SEECOF-10 verification for DJF 2013-2014 over Israel

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a. Precipitation

1) The SEECOF-10 precipitation outlook had no preference for any climate defined category (Fig. 1). Therefore a-priori the forecast skill was zero.

2) The average DJF 2013-14 precipitation observed for Northern and Central Israel was 242 mm. This value is 19% below median, 28% below average and therefore it resides well in the "below normal" tercile (Figs. 2a, 2b).

3) Examining the results of 12 GPC's (Figs. 3, 4) show that only Washington and CPTEC (Brazil) gave a correct negative anomaly. Exeter and Pretoria gave a strong erroneous positive anomaly. All the other centers did not indicate a strong precipitation anomaly. As the models climatology is not known it is possible only to evaluate the anomaly sign.
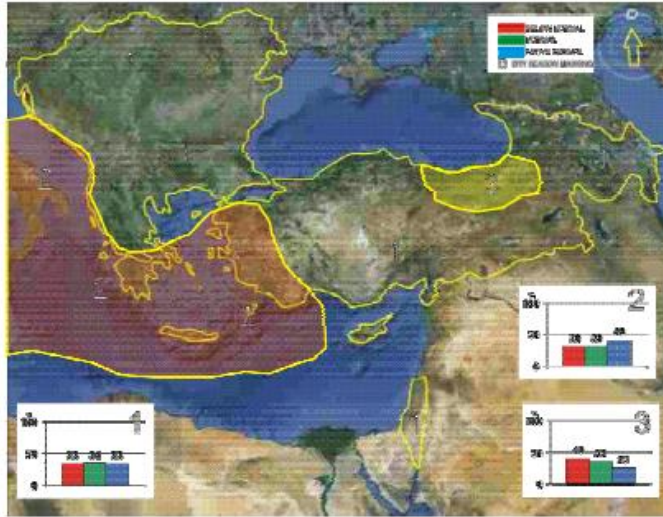
Figure 2. Graphical presentation of the 2013/14 winter precipitation outlook

Fig. 1: The SEECOF-10 DJF precipitation forecast map that shows the probabilistic consensus forecast for tercile categories of anomalies of seasonal mean precipitation, relative to the period 1981-2010.
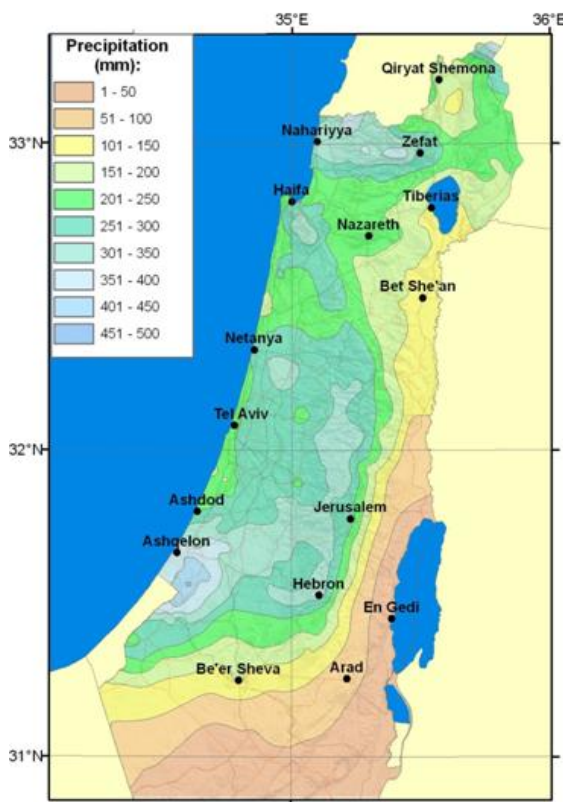

Fig 2a: Accumulated precipitation (mm) December 2013 to February 2014
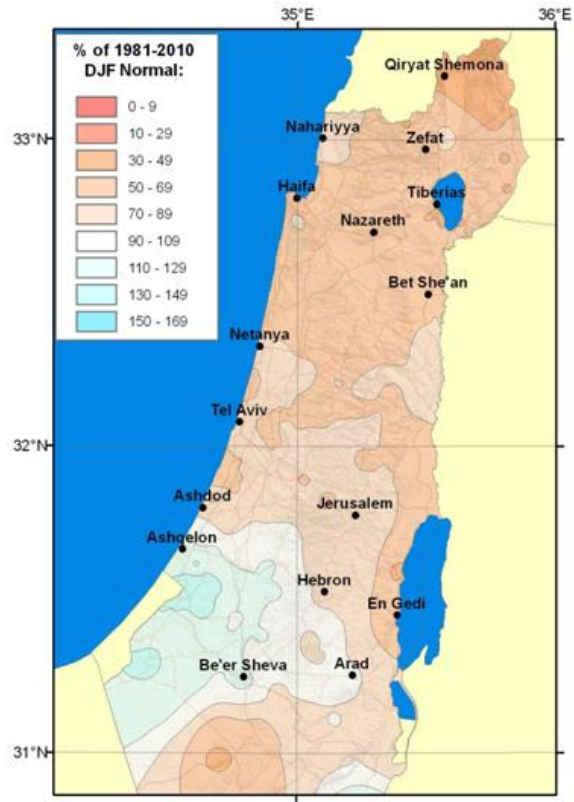
Fig 2b: Accumulated precipitation December 2013 to February 2014 - percent of normal
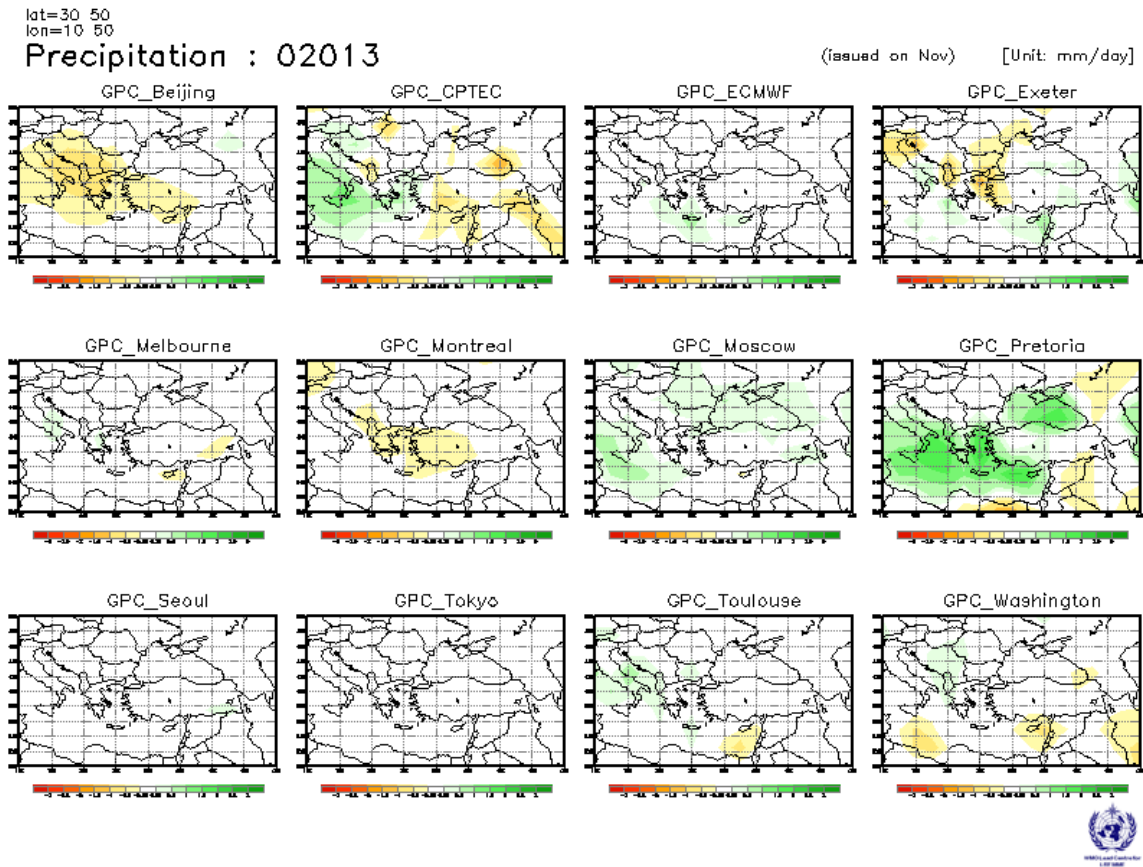
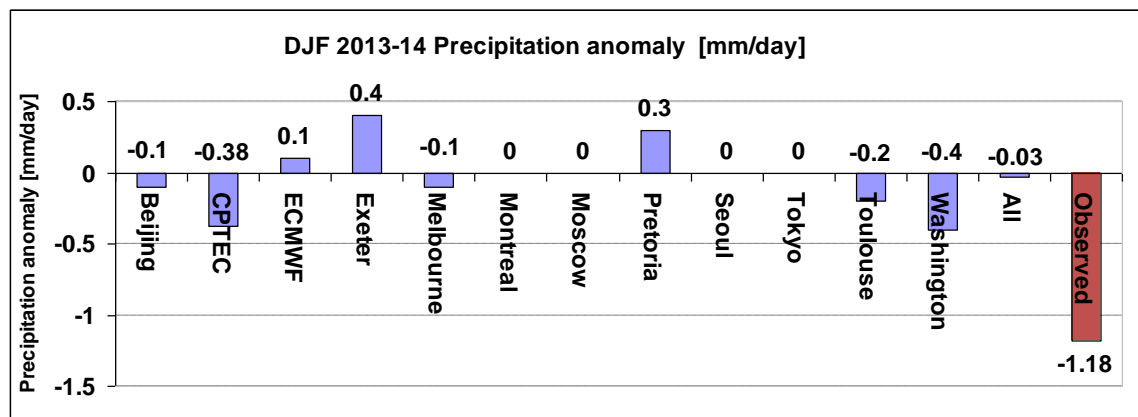Fig 3: 12 GPC forecast for DJF precipitation anomaly over the SEECOF domain.

Fig 4: The 12 GPC forecast precipitation anomaly in mm/day for DJF over Israel. The values were subjectively retrieved from figure 3.

b. Temperature

1) The SEECOF-10 temperature outlook assigned 40% chance for the "above normal" tercile, 35% for the "normal" tercile and 25% for the "below normal" terciles (Fig. 5).

2) The average temperature of five stations, which represent most of the country's climate regimes, was used. The stations used are: Eilat (southern Israel) Negba (southern coastal plan), Bet-Gimal (central low mountain ridge), Jerusalem (central mountain ridge) and Zefad (Northern mountain ridge). The choice was proved to be correct as these stations' average temperature for the last decade (2001-2010) turned out to be almost identical to the average temperature produced from 39 stations spread all over the country. It can be seen from figure 6 that the DJF average temperature resides in the "above normal" tercile.

3) The Rank Probability Skill Score* compared to an equal probability forecast (climatology) is positive with a value of 0.24.

4) Examining the results of 12 GPC's (Figs. 7, 8) shows that: Toulouse, ECMWF, and Seoul indicated a correct positive anomaly. CPTEC, Exeter, Moscow and Pretoria indicated a an erroneous negative anomaly.
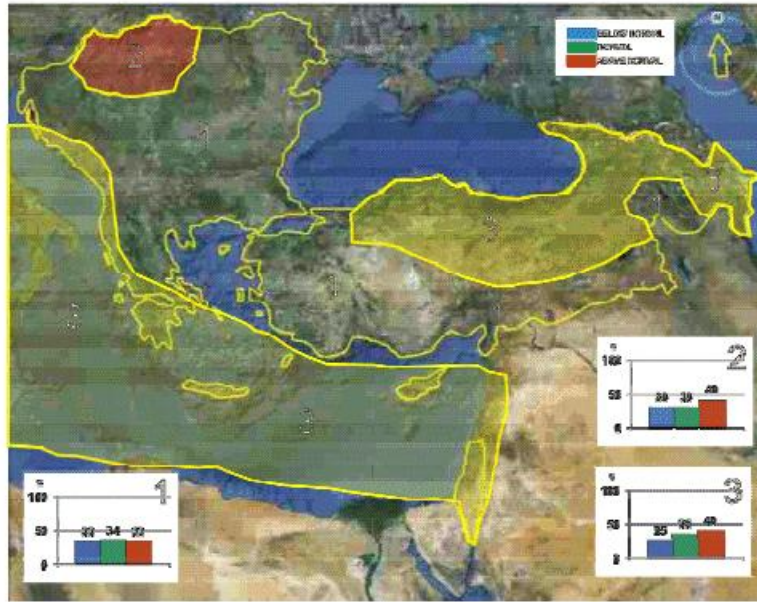
Figure 1. Graphical presentation of the 2013/14 winter temperature outlook

Fig. 5: The SEECOF-10 DJF temperature forecast map that shows the probabilistic consensus forecast for tercile categories of anomalies of seasonal mean temperature, relative to the period 1981-2010.
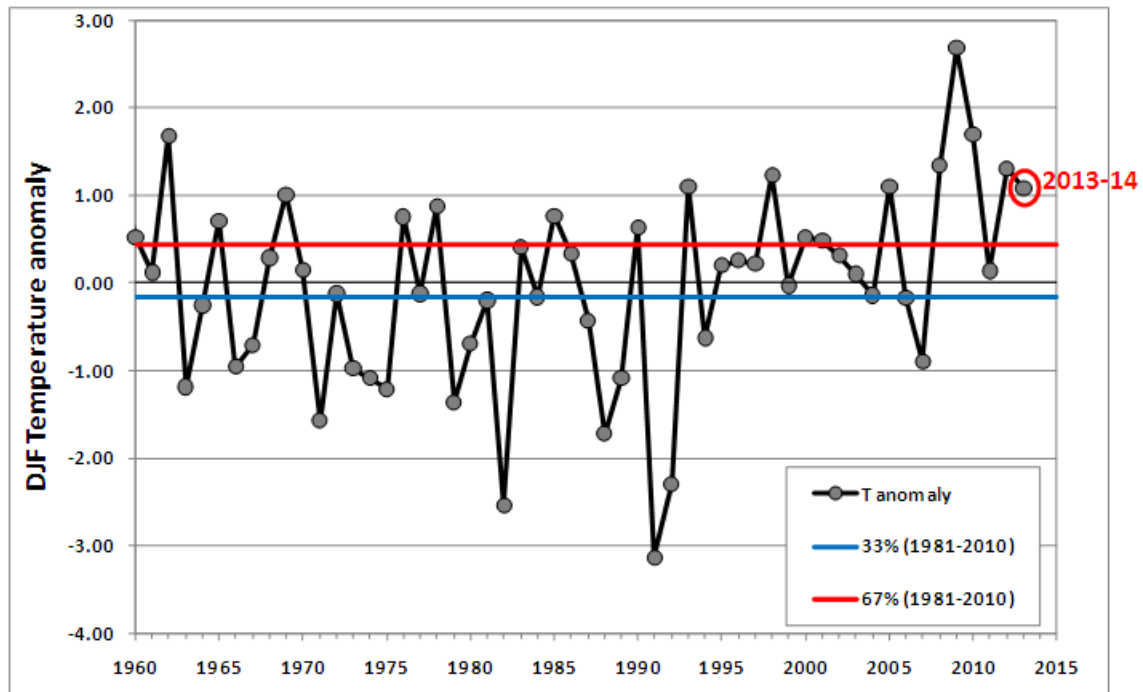

Fig. 6: DJF temperatures anomalies from 5 representing stations in Israel. The horizontal lines are the upper and lower tercile thresholds for the 1981-2010 reference periods.
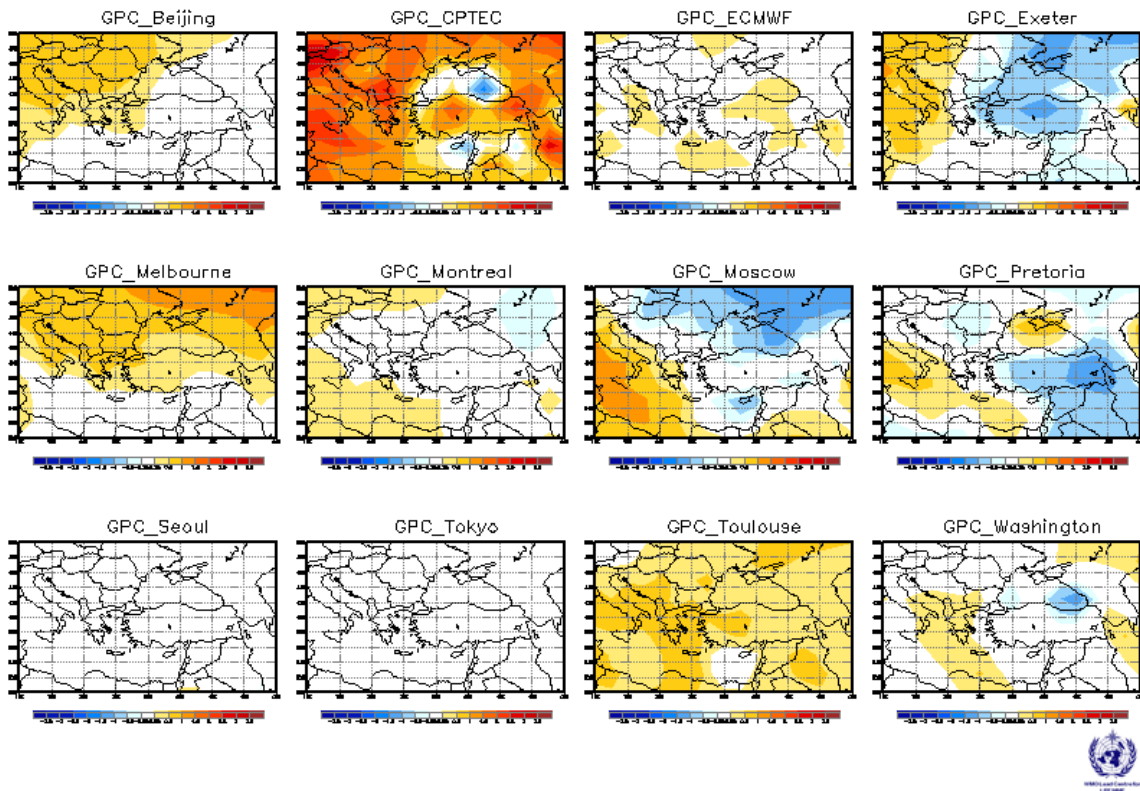
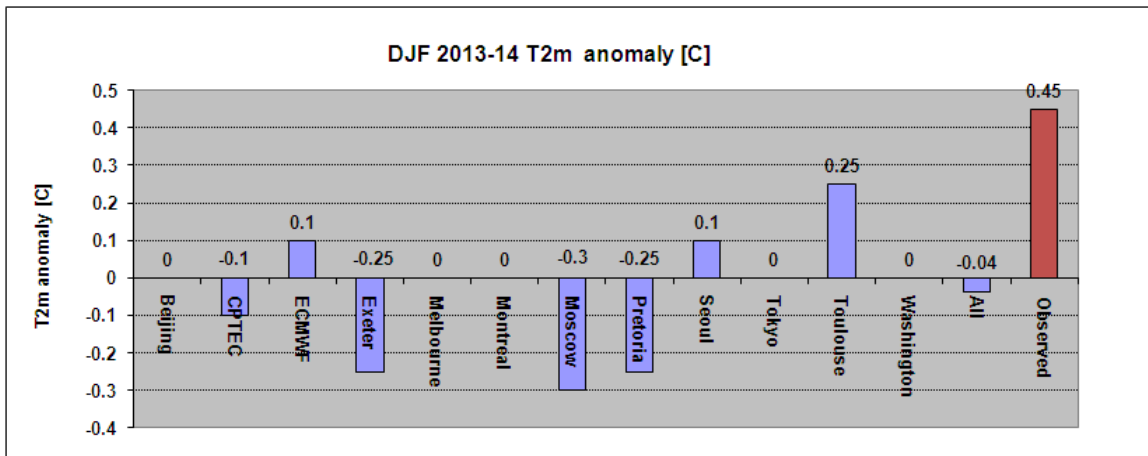Fig 7: 12 GPC forecast for DJF temperature anomaly over SEECOF domain.

Fig. 8: The 12 GPC forecast temperature anomaly for DJF over Israel. The values were subjectively retrieved from figure 6. The "observed" value is the average of five stations anomaly calculated for 1981-2010 reference periods (table 2).

<u>*Rank Probability Skill Score</u>

The Rank Probability Skill Score (RPSS) is essentially an extension of the Brier score to 3 event situation.

$$RPS = \sum_{m=1}^{j} \left[\left(\sum_{j=1}^{m} F_J \right) - \left(\sum_{j=1}^{m} O_j \right) \right]^2$$

Where F and O denotes the Forecast and Observed values, respectively for tercile forecasts j=3.

The skill score is defined by:

$$RPSS = 1 - \frac{RPS}{RPS_{c\lim}}$$

Were RPS$_{clim}$ is obtained by assigning equal probability of 33.33% to all categories.