

# **Errors in predicting spatial temperature distribution by multiple regression and optimal interpolation methods**

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Mean monthly temperature maps for the continental part of Croatia have been elaborated by multiple regression and optimal interpolation methods. Emphasis has been put on standard error prediction values for both procedures and selection of the most useful among the statistically significant regression models. Forward stepwise procedure used for defining the regression model showed that altitude is the most significant independent variable according to F-statistics for all twelve months. Also for some monthly means latitude and longitude have been significant independent variables. But in January and December, according to ANOVA analysis, a suggested model seems not to be also the useful one. The residual sum of squares has been too high compared to regression sum of squares, so  $R^2$  has been too low. Main reason for this is that winter temperature inversion affects the vertical temperature lapse rate and disturbs the temperature-to-elevation relationship. For other months multiple regression equations have been used for prediction of the preliminary temperature fields. Two urban sites have been detected as strong positive outliers so they have been removed from the regression analysis. Also one site had negative residual values of yet unknown origin during April to July so it has also been removed. The residuals (observed - predicted temperatures) have been optimally interpolated in order to explain nondeterministic part of the temperature field and errors have been calculated.