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★ Abstract title:

Accounting for spatiotemporal correlations of GNSS coordinate time series to estimate station velocities

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It is well known that GNSS coordinate time series exhibit time-correlated noise. Spatial correlations between coordinate time series of nearby stations are also long-established and generally handled by means of spatial filtering techniques. In this work, we provide a methodology to estimate GNSS station velocities by modeling the spatiotemporal correlations of GNSS coordinate time series in a Kalman filter.

We present a method to estimate the three-dimensional cross-correlations between series and apply it to station coordinate time series from the second reprocessing campaign of the International GNSS Service. We are able to show in two distinct areas of the world that accounting for spatial correlations leads to a more reliable interpolation of the coordinate time series and an improvement of the velocity determination for short series in a significant number of cases.