

## Abstract Details

**Session title:** G06I - Monitoring and Understanding the Dynamic Earth With Geodetic Observations

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### ★ Abstract title:

Geodetic observations to monitor natural hydraulic overpressure

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The pressurization of a channel system occurs naturally through intake of rainfall and river drainage. The consequences of up to 1MPa pressurization include sudden uprise of water level, blockage of channels, increased erosion and possible triggering of seismicity, with associated diversified hazards. We model the expected deformation with the Finite Element Method and analytical approaches, and find that the pressures induce deformation which can be geodetically detected. The careful analysis of GNSS timeseries and tilt observations recovered in N-Italy demonstrates that the signals are observable. The observations of tilt have been made in karstic caves where a GPS station has been colocated on the surface. The uplift of GPS during underground floods is expected to be up to several mm and the titling at the microradians level for the tiltmeters. The results demonstrate that geodetic observations could be used to monitor internal pressure loading of the underground channel system. The research is based on the results described in Grillo et al. 2018 and Braitenberg et al. 2019.

#### References

Braitenberg C., Pivetta T., Barbolla D.F., Gabrovšek F., Devoti R., Nagy I. (2019) Terrain uplift due to natural hydrologic overpressure in karstic conduits, Scientific Reports, in press.

Grillo B., Braitenberg C., Nagy I., Devoti R., Zuliani D., Fabris P. (2018). Cansiglio Karst-Plateau: 10 years of geodetic-hydrological observations in seismically active northeast Italy. Pure and Applied Geophysics, Volume 175, Issue 5, 1765-1781, doi:10.1007/s00024-018-1860-7.