



The subsidence in Bologna city (Italy) and in the Po Plain detected by InSAR SBAS technique

S. Stramondo (1), M. Saroli (1,2), C. Tolomei (1), M. Moro (1,2), F. Doumaz (1), A. Pesci (1), F. Loddo (1), P. Baldi (3), E. Boschi (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy, (2) Dipartimento di Scienze della terra Università degli Studi di Roma “La Sapienza”, Italy, (3) Univerità degli Studi di Bologna, Italy

The city of Bologna is affected by a well known subsidence. Data from optical levelling between 1897 and 1957 have clearly pointed out surface movements up to 2-3 mm/y. During the second half of the 20th century and coinciding with the economic boom, the subsidence rate registered at such levelling benchmarks increased up to 60 mm/y. To perform a monitoring of the phenomenon we applied a multitemporal InSAR remote sensing technique known as SBAS (Small Baseline Subset). The available dataset of ERS1 and ERS2 SAR images (ESA Cat1 3258) covers the time period 1992-2000, therefore coinciding with the levelling campaigns in 1992 and late 1999. The result of InSAR SBAS processing shows velocity rates between 10 mm/y in the ancient portion of Bologna up to 60 mm/y in the NE periphery. Moreover along the narrow piedmont sector comprised between the Mt. Sabbiano growing anticline and the Po Plain the detected subsidence rate is 2 up to 4-5 mm/y. Based on geological and hydrogeological considerations such subsidence values have been attributed to tectonics. Therefore the combined analysis of remote sensing results together with the geological-hydrogeological and seismological settings of the investigated area allowed to advance an interpretation of the detected movements as partially due to natural causes (tectonic subsidence) and to anthropic ones (water extraction).