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A New Multiscale and Multisensory Approach for Coastal Groundwater Discharge – the SUBGEO Project

G. ROMANO^a, L. CAPOZZOLI^b, M. POLEMIO^c, M. DE GIROLAMO^{a,d}, G. DE MARTINO^b, D. DI GENNARO^b, R. GIANNUZZI^a, D. PATELLA^a

^a Department of Earth and Geo-Environmental Sciences, University of Bari Aldo Moro, Piazza Umberto I, 70121 Bari, Italy

gerardo.romano@uniba.it, rossella.giannuzzi@uniba.it, domenico.patella@uniba.it

^b Institute of Methodologies for Environmental Analysis, National Research Council of Italy (IMAA CNR), C. da S. Loja—Zona Industriale, 85050 Tito Scalo, Italy

luigi.capozzoli@cnr.it, gregory.demartino@cnr.it, davidedigennaro@cnr.it

^c Research Institute for Hydrogeological Protection, National Research Council of Italy (IRPI CNR), 70126 Bari, Italy

maurizio.polemio@cnr.it

^d National Institute of Geophysics and Volcanology (INGV), Via di Vigna Murata 605, 00143 Rome, Italy

michele.degirolamo@ingv.it

ABSTRACT

The characterization and monitoring of groundwater resources play a crucial role in the sustainable development and management of coastal areas. This is a fundamental aspect considering the climate changes occurring in areas particularly exposed to coastal erosion, groundwater salinization, flooding and other hazards in low-lying coastal zones. Moreover, coastal freshwater reservoirs can represent a fundamental resource to address water shortages.

The hydro-geological potential and economic factors linked to the groundwater and to submarine groundwater are the starting point of the two-year Italian Research Project of National Relevance (PRIN-2022) SUBGEO (funded by the European Union-NextGeneration EU, Mission 4, Component 2, INVESTMENT 1.1, CUP H53D23011270001) where the University of Bari (UNIBA) and the two Institutes (IMAA and IRPI) of the National Research Council are involved. The project is focused on the submarine groundwater discharge analysis with an innovative and integrated geophysical approach based on the use of electric and electromagnetic methods for the twofold targets of coastal underground freshwater reservoir non-invasive characterization and to gain useful tools for the optimal and sustainable management of the coastal areas and resources.

Here we present the first project results which consist in the output of geophysical investigation

strategy tuning phase and in investigation strategy application in three different test areas located in Puglia region and Pianosa Island.

As regard as the tuning phase, it has been focused on the definition of the best acquisition procedures to follow and to check the sensitivity of the strategy for different subsurface conditions. All these activities have been performed by developing small-scale laboratory experiments, numerical simulations and field tests.

Keywords: *Electrical resistivity, Electromagnetic methods, Coastal Aquifer, Subsurface Characterization.*