



## **Can line-of-sight information be recovered from GPS double-differences ? - Alber's approach revisited**

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Double differences (DD) of GNSS phase observations are often used to eliminate or largely reduce systematic effects in the observations, especially the satellite and receiver clock errors. However, during this operation not only errors are eliminated but also information of four different lines-of-sights is combined into one DD observation. Consequently it is very difficult to attribute specific effects of interest like e.g. multipath signatures or tropospheric slant delay variations to a specific line-of-sight in order to study these effects in detail. To overcome these problems, Alber et al. (2000) proposed a strategy to recover undifferenced observations (ZD) from DD which is now widely used in geodesy and GPS data assimilation in meteorology.

In this poster we will give for the first time the explicit analytical solution of the strategy proposed by Alber et al. (2000). Our findings describe directly the repartition of the information contained in the DD on the recovered ZD and the difference between the original ZD and the recovered one. Using simulated and real data the benefits and limitations of the strategy are discussed. It is shown that individual signatures cannot be completely recovered. We found that the success of recovering individual signatures and the degree of contamination of other observations by these signatures depend on the number of stations in the network, the number of satellites in common view, and the uniqueness of the signatures.

Alber C, Ware R, Rocken C, Braun J (2000) Obtaining single path phase delays from GPS double differences. *Geophysical Research Letters*, 27:2661-2664