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Precipitation mapping assisted by means of subjective methods

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Accurate precipitation maps are an important tool for climatologic and hydrological purposes, since the spatial aspects of rainfall are critical parameters for diverse calculations concerning runoff, infiltration and evapo-transpiration rates.

The mapping of precipitation totals by means of spatial interpolation methods, such as IDW, Spline and Kriging, based directly on absolute data, is problematic, since they do not take into account the relationship between rainfall and topography.

While the relationship between rainfall and topography is complex and not easily computed by linear regressions or other objective methods, it can be better expressed through the subjective mapping by experts who are familiar with the climatic uniqueness of a specific region. However, the major drawbacks of such subjective methods, as compared with objective ones, are the time it takes to draw these maps, the eventual dissimilarities between maps prepared by different experts using the same database due to varying perceptions, and the difficulties in using the same methods without modifications in other places of the world.

The proposed process combines subjective and objective mapping methods, with a view of drawing from the advantages of each method while avoiding their disadvantages. This may be achieved in several steps, which among other things include the digitization of a subjective annual normals' map, the drawing of isomer maps, the interpolation of monthly relative quantities of rainfall, and the multiplying of maps in order to convert maps of relative data into maps of absolute data.

The mapping of a long record of years enables the elaboration of an improved annual normals' map, which may replace the digitized subjective map in a new loop of mapping with reduced subjective aspects.

The suggested interpolation method for the relative mapping of rainfall will be discussed in the context of precipitation mapping in Israel's terrain.