



A new medium-wavelength gravity map over the Alps based on airborne gravimetry data

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During February 1998, a large scale airborne gravimetric survey was carried out over the Occidental Alps. The gravimetric system was a LaCosteRomberg air/sea stabilized gravimeter. A classical frequency domain low-pass filtering procedure was used to model the gravity field at flight altitude. Nevertheless, results showed that this method was not stable enough, with results varying considerably with the filtering degree (choice of the cut-off frequency). Henceforth, we have developed a new filtering method based on an integral transformation of the differential equation of the gravimeter, resulting in a more stable least square solution. The solution is nevertheless biased because we need to regularize a first kind Fredholm integral equation with an a priori covariance matrix of the gravity disturbances at the flight height. The derived solution shows more consistency with the gravity field created by the topography at the flight altitude. Another advantage of the method is that it directly gives the covariance matrix of the estimated parameters as a quality criterion of the results.