

Analysis of Environmental and Loading Effects in Tilt and SG Gravity Observations at Conrad (Austria) and Peters Seismological (Australia) Observatories

Papp G, Ruotsalainen H, Meurers B, Benedek J, Leonhardt R, Hutchinson P, Szántó M

Since spring 2016 two co-located and co-oriented tilt meters have been operating continuously in the seismo-gravimetric tunnel of the Conrad Observatory (COBS, Austria): a 5.5m long interferometric water level tilt meter (iWT) built by the Finnish Geospatial Research Institute (FGI) and a Lippmann-type 2D tilt sensor (LTS). While iWT monitors E-W tilts, LTS provides both N-S and E-W tilt time series. Based on 1000 days of observations a discussion on tidal analysis and air pressure response is given. The residual time series from both the tilt meters and the SG are also compared and investigated. The residuals of all sensors clearly reflect the gravity/deformation effects due to short- and long-term environmental processes. Remarkable long-term signatures show a clear correlation between the tilt and SG sensor data related to snowmelt and long lasting rain helping the correct physical interpretation of the observed changes in a great extent.

An LTS has also been operating since September 2018 at The Peters Seismological Observatory (TPSO, Victor Harbor, South Australia, Australia). The close vicinity of the Indian Ocean gives a good opportunity to investigate different models (e.g. Schwiderski, FES2004, FES2014b) of ocean loading effect the contribution of those to the bulk tidal effect varies between 20 % and 100% related to the theoretical values provided by Dehant, Defraigne and Wahr body tide models. The second part of the presentation shows the results of ocean loading analysis.