Using spot gauging data to interpolate low flow characteristics

E. Sauquet (1) and S. Chopart (2)

(1) Cemagref, Hydrology-Hydraulics Research Unit, Lyon, France (eric.sauquet@cemagref.fr, fax: +33 4 78 47 78 75) (2) INRIA, MISTIS, Saint Ismier, France (sophie.chopart@inria.fr)

A general framework for improving the use of spot gauging data to estimate low flow characteristics is presented. The variable studied is QMNA5, the annual minimum monthly flow with a return period of 5 years. The dataset consists of 133 gauging stations of the Seine-Normandy basin. The method using the spot gauging data provides estimates of QMNA5 at a poorly gauged site by multiplying QMNA5 computed at a nearby gauging station by a scale coefficient k. k is obtained through synchronous measurements recorded at the poorly-gauged site and at the nearby station. First, a sensitivity analysis to the data collection strategy is performed. Second, this method is compared to regionalization procedures. Their efficiency is measured by cross validation. The procedure considers in turn one station from the dataset as one poorly gauged site. Regression analysis performs worse than the two kriging techniques which efficiencies are comparable. The method using spot gauging data yields the best predictive performance even when the collected data are few. At last, the values obtained at the poorly gauged sites with respect to their uncertainties are introduced in a geostatistical framework. A cross validation is carried out and demonstrates that there is a significant gain in using few measurements over regional information to interpolate QMNA5.