A segmentation-Lasso approach for the homogenization of GPS series

Emilie Lebarbier (1), Karine Bertin (2), Xavier Collilieux (3), and Cristian Meza (4)

(1) AgroParisTech UMR518, Paris 5e and INRA UMR518, Paris 5e, FRANCE. , (2) CIMFAV, Facultad de Ingenieria, Universidad de Valparaiso, Valparaiso, CHILE., (3) IGN LAREG, Univ Paris Diderot, Sorbonne Paris Cité, France. , (4) CIMFAV, Facultad de Ingenieria, Universidad de Valparaiso, Valparaiso, CHILE.

The GPS series are generally affected by two different types of biases : abrupt changes du to instrument changes or re-location and functional biases (periodic signals) due to environmental effects (changes in atmospheric pressure and hydrology). The detection and correction of such biases, called homogenization, is a fundamental step in all dataset pre-processing in geosciences study.
The segmentation methods are now well known to detect abrupt-changes in the distribution of the observations along time. We propose here a segmentation model in which a functional part is included. To estimate these two parts of the model, we propose an iterative procedure combining a Dynamic Programming algorithm (which is the well-established efficient strategy to locate the abrupt-changes) and a Lasso-type procedure to estimate the functional part. An application to real data is done.