



On pertinent use of GRACE K-band data

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The GRACE mission has contributed through its K-band measurement between the twin satellites orbiting actually at 470 km altitude to the enormous progress in the knowledge of the Earth gravity field. K-b measurements are made available in three different types in Level-1B data files; biased range, range-rate and range-acceleration are provided normally at a 5 s sampling.

Each one of these types presents advantages and disadvantages for computing gravity field coefficients. Biased range, specified at best between 10^{-4} and 10^{-1} Hz, should bring the most complete information, although it is exposed to some modelled device behaviour, which obliges us to estimate many empirical parameters in semi-dynamical orbit processing. Range-acceleration data coupled with accelerometer data can be processed faster to generate directly linear combination of gravity field coefficient, avoiding the costly process of integrating partial derivatives together with accelerations. But the gravity signal is weakened by double derivation and depends on the quality of the applied derivation process. Intermediately, range-rate data, which are mostly used, could be seen as good compromise.

In order to estimate the interest of each one of these data types for gravity field determination, we have investigated their impact in terms of information, performance in gravity field modelling, computational convenience... A summary and the conclusions of this study based on test cases will be presented.