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Maps of correlation of GPS noise in Italy, 2013-2017

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The dense GPS network in Italy (597 stations within rectangular domain (36N-48N)x(8E-20E)) provides the data for detail investigation of the Earth surface tremor in this region. We used 3-components GPS data with sampling time step 5 minutes which were downloaded from the site of Nevada Geodetic Laboratory since 2013.03.28 up to the current time. Maps of kernel estimates of probability density functions are presented for nodes of the regular grid sized 30x50, which are realized the spatial maximum of the mean of all by-pairs correlation coefficients of GPS time series from the nearest 10 workable stations for all 3 components of GPS time-series within moving time window of the length 5 days. The GPS station is considered workable in the time window if its registration interval includes the considered time window and the number of missing values does not exceed a predetermined maximum allowable proportion of the total length equal to 0.1. The missed values are filled using information about records from neighbor time interval of the same length as the length of gaps. Before calculating the correlation coefficients in each window the trend is removed by polynomial of 4th order and 3-sigma winsorizing was performed. The sequence of maps of most frequent positions of spatial maximums of mean correlation coefficients of GPS noise extract the middle of Apennine peninsula with probability maximum at the vicinity of the point 42N and 14E. This result is interpreted as extracting “spot of seismic danger” which is characterized by high correlation of ambient Earth’s noise.

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