On 27 February 2010 an earthquake occurred in Chile with a magnitude of Mw 8.8 and it is a candidate with potential visibility in the GOCE gradiometer data. The GOCE gradiometer delivers gravity gradients, which are the 2nd order spatial derivatives of the gravitational potential. Thus GOCE provides 3-D gravity field information. To assess whether the earthquake induced gravity field changes are visible in the GOCE data, we will on the one hand model the earthquake and on the other hand assess the differences between GOCE data before and after 27 February 2010. The modelling of the co- and postseismic deformation and associated gravity changes is based on semi-analytical viscoelastic normal mode theory, with deformation, stresses, strains and gravity fields decomposed in a spherical harmonic expansion. This can be used to predict the gravity gradient signal at GOCE altitude. GOCE gravity gradient data acquired over several months will be averaged before and after the earthquake. The accuracy of the data will be assessed and gravity gradient differences will be compared with the signal that was predicted in the forward modelling.