EGU22-927
https://doi.org/10.5194/egusphere-egu22-927
EGU General Assembly 2022

Practical implementation of the IHRF employing local gravity data and geoid models

Riccardo Barzaghi and Georgios Vergos
Politecnico di Milano, DICA, Milano, Italy (riccardo.barzaghi@polimi.it)

With the definition of the International Height Reference System (IHRS) and the development of a roadmap for its implementation through the International Height Reference Frame (IHRF), an analytical evaluation of the various approaches for the practical determination of potential values at IHRF is necessary. In this work we focus on two main approaches to estimate geopotential values at IHRF stations. The first approach resides on the use of either local gravity anomalies and gravity disturbances around each site and the geopotential determination based on Stokes' and Molodensky's boundary value problems, respectively. In this scheme, the influence of the classical residual terrain model (RTM) reduction as well as that of RTM effects based on spherical harmonics expansion of the topographic potential are investigated. Furthermore, the introduction of possible biases within the various pre- and post-processing steps are thoroughly investigated, as e.g., during the estimation of station geometric heights, along with the influence of the quasi-geoid to geoid separation estimation. In the second approach, we investigate the determination of geopotential values based on either national and regional geoid models, i.e., resembling the case that access to local gravity data is not available, and the determination has to be based on some available geoid model. In the present work we analyze the theoretical and methodological steps that need to be followed in each approach, identifying the possible sources of biases. Finally, some early results are presented aiming at providing a roadmap and an error assessment for the practical realization of the IHRF.