A new benchmark study for post-glacial rebound codes

Giorgio Spada and the COST Action ES0701 WG4 Team

Institute of Physics, Urbino University "Carlo Bo", Urbino, Italy (giorgio.spada@gmail.com)

Modern modelling approaches to post-glacial rebound (PGR) are based on several techniques ranging from purely analytical formulations to fully numerical methods. Various European teams nowadays are independently working on the post-glacial rebound process in order to constrain the rheological profile of the mantle and the extent and chronology of the late-Pleistocene ice sheets which are prerequisites for the determination of the PGR contribution to geodetic observables. With the aim of i) testing the codes currently in use by the various teams, ii) to establish a minimum set of agreed results, iii) correct possible systematic errors embedded in the various physical formulations and/or computer implementations, and iv) facilitate the dissemination of numerical tools for surface loading studies to the geodynamical community and to young scientists, we present a set of benchmark computations mainly based on models with spherical symmetry and viscoelastic rheology but also including inputs from finite elements modelers. This study is performed within the Working Group 4 of the ESF COST Action ES0701 "Improved constraints on models of Glacial Isostatic Adjustment" and focuses on i) load Love numbers and relaxation spectra, ii) the deformation and gravity variations driven by surface loads characterized by simple geometry and time-history, and iii) the rotational fluctuations in response to glacial unloading.