

STAT 406, Spring 2008
Assignment 2 (turn in by Thursday, February 22)

Using the functions in R we have discussed in class, produce ordinary kriging predictions for the Jura prediction and verification data sets. Pick only one of the variables from Assignment 1, and start by presenting image plots (and the actual locations) of the two data sets (Jura prediction and validation).

Then present fitted variogram(s) overlying the empirical variogram and a list of the parameter estimates and weighted least squares criterion (for the prediction data set, this should be the one you have already computed for the previous homework).

Using the locations in the Jura prediction data set, compare the theoretical models that seem to fit the sample variogram best, using ordinary kriging and cross validation as discussed in class. Compute cross validation mean absolute prediction differences, mean squared prediction error and the average ratio of squared prediction errors to kriging errors. Select the most suitable model based on one or all these criteria.

Next, verify the choice of model with another data set (Jura validation). Using ordinary kriging, produce predictions at the locations in Jura validation data set. Compute mean absolute prediction differences, mean squared prediction error and the average ratio of squared prediction errors to kriging errors (no need for cross validation here, we have a set of locations different from the original ones). Are the conclusions you drew from the prediction data set similar to the ones from the validation data set? Comment on these similarities and dissimilarities.

As a final step, pick the model you thought fitted the data best, and produce a smooth map. Overlay a fine grid on the spatial domain and produce ordinary kriging estimates and standard error. Plot these maps. Comment on the general aspect of the prediction maps and its similarities/dissimilarities to the original data.