Geophysical Research Abstracts, Vol. 7, 05085, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05085

Gravity and Height Changes near Vatnajökull, SE Iceland

W.R. Jacoby (1), O. Hartmann (1), H. Wallner (1)

(1) Institut f. Geowissenschaften, Mainz Universíty (jacoby@uni-mainz.de/x49 6131 392 4760)

Repeated gravity and GPS height observations (by Sjöberg and Erlingsson) near, mainly SE of, Vatnajökull with reference stations at great distance, show temporal variations relative to local reference points near Höfn i Hornafirdi, 70 km from the ice centre. This reference itself rises about 10 mm/a in the global IGS frame and shows a corresponding gravity change of -0.2+-1 mGal/m versus the base in Reykjavík. The ratio of gravity over elevation change corresponds on average to a Bouguer effect with mantle density, but varies systematically with distance from the ice; near the SE edge of Vatnajökull it is closer to -0.3mGal/m (Free Air effect), and at 100 km from ice centre drops to absolutely less than -0.1 mGal/m (Bouguer effect with very high density). The variation suggests a high volume expansion by increased partial melting in the lower crust and uppermost mantle under shrinking Vatnajökull and possible increase of lithosphere thickness to the SE and/or hydrogeological effects in the uppermost crust.