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"Ancillary" products from a dense GNSS geodetic network: study of tropospheric delay on NeVoCGPS network for weather, climate, and natural hazard applications.

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Microwave signal is significantly delayed while propagates through the troposphere. Bearing in mind the index of refraction in the atmosphere is a function of water vapor content, pressure, and temperature, tropospheric delay can be exploited for short-term weather forecasting and long-term climate studies. Here we benefit from continuous GNSS data (cGNSS) collected on NeVoCGPS, a dense network designed for monitoring active Neapolitan volcanoes and one co-located meteorological and GNSS station as well. We analyse in a differential way about 10 years of cGNSS data aimed to ruling out the tropospheric slant delay to be used as a probe tool to quantify precipitable water and tracking its time-space evolution. A correlation analysis is performed between the time series of the PW retrieved from the so called GNSS meteorology and the time evolution of surface dew point from humidity and temperature observations. Attention is even paid to the effect of steep topography on the space distribution of PW, as around Somma Vesuvius volcano (Italy),.
Our primary goal is evaluating performances of GNSS meteorology at different time and space scales. In fact, this study can be applied at long term, for climate studies, and at short-term as well, to assess the impact of higher temporal and spatial resolution estimates of PW on "local" and regional predictions and warnings of heavy raining events in a densely populated sector of a landslide/flooding-prone region.