



Airplane induced accelerations in airborne gravimetry: computation and accuracy estimation

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Three types of accelerations are sensed by the gravimeter during an airborne gravimetry campaign: the gravity acceleration, the vertical acceleration of the plane and the Eotvos acceleration. The computation of the aircraft vertical acceleration is one of the most delicate parts to be done. The coordinates of the flight trajectory are measured by GPS in the form of time series. The main problem is then to compute the numerical derivatives of these time series, as differentiation enhances the noise of the measurements. The sampling rate is also a key parameter. We analyse the different methods that have been used so far for numerical differentiation and introduce a more robust new method. We estimate also the errors on these numerical derivatives by introducing an a priori variance-covariance matrix of the measurements.