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An integrated geophysical approach for urban underground characterization: the Avigliano town (southern Italy) case study

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A geophysical approach, based on the integration of satellite differential interferometric SAR technique and in situ geoelectrical and seismic methods, was applied with the aim to characterize a portion of the urban area of Avigliano (PZ) town in Basilicata Region (southern Italy) affected by ground instability phenomena. Satellite analysis helped to discriminate areas of the town affected by superficial deformations and to monitor the dynamic behaviour of the structures located in these areas. Results from geoelectrical and seismic (active and passive) methods were compared with direct data (stratigraphic) and were interpreted with the aim to reconstruct the geometry of the subsoil. The joint application of both in situ techniques allowed the overcoming of the specific limits of each method and to improve the poor quality of the data due to the noise conditions typical of measurements carried out in urban areas. A preliminary geophysical model of the subsoil was obtained. The geophysical contrasts highlighted the presence of lithological discontinuities due to the superficial deformation processes that are affecting the portion of the investigated urban area. All the information has been transferred to the public administration technicians involved in the mitigation ofhydrogeological risk in Basilicata Region.