

SPECIAL ISSUE ON AQUATIC SCIENCE AND TECHNOLOGY (i-CoAST) PART 2

PREFACE



The observation of marine and coastal environments has entered a phase in which the decisive question is no longer how much data can be acquired, but how reliably that data can be interpreted, standardized, and translated into operational decisions. Building on the first part of this special issue, which marked the tenth anniversary of the International Conference on Aquatic Science & Technology (i-CoAST), this second installment turns toward the interpretive layer of aquatic science: the confidence with which sensor-derived information can be trusted, the interoperability that allows heterogeneous datasets to be exchanged across domains, and the long observational records against which environmental changes must ultimately be measured.

This part comprises ten peer-reviewed contributions spanning long-term coastal observation, airborne and satellite remote sensing, artificial-intelligence-driven interpretation of marine imagery, geospatial data standards, radionuclide dispersion modeling, and the rehabilitation of aging infrastructure.

Long-term and high-precision observation forms the first thread. Han *et al.* examined the spatiotemporal variability of sea level along the coast of Korea using long-term observational data, resolving regional differences that shorter records cannot reveal. Huh and Lee applied airborne bathymetric LiDAR to detect topographic changes around underwater artificial structures, presenting Won-Pyeong Beach as a case study of how submerged morphology responds to engineered intervention. Kim *et al.* proposed a refinement method using a hybrid digital elevation model and evaluated its performance by terrain type using Korea Multi-Purpose Satellite-3 stereo imagery.

The second thread concerns the reliability and autonomy of artificial-intelligence-based interpretation. Jeon *et al.* introduced an entropy-guided confidence evaluation scheme for the semantic segmentation of marine debris, addressing the issue of when a segmentation result should be trusted rather than merely how accurate it is on average. Yeun and Choi designed an artificial intelligence agent framework for maritime surveillance based on electro-optical targeting systems, illustrating the transition from operator-driven monitoring toward agent-mediated situational awareness.

Interoperability and standardization constitute the third thread. Choi *et al.* demonstrated ship navigation optimization using detailed oceanographic information structured according to the S-100 standards, connecting hydrographic data models directly to route decisions. Kim

et al. developed a terrain conversion technique using the City Geography Markup Language-to-Land Extensible Markup Language, enabling urban-scale spatial models to be reused in the maintenance of port facilities.

This special issue further extends to environmental modeling and infrastructure resilience. Kim *et al.* evaluated the effect of sediment flux on Cs-137 dispersion in the Yellow and East China Seas using the POSEIDON-R box model, quantifying the role of particulate transport in radionuclide fate. You *et al.* assessed the rehabilitation performance of textile-reinforced mortar applied to damaged reinforced concrete beams, contributing to the maintenance of deteriorating structures in aggressive coastal environments.

Finally, Yang and Song compared corrected QT interval formulas across controlled heart rate conditions for electrocardiogram-based diabetes risk stratification, a reminder that the sensing and signal-processing principles cultivated in aquatic science share common ground with other measurement disciplines.

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