PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

Sustain-COAST
REDUCE · RECYCLE · REUSE · RECOVER

MEDSAV

Common International Conference

Integrated Groundwater Management of Mediterranean Coastal Aquifers

27-30 September 2022

Chania, Crete, Greece

Book of Abstracts

Technical University of Crete · UFZ Helmholtz Centre for Environmental Research · SEMIDE EMWIS · University of Strasbourg · cnrs · uniss Università degli Studi di Sassari · CERTE · Mersin Universitesi 1992 · CERTH Centre for Research & Technology Hellas · Cyprus University of Technology · ELGO - Dimitra Hellenic Agricultural Organization - Dimitra · Politecnico di Bari · Technische Hochschule Lübeck

PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

Sustain-COAST
REDUCE · RECYCLE · REUSE · RECOVER

MEDSAL

Common International Conference

Scientific Committee

- H. AKROUT - CERTE, Tunisia
- M. ANANE - CERTE, Tunisia
- I. ANYFANTI - TUC, Greece
- G. BALACCO - POLIBA, Italy
- N. BEN SALEM - UFZ, Germany
- G. BRANCA - UNISS, Italy
- A. CARLETTI - UNISS, Italy
- C. CESERACCIU - UNISS, Italy
- P. DARAS - CERTH, Greece
- R. DERIU - UNISS, Italy
- P. DIAKOPARASKEVAS - TUC, Greece
- C. DOULGERIS - SWRI, Greece
- M.D. FIDELIBUS - POLIBA, Italy
- E. GAUBI - FST, Tunisia
- C. GOUMAS - TUC, Greece
- C. GÜLER - MEU, Turkey
- F. HAMZAOUI - FST, Tunisia
- S. JOMAA - UFZ, Germany
- C. KÜLLS - THL, Germany
- M.A. KURT - MEU, Turkey
- P. KYRIAKIDIS - SWRI, Greece
- S. MAURIZI - UNISS, Italy
- T. MELLAH - CERTE, Tunisia
- K. NIKOLAIDOU - CERTH, Greece
- C. PANAGIOTOU - CUT, Cyprus
- T. SEMERTZIDIS - CERTH, Greece
- G. SCHÄFER - UNISTRA, France
- C. TIDORE - UNISS, Italy
- Ü. YILDIRIM - MEU, Turkey
- M. ZAMMOURI - MEU, Turkey

Analyzing the dynamics of groundwater salinization in coastal aquifers through statistical and hydrogeochemical approaches: strengths and future outlooks

[1]*Parisi, A., [1]Alfio, M.R., [1]Balacco, G., [2]Güler, C. & [1]Fidelibus, M.D.

[1] (alessandro.parisi@poliba.it), Polytechnic University of Bari, DICATECh Department, Italy
[2] Mersin University, Faculty of Engineering, Department of Geological Engineering, Yenişehir, Mersin, Turkey

Keywords: Coastal aquifers, MVSA, HFE-D, groundwater salinization, 3D density distribution

Coastal aquifers in highly urbanized areas, in particular those in arid/semi-arid regions, are much prone to groundwater salinization because of the impact of natural and man-made drivers. Salinization negatively affects groundwater quality and causes cascading effects on its depending systems and ecosystems. Determining the spatial and temporal evolution of salinization phenomenon in coastal aquifers might help policymakers, decision makers and stakeholders to better understand the dynamics of such worrying phenomenon, as well as to act towards implementing structural and non-structural mitigation and adaptation strategies in the short, medium and long terms. During the last decades, researchers implemented several methodological approaches based on statistical and hydrogeochemical techniques in groundwater studies for the assessment of groundwater salinization dynamics. By dealing with the case study of a karstic coastal aquifer in the Mediterranean basin prone to groundwater salinization (Salento aquifer, Southern Italy), this study aims at evaluating the dynamics of groundwater salinization through multivariate statistical analysis (MSVA), as well as through a hydrogeochemical approach based on facies evolution (HFE-D). The study applies Hierarchical Cluster Analysis and Factor Analysis, and HFE-D on a set of groundwater samples collected from the regional groundwater monitoring network of the Salento aquifer during six consecutive monitoring surveys, carried out at the end of each wet and dry season from 2016 to 2018. The results of such applications highlight the vulnerability of some coastal and inland zones to groundwater salinization and can decipher its spatial and temporal evolution. Both methodological approaches show comparable results, which provide a mutual validation of both outcomes. The study also advances some general critical remarks on the influence of the 3D groundwater density distribution as far as the groundwater sample collection methods and well equipment: the related issues concern monitoring reliability in coastal aquifers and consequently the results of the application of both techniques.

Presentation preferred

Invited

Acknowledgements

This research has been conducted in the context of MEDSAL Project© (www.medsal.net), which is part of the PRIMA (Partnership for Research and Innovation in the Mediterranean Area) Programme supported by the European Union's Horizon 2020 Research and Innovation Programme and funded by the national funding agencies MIUR (Ministry of Universities and Research of Italy) (Grant No: 1421) and TÜBİTAK (Scientific and Technical Research Council of Turkey) (Grant No: 118Y366).