Meteorological Interpolation based on Surface Homogenized Data Basis (MISH)

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The MISH method was developed at the Hungarian Meteorological Service for the spatial interpolation of surface meteorological elements. This is a meteorological system not only in respect of the aim but in respect of the tools as well. It means that using all the valuable meteorological information – e.g. climate and possible background information – is required. For that purpose an adequate mathematical background is also necessary of course.

In the practice many kinds of interpolation methods exist therefore the question is the difference between them. According to the interpolation problem the unknown predictand value is estimated by using the known predictor values. The type of the adequate interpolation formula depends on the probability distribution of the meteorological elements! Additive formula is appropriate for normal distribution (e.g. temperature) while some multiplicative formula can be applied for quasi lognormal distribution (e.g. precipitation). The expected interpolation error depends on certain interpolation parameters as for example the weighting factors. The optimum interpolation parameters minimize the expected interpolation error and these parameters are some known functions of different climate statistical parameters e.g. expectations, deviations and correlations. Consequently the modelling of the climate statistical parameters is a key issue to the interpolation of meteorological elements.

The various geostatistical kriging methods applied in GIS are also based on the above mathematical theory. However these methods use only a single realization in time for modelling of the necessary statistical parameters that is neglecting the long data series which series form a sample in time and space alike. The long data series is such a speciality of the meteorology that makes possible to model efficiently the climate statistical parameters in question!

The MISH method has been developed according to the above basic principles. The main steps of the interpolation procedure are as follows.

- To model the climate statistical parameters by using long homogenized data series.

- To calculate the modeled optimum interpolation parameters which are some known functions of the modeled climate statistical parameters.

- To calculate the interpolation formula with the modeled optimum interpolation parameters and the predictor values.