheme especially for Synoptic types.
- Probing the LM model as a possible candidate for the next generation of Regional Model, in collaboration with DWD.
- Cooperation agreement with the ECMWF.