Coordinate time series comparison. Application to ITRF2005 height residuals time series.

X. Collilieux , D. Coulot , and Z. Altamimi

IGN/LAREG, France (xavier.collilieux@ensg.ign.fr / Fax: +33 1 64 15 32 53 / +33 1 64 15 32 60)

The comparison of coordinate time series estimated by different spatial geodetic techniques is a possible way to study the systematic errors inherent to each technique. Various noise levels, individual data heterogeneities, data gaps and various samplings coming from the data processing are the limiting factors of such comparisons. We suggest a method to estimate the possible agreement of such coordinate time series which solves these problems and explicitly uses the uncertainties provided by the parameter variances estimated during geodetic data processing. This method is based on Maximum Likelihood estimation (MLE) and uses a Kalman filter as a tool to evaluate the likelihood function.

This method has been applied to compare the height residual time series coming from Very Long Baseline Interferometry (VLBI), Satellite Laser Ranging (SLR) and Global Positioning System (GPS). VLBI and GPS residual time series coming from ITRF2005 analyses are shown to agree quite well for most of co-located sites. SLR and GPS residual time series do not exhibit systematic good agreement. A possible explanation of disagreement might be attributed to the network effect which is evaluated thanks to the GPS co-located network.