



Spatial and Temporal evolution of the subsidence phenomena in the Italian Peninsula

Luca Poluzzi (1), Nicola Cenni (2), MariaElina Belardinelli (3), Stefano Gandolfi (1), Enzo Mantovani (4), Massimo Nespoli (3), Luca Tavasci (1), Francesco Corsini (1), Daniele Babbucci (4), and Marcello Viti (4)

(1) Dept. Of Civil, Chemical, Environmental and Materials Engineering (DICAM), University of Bologna, Bologna, Italy, (2) Dept. Of Geoscience, University of Padova, Padova, Italy, (3) Dept. Of Physics and Astronomy (DIFA), University of Bologna, Bologna, Italy, (4) Dept. of Physical Sciences, Earth and Environment, University of Siena, Siena, Italy

A large number of continuous GNSS (CGNSS) stations are nowadays available in Italy, this has already allowed an accurate monitoring of the horizontal and vertical kinematic pattern in the Italian peninsula in terms of linear trends. The crustal displacements can be considered as the result of several contributions: global, regional and local tectonic processes, climatic and meteorological phenomena, but also human activities. In particular, the groundwater exploitation for agricultural and industrial purposes and the extractive activities of gas, oil and geothermal fluids can induce displacements that can be greater than the ones due to natural contributions. Human activities could induce rapid changes in the local dynamic of the Earth crust and usually have stronger impact on the vertical component. Therefore, an accurate monitoring of the vertical displacements that takes into account also the spatial heterogeneity of the human activities is a major issue. In order to monitor and study the vertical velocity field in the Italian area, the observation of more than 600 CGNSS sites have been analysed using the GAMIT software package. The interdistances between the considered sites is about 40-50 Km and should allow a fairly good definition of the vertical velocity field and to study the possible spatial evolution of the pattern. The relatively long time interval of data acquisition (2001-2018) provides an important data set that make possible to identify different time evolutions with respect to the linear trend usually adopted in the GNSS time series analysis. The present vertical velocity field in the Italian peninsula and in particular along the coastal areas and neighbour zones will be shown. Preliminary studies about the spatial and temporal evolution of the subsidence phenomena in these areas will be also discussed.