

Plate movement and karstic underground water flow in fifty years of ultra broad band tilt observations in the Karst- implications for GNSS

Authors:

Carla Braitenberg ⁽¹⁾, Ildiko' Nagy ⁽¹⁾, Barbara Grillo ⁽¹⁾, David Zuliani ⁽²⁾

(1) University of Trieste, (2) OGS-CRS

State:

Accepted

Submission preference:

Oral presentation

Abstract:

The development of precision and length of available time series of continuous GNSS observations reveals an increasing multitude of observed crustal deformation signals. The environmental induced signals are becoming more evident, as those due to thermoelastic deformation, due to subsurface water flows and loading tides and the tectonic signals as seismic fault movements and free oscillations. The time series covering fifty years of continuous underground geodetic observations from the Karst and seismic Friuli area (in NE Italy) offer a broad spectrum of earth signals that have been univocally identified and which will be increasingly observable by GNSS alongside improvements in precision. The geodetic time series were obtained with ultra broad band tilt meters of the Grotta Gigante and conventional tilt and strain meters in Friuli and Cansiglio plateau, all active to date. Especially the strong hydrologic deformation induced by underground water flows in the karstic channels and fractures has been already demonstrated to be seen also in GNSS (Devoti et al., 2015). The spectrum of crustal movements seen by the geodetic observations is though broader (e.g. Braitenberg and Nagy, 2014) and the other signals are still to be detected in the comparison of underground geodetic and space-geodetic techniques.

Braitenberg C., Nagy I. (2014). Illustrating the superposition of signals recorded by the Grotta Gigante pendulums with musical analogues. *Acta Carsologica*, 43/1, 139-147,

Devoti R., Zuliani D., Braitenberg C., Fabris P., Grillo B. (2015). Hydrologically induced slope deformations detected by GPS and clinometric surveys in the Cansiglio Plateau, southern Alps. *Earth and Planetary Science Letters*, 419, 134-142, doi:10.1016/j.epsl.2015.03.023

Presentation date time:

Thursday, June 9, 2016 - 10:00 to 10:15