Annex

Country: Israel

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Assessment of the seasonal forecast for the winter season

DJF 2014-15

1. MedCOF-3 Climate outlook for the 2014-15 winter season:

The MedCOF-3 temperature outlook assigned 50% chance for the "above normal" tercile, 30% for the "normal" tercile and 20% for the "below normal" terciles (fig. 1).

The MedCOF-3 precipitation outlook had no preference for any climate defined category. Therefore a-priori the forecast skill was zero (fig. 2).

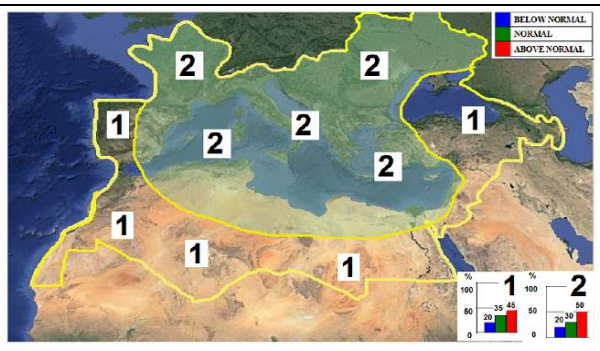

Fig. 1: 2014/15 winter temperature outlook

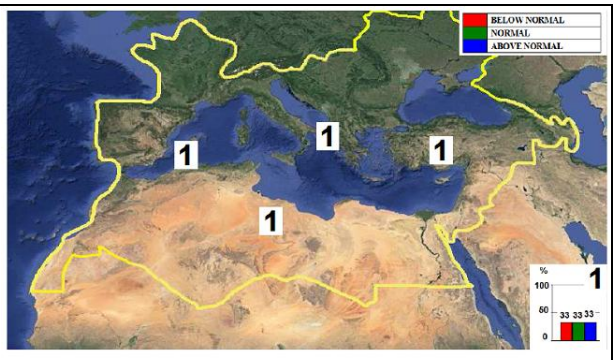

Fig 2: 2014/15 winter precipitation outlook

2. Analysis of the 2014-15 winter season:

Temperature

The Average temperature from five representing stations: Eilat (southern Israel) Negba (southern coastal plan), Bet-Gimal (central low mountain ridge), Jerusalem (central mountain ridge) and Zefad (Northern mountain ridge) is presented is figure 3.

It can be seen from figure 3 that DJF 2014-15 average temperature resides in the "above normal" tercile calculated from the reference period of 1981-2010.

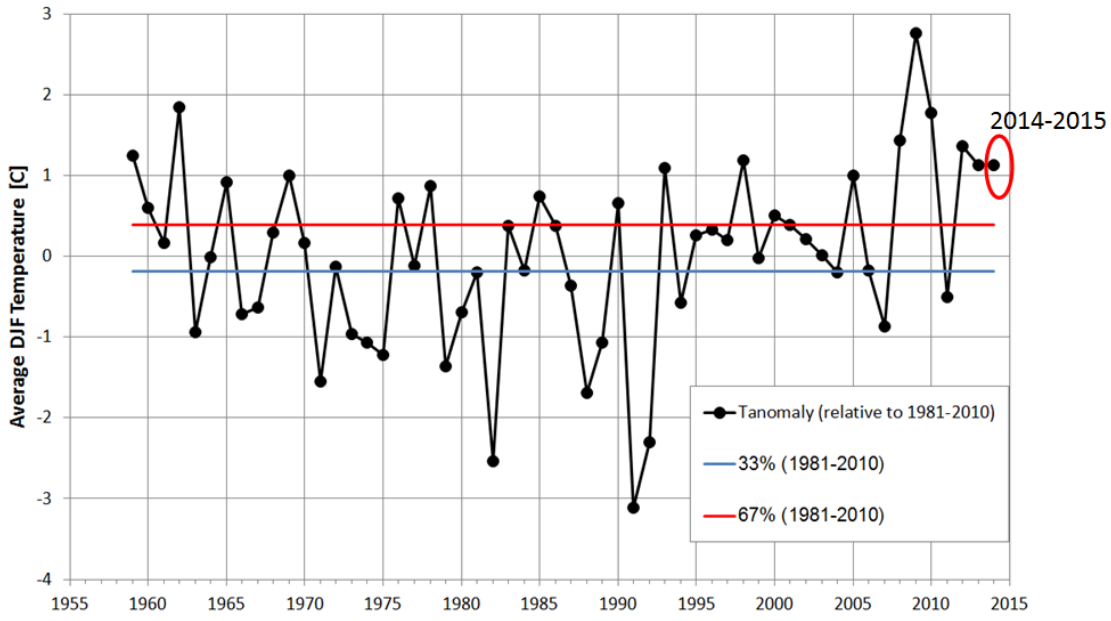

Fig. 3: DJF average temperature anomalies for Israel since 1959 (DJF 1959/1960). The horizontal lines represent the upper and lower tercile thresholds for the 1981-2010 reference periods.

Precipitation

The average DJF 2013-14 precipitation observed for Northern and Central Israel (average isohyet above 200 mm) was 322.6 mm (Figs. 4a, 4b). This value is 2.9% below the 1981/82-2010/11 average, 8.9% above the median and resides in the 66.3% percentile from the precipitation distribution. Hence, DJF 2014/15 resides in the “around normal” tercile but very close to the "above normal" tercile.

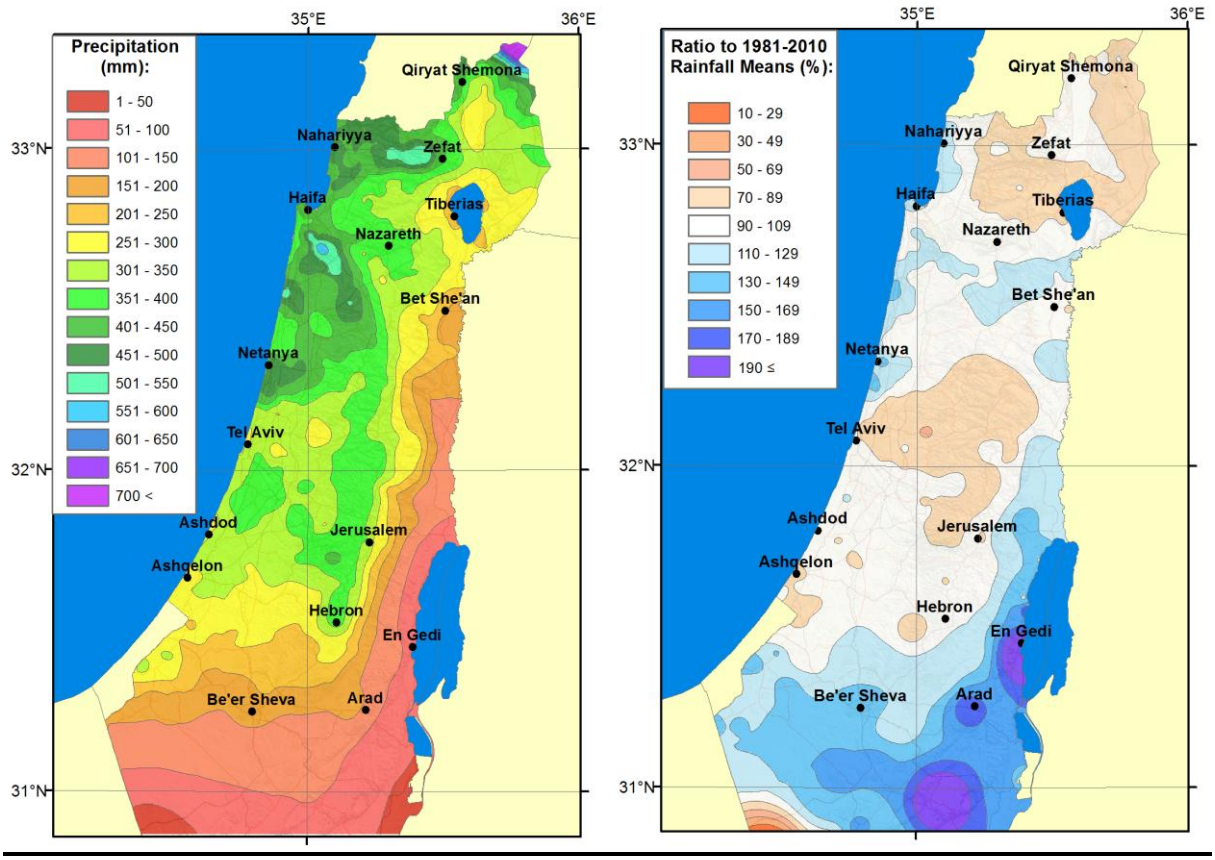

Fig. 4: (a) DJF 2014/15 accumulated precipitation (mm). (b) Percent of normal (1981-2010).

3. High Impacts Events:

DJF 2014-15 included two impact events of snow in Jerusalem, whereas, usually it happens only once in a year.

1. **The First event of snow in Jerusalem** - A major cold spell storm during 11^{th}-16^{th} of January 2014 which included:
    a. Snow depth of 1 m at the Hermon (2200 m above sea level), 0.3-1 m in the Galilee and Golan heights (900-1100 m). The snow cover reached low altitudes of 70 m ASL which has happened only 4-5 times since the 40s'. In Jerusalem the snow depth was only 5 cm.
    b. In North Israel the rain amount were in this event 150-220 mm. In the southern and central coastal plain the precipitation amounts were 100-150 mm.
    c. A record-breaking minimum temperature (since 1978) of -14.2ºC was measured at the Golan Heights (1100 m) , braking last year record of -13.6 ºC.

2. **The second snow event** - A cold spell during 8^{th}-11^{th} of February 2014 which included:
    a. Snow depth of 10-30cm in mountains above 300 m ASL in northern Israel and 500 m in Central Israel.
    b. In North Israel the rain amount reaches 30-60 mm.
    c. In Israel plain area the rain amounts were between 20-90 mm.
    d. In Central Mountain of Israel the precipitation amount was 80-140 mm.

4. Verification of the MedCOF -3 climate outlook for the 2014-15 winter season:

The table below is a verification summary of the climate outlook for the DJF 2014-15 to the reference period of 1981-2010.

Country	Seasonal temperature (DJF)			Seasonal precipitation (DJF)		
	Observed	MedCOF-1 climate outlook for temperature	Ranked Probability Skill Score*	Observed	MedCOF-1 climate outlook for precipitation	Ranked Probability Skill Score
Israel	above normal	50% above normal, 30% Around Normal and 20% Below Normal	0.48	around normal	Equal probability for all categories.	0.0 (By definition for an equal probability forecast)

*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.

Users' perceptions of the MedCOF-1 outlook

The seasonal forecast skill is still too low in order to provide it to decision makers in the government or to public services. As there are other professional and unprofessional seasonal forecasts in the air, we provide only the wide public with the seasonal forecast to show our efforts to deal with this tough issue. The most important forecast is for precipitation. As we did not indicate any preferable scenario, obviously the end users were not satisfied.