

Surveillance of the seashore using the KATERINA II geo-referenced detection system

C. Tsabaris^{1*}, D.L. Patiris¹, E.G. Androulakaki^{1,2}, G. Eleftheriou¹, F.K. Pappa^{1,3}, C. Maramathas⁴, S. Alexakis¹

¹ *Hellenic Centre for Marine Research, Institute of Oceanography, P.O. Box 712, GR-19013 Anavyssos, Greece*

² *National Technical University of Athens, Department of Physics, Zografou, Athens, 15780, Greece*

³ *University of the Aegean, Department of Marine Sciences, Mytilene, Lesvos, Greece*

⁴ *TELEDOS Laboratories S.M. P.C., Corinth, Greece*

*Corresponding author: tsabaris@hcmr.gr

In this work, the design and initial demonstration of the KATERINA II detection system [1] is presented for rapid mapping of radionuclides in areas near to seashore. A new development is presented by integrating and synchronizing a GPS module with the acquired spectra from the KATERINA II detection system [2, 3, 4]. The system may be installed as backpack for areas with low activity concentration or in an unmanned vehicle for areas with high contamination for observing the source of radioactivity at the seashore. A quantitative solution is provided for natural and artificial radionuclides taking into account the parameters of the characteristics of the detector, the measurement geometry and the beach sand/sediment content. This paper reports on the field results for site characterization issues through automated analysis of gamma-ray spectra including low-level and low-energy γ -ray emitters. Perspectives of the future application of the system on a worldwide basis are related to the assessment of the dose rates in seashore areas that may be contaminated due to the operation of nuclear power plants and desalination plants and/or due to the decommissioning of nuclear power plants.

Acknowledgements:

The authors would like to acknowledge IAEA for supporting this work in the frame of CRP entitled 'In-Situ Method for Radioactivity Mapping of Beach Sands to Study Transport Processes Using Radio-Tracers'.

References

- [1] C. Tsabaris et al. Ninth International Symposium on Monitoring of Mediterranean Coastal Areas: Problems and Measurement Techniques", Livorno, Italy (2022).
- [2] C. Tsabaris et al., International Conference on the Safety and Security of Radioactive Sources: Accomplishments and Future Endeavours (CN-295), IAEA, Vienna, Austria (2022).
- [3] C. Tsabaris et al., Second International Conference on Applications of Radiation Science and Technology (ICARST-2022), IAEA, Vienna, Austria (2022).
- [4] Alexakis et al., Journal of Marine Science and Engineering, 9, 910 (2021).