Geophysical Research Abstracts,
Vol. 11, EGU2009-12332, 2009
EGU General Assembly 2009

Physiographic space-based interpolation vs. TOPKRIGING for predicting low-flow indices

S. Castiglioni (1), A. Castellarin (1), G. Laaha (2), J. O. Skøien (3), and G. Blöschl (4)

(1) University of Bologna, DISTART, Bologna, Italy (simone.castiglioni@mail.ing.unibo.it), (2) Institute of Applied Statistics and Computing, University of Natural Resources and Applied Life Sciences, BOKU Vienna, Austria, (3) Department of Physical Geography, University of Utrecht, Netherlands, (4) Institute for Hydraulic and Water Resources Engineering, Vienna University of Technology, Vienna, Austria.

A new and very interesting approach to the prediction of floods and low-flows in ungauged basins is the application of geostatistical procedures, which were originally developed for the spatial interpolation of point data. The literature proposes two different techniques. The first one, named Physiographic-Space Based Interpolation (PSBI), performs the spatial interpolation of the desired streamflow related variable (e.g., annual streamflow, low-flow index, flood quantile, etc.) in the bidimensional space of catchment descriptors. The x and y coordinates of this space are derived from a set of n>1 catchment descriptors through the application of multivariate techniques (e.g., principal component analysis). The second technique, named Topological kriging or TOPKRIGING, estimates the variable of interest along river networks taking both the area and the nested nature of catchments into account. We present an application of TOPKRIGING and PSBI to the problem of low-flow estimation for a broad geographical region located in northern-central Italy. The region counts 51 gauged catchments, for which a number of physiographic descriptors are available. The analysis aims at (1) comparing advantages and disadvantages and (2) quantifying the reliability of predicted low-flow indices in ungauged basins for both methodologies.