ANALYSIS OF POSITIONS TIME SERIES OF GPS-DORIS COLLOCATED STATIONS

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Abstract

We study the signal of weekly solution time series of coordinate residuals for 10 GPS-DORIS collocation sites, using the wavelet transform to extract their trends and periodic signals, and the Allan variance to characterize their noise.

The obtained results show that the wavelet analysis has useful revealed the trends and periodic signals of the three position components (north, east, and vertical). However, after a periodic signals have been removed, the Allan variance analysis shows that the GPS noise type of all three components is a combination of flicker and white noise, while the DORIS time series have a white noise. The GPS positioning is more stable in the horizontal components (1 mm) than in the vertical one. The noise level of the studied time series shows that the GPS stations are more stable than the DORIS stations.

3. Data description

The GPS series are provided by ARIJ Analysis centre "CODE" of the IGS using the BERNES Software.

The DORIS series are provided by IGN/JPL, using the GIPSY-OASIS II software package.

3.3. Data description

The studied GPS and DORIS time series are referred to ITRF2000, and expressed in the local geodetic reference frame ( N : North component, E : East component and H : Vertical component).

4. Results and Conclusions

Original time series of studied GPS-DORIS collocated stations and their decompositions at level 5

Allan variances of components (North, East and Vertical) of studied GPS-DORIS collocated stations

Conclusion

- The studied GPS-DORIS time series contain an annual signal.
- The GPS-DORIS time series does not contain a clear linear trend (ascendant or descendant).
- The noise type, inferred from the slope of the Allan graph, is a combination of flicker and white noise, while the DORIS time series have a white noise.
- The noise level measured by the Allan deviation for a one-year sampling time of the non-linear, non seasonal coordinate time series, shows that the GPS stations are more stable than the DORIS stations.

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