Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11422, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11422
EGU General Assembly 2008

Noise reduction through a joint processing of gravity and gravity gradient data

G. Pajot (1), O. de Viron (2,3), M. Diament (2), M.-F. Lequentrec-Lalancette (4) and V. O. Mikhailov (5)

(1) Bureau des Recherches Géologiques et Minières, Orléans, France. (2) Institut de Physique du Globe de Paris, Paris, France. (3) Université Paris Diderot, UFR STEP, Paris, France. (4) Service Hydrographique et Océanographique de la Marine, centre de Brest, Brest, France. (5) Institute of Physics of the Earth, Moscow, Russia. (g.pajot@brgm.fr / Fax : (+33)238643689 / Phone (+33)238643740)

The satellite GOCE from the European Space Agency will be launched this year, carrying the first space device capable to measure simultaneously the derivatives of the gravity field in three independent directions of space. The gravity gradients measured by the gradiometer onboard GOCE will then be used to compute a global static gravity field with a spatial resolution and an accuracy never reached so far. The main advantage of gravity gradients is that the high frequency signal is emphasized, allowing to better detect the small scale features of the gravity field. But isolating the small scale signal from the high frequency noise in the data is a challenging task in gravity gradiometry.

We present a method to reduce the noise in gravity gradient and gravity data without altering the small wavelength content of the signals. This noise reduction method takes full advantage of gravity gradients and gravity being derivatives of the same potential function, and of simultaneous measurements of all gravity first order derivatives. We present the results obtained in test cases, where we obtain in particular a near-total reduction of the noise on gravity data without altering the high frequency content of the gravity spatial spectrum and show our method and the traditional low-pass filtering are complementary to each other to remove the noise from gravity gradients. We applied our method to marine gravity gradiometry data collected with the Lockheed

Martin FTG instrument and provided by Bell Geospace.