

CANSIGLIO PLATEAU: TEN YEARS OF GEODETIC OBSERVATIONS IN A SEISMIC AND KARSTIC AREA IN NORTH-EASTERN ITALY

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Abstract:

We report on the ten years geodetic observations of a two component tilt station in a natural cave of the Cansiglio plateau (Bus de la Genziana), an interesting limestone karstic area in the north-eastern of Italy. The location of this cavity completes the network of tiltmeter stations of the Department of Mathematics and Earth Sciences, University of Trieste. The present seismicity of NE-Italy is well manifested towards the Friuli region, whereas towards the western sector a relative calmness is found. This picture emerges when considering the local seismicity recorded since the 1976 disastrous Friuli earthquake, certainly based by the post-seismic sequence of this event. The western sector was hit in 1936 by the destructive Cansiglio earthquake, showing that the seismic potential is high in the entire region, reaching also farther west to the eastern Venetian sector. For this reason ten years ago it was decided to monitor the deformation of the area, possibly by different geodetic methods.

We find a strong south ward tilting of the geodetic station. We discuss the observed tilt records, also in reference to the earth tides and signals induced by hydrologic and tectonic effects. The station is set in a natural cavity 25 meters underground that is part of an important karstic system. At the foothills of the karstic massif a number of springs form the source of the Livenza river that flows through the Friuli-Veneto plain into the Adriatic Sea. Comparing the tiltmeter signal recorded at the Genziana station with the local pluviometrical series and the hydrometric series of the Livenza river, a clear correlation is recognized. Moreover, the data of a permanent GPS station located on the southern slopes of the Cansiglio Massif (CANV) show also a clear correspondence with the water runoff.

In ten years a new multidisciplinary frontier was opened between the geodetic studies and the karstic hydrogeology to obtain a more complete geologic description. Furthermore a better characterization of the hydrologic effects on GPS and tilt observations will have the benefit that these signals can be corrected when the focus of the study is to recover the tectonic deformation.

Keywords: tilting, tiltmeter, geodetic measurements, GPS, karstic aquifer, hydrogeology, seismicity, Cansiglio.

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