Simultaneous filtering and crossover adjustment of airborne gravimetry data

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In airborne gravimetry, the data acquisition profiles are usually chosen to form a network with a sufficient number of crossings. The difference of the computed gravities at these points gives a quality control of the survey. These differences are due to the difference of the flight altitudes, the drift of the gravimeter, as well as other bias sources. Classically, the airborne gravimetry data are first filtered with a low pass filter for removing the high frequency noise, then a least squares adjustment based on a linear model for the remaining biases is done with respect to crossover points. We propose a new method in which we do in the same pass the crossover adjustment and the filtering through a least squares procedure. The advantage of our method is that we have a posteriori covariance matrices giving formal errors about the estimated gravity disturbances. The method is applied over the actual data acquired over the French Alps.