# Verification of Models Used by the Israel Met. Service

Amos Porat

Israel Meteorological Service

# General Description

- Several models are used by the forecasters of the Israel Meteorological Service (IMS)
- Different results are provided by the models
- Verification of the results was made for Eastern Mediterranean stations
- Presentation of the results

# Models used by the IMS

- ECMWF Global High Resolution (EH) 2.5°x2.5°
- UKMO High Resolution (BH) 0.56°x0.83°
- Offenbach High Resolution from GME (OH) 0.36°x0.36°
- MM5 IAF High Resolution (AH) 0.21°x0.21°
- US NCEP Global Model (NC) 1.25°x1.25°
- NOGAPS US Navy Global Model (NG) 1.0°x1.0°
- IMS High Resolution Regional Forecast (IH) 0.125°x0.125°
- IMS High Resolution Regional Forecast Test (IT) 0.125°x0.125°

# Forecasted Elements and Time Range

- Sea level pressure
- Geopotential height
- Temperature
- Relative humidity
- Other (wind, rainfall, waves, etc.)

+00 to +168 every 6, 12 or 24 hours depending on the model

# Models - Forecast Range and Elements

- ECMWF: +24h to +168h every 24h for SLP, 500 mb GPH, 850 mb temp + Rh and 700 mb RH
- UKMO: +00h to +72h every 6h
  +72h to +132h every 12h
  for most elements
- Offenbach: +00h to +72h every 6h, +84h
  +96h to +168h every 24h
  for most elements
- IMS Regional: +00h to +78h every 6h
  for most elements

# Station List

- 40179 – Bet Dagan, Israel
- 16716 – Athens, Greece
- 16754 – Heraklion, Greece
- 17130 – Ankara, Turkey
- 17210 – Izmir, Turkey
- 17240 – Isparta, Turkey
- 17280 – Diyarbakir, Turkey
- 17351 – Adana, Turkey

# Station List (cont.)

- 17607 – Thalassa, Cyprus
- 40100 – Beyrouth, Lebanon
- 40375 – Tabuk, Saudi Arabia
- 62306 – Mersah Matruh, Egypt
- 62337 – El Arish, Egypt
- 62378 – Helwan, Egypt
- 17280 – Farfara, Egypt

# Methods of Verification

Root Mean Square Error (RMSE) of model results vs. radiosonde data:

For each station

For each month of 2005

For main elements

For main time ranges

# Presentation of the Results

- Each station is encircled by the RMSE of the various models
- The models with the least value of the RMSE are marked.
- Also marked – models with RMSE values that are less than least RMSE+10%
- A table sums the best models

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# Verification Results for the Seasons (1)

**<u>Winter (January-March)</u>, +24h to +120h**

- Sea level pressure: ECMWF with the best results
- 500 mb GPH: ECMWF and UKMO are equally best
- 850 mb Temp. : ECMWF with the best results shortly followed by UKMO
- 850 mb RH: ECMWF and UKMO are equally best

24h, 48h, ECMWF best for 72h and more

# Verification Results for the Seasons (1a)

**<u>Winter (January-March)</u>, cont.**

- 500 mb and 700 mb. Temp. : Small differences between UKMO, Offenbach, NCEP and IMS
- 500 mb and 700 mb. RH: UKMO with the best results
- 700 mb and 850 mb. GPH: UKMO with the best results

Note: ECMWF not included

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# Verification Results for the Seasons (2)

**<u>Spring (April-May),</u> +24h to +120h**

- Sea level pressure: ECMWF with the best results shortly followed by NCEP
- 500 mb GPH: ECMWF with the best results shortly followed by NCEP and UKMO
- 850 mb Temp & RH. : ECMWF with the best results
- 700 mb RH: ECMWF with the best results shortly followed by NCEP/UKMO/Offenbach

# Verification Results for the Seasons (2a)

**Spring (April-May), cont.**

- 500 mb and 700 mb. Temp. : UKMO and NCEP with the best results
- 500 mb RH: UKMO with the best results
- 700 mb and 850 mb. GPH: UKMO with the best results up to +24h. Other models equal for +36h or more
- 925 mb Temp. : IMS with the best results shortly followed by UKMO

Note: ECMWF not included

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# Verification Results for the Seasons (3)

**Summer (June-September), +24h to +120h**

- Sea level pressure: No significant difference between models
- 500 mb GPH: ECMWF with the best results
- 850 mb Temp. : ECMWF and NCEP are equally best
- 850 mb RH: NCEP with the best results
- 700 mb RH: ECMWF, UKMO and NCEP are equally best

# Verification Results for the Seasons (3a)

- **<u>Summer (June-September),</u> cont.**
- 500 mb and 700 mb. Temp. : Small differences between UKMO, Offenbach, NCEP and IMS
- 500 mb RH: UKMO and NCEP equally best
- 700 mb and 850 mb. GPH: UKMO with the best results shortly followed by NCEP
- 925 mb Temp. : IMS with the best results

Note: ECMWF not included

# Summary of Results

- **Winter**
  ECMWF with the best results, followed by UKMO
- **Spring**
  ECMWF with the best results, followed by UKMO and NCEP
  IMS with good results for low levels

# Summary of Results (cont.)

- **Summer**
  ECMWF and NCEP with the best results, followed by UKMO
  IMS with good results for low levels

# Conclusions

- ECMWF with the best results especially in winter
- Good results for UKMO
- UKMO with the best results when ECMWF is not included
- Good results for NCEP in Spring and Summer
- IMS Reg. Good for low levels
- Verification to be continued