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Objective analysis of surface wind regimes over Israel using self-organizing maps

Sigalit Berkovic
Tel Aviv University, Tel-Aviv, Israel (berkovics@yahoo.com)

The surface wind across Israel is studied using the method of Self Organizing maps (SOMs). Emphasis is made on identifying the characteristic diurnal patterns at the synoptic hours during the winter months. The investigation is made by analyzing surface wind measurements from 53 Israel Meteorological Service (IMS) stations during 2006-2012. The relation between surface wind patterns and synoptic variables (temperature, specific humidity, geopotential height and synoptic wind) is obtained from calculation of averages of these variables according to the surface wind SOMs classification. The synoptic data is derived from ECMWF ERA40 data.
Under winter lows the flow over Israel is westerly with high steadiness (>0.8) and intensity (4-10 m/s). Under winter highs the flow over northern Israel is easterly with high steadiness (>0.8) and intensity. Wind intensity is proportional to the pressure gradient. Under transitional pressure gradients, the flow is determined by the local topography and the diurnal heating, its steadiness is relatively low and its intensity weakens.
The wind regimes are in agreement with previous subjective and semi-objective classification studies of surface flow under the frequent synoptic classes.
The ability to reconstruct subjective knowledge by an objective algorithm is crucial for future statistical climatological analysis and applications over Israel.