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Editorial

Recent Advances in Marine Environmental Research

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The marine environment includes the waters of seas and estuaries, the seabed and its subsoils, and all marine wildlife and its sea and coastal habitats. Marine ecosystems perform a number of key environmental functions, and is a vital resource for life on Earth. The story of oceans is the story of life; therefore, the ultimate aim is to keep our oceans and seas safe, clean, healthy, and productive.

In the ocean, a range of multi-scale oscillations include ocean circulations, eddies, tides, surges, and waves. They play an important role in many aspects, e.g., climate regulation, ocean energy, fishery resources, navigation safety, disaster prevention. In addition, chemical and biological processes would further affect coastal ecosystems. In general, field measurement/remote sensing, numerical modelling, and artificial intelligence approaches are being used to deliver more comprehensive and reliable information for marine environment.

The aim and scope of the Special Issue is to invite papers with main focuses on marine environment research, including clarification of interesting physical/chemical/biological phenomenon, processes, and mechanism, as well as recent development/applications of remote sensing technique, numerical modelling, and artificial intelligence/soft computing in the field of marine environmental studies. The current Special Issue contains nine interesting papers, ranging from fundamental studies and application research.

Lu et al. [1] presented a combined analytical and numerical (CAN) model to simulate the scattering of cnoidal waves by a fixed and partially immersed box-type breakwater. Experimental measurements on the wave profiles were carried out in a wave tank to verify the model solutions. Reflected and transmitted wave elevations obtained from the CAN model match closely with the measured data. The proposed CAN model can provide the expected trends in terms of applied forces, wave reflection, and transmission.

Huang and Chan [2] reviewed several historical landslide tsunami events and performed a set of numerical experiments to investigate the particular effects of slide shape on impulsive waves generated by a subaerial solid slide. Overall, the slide shape can have significant impacts on the characteristics of impulsive waves, such as maximum wave amplitude and its location, impact energy conversion rate, and the amplitude ratio between the first wave crest and the second crest in the leading wave group.

Chao and Young [3] proposed a parametric cyclone and neural network hybrid model for accurate, long lead-time storm surge prediction in order to reduce the devastation of coastal disasters. Particularly, local pressure and winds estimated from storm parameters through physically based parametric cyclone models indicated the possible future influence of a typhoon. Meanwhile, the error-tolerance capability of the neural network alleviated the discrepancy in model inputs and enabled accurate predictions.

Yaitskaya [4] described the results of the retrospective numerical simulation of wind waves in the Sea of Azov using the SWAN spectral wave model and the ERA-Interim global reanalysis for 1979–2019. The main focus was on the following parameters: significant wave height, wave period, and wave direction. After 2002, the wave height increased in the summer and autumn seasons and slightly decreased in winter and spring. A shift of the storm season to a warmer period was also detected.

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Liu et al. [5] utilized a three-dimensional (3D) circulation and mass transport model to delineate the salinity plume in a tidal estuary and continental shelf. The model was well validated, in reasonable agreement with measurement data. The model was adopted to estimate the recovery times in tidal estuaries and to analyze the influences of freshwater discharge and wind stress on the river plume around the continental shelf. The results indicated that freshwater discharges frequently dominated the river plume.

Liu et al. [6] further carried out numerical study to investigate the effects of environmental factors on suspended sediment plumes in the continental shelf out of the Danshuei River estuary. Analysis and comparisons of different scenario results indicated that the suspended sediment plume was greatly affected by tides. A higher sediment concentration in the plume in the offshore area was found during the neap tide. In addition, salinity affects the movement of density currents and the spread of the sediment plume.

Lai et al. [7] used a numerical model to simulate the floating trajectory of garbage falling into the sea from the landfill near the coast of Wanghaixiang Bay in northeast Taiwan. In the no-wind scenario, garbage was mainly affected by tidal currents. In the northeast monsoon scenario, garbage was forced toward the shore due to the windage effect. When the garbage falling into the sea was located in the bay or the mouth of the bay, the garbage had a higher probability of being forced into the bay by typhoons.

Fan et al. [8] conducted two cruises across the mainstream of the Kuroshio off eastern Taiwan before and after the passage of Typhoon Saola in summer 2012. The continuous underway pCO_2 (partial pressure of CO_2) measurements revealed that surface seawater pCO_2 (SS pCO_2) displayed spatial variations in response to typhoon passage. In contrast to the mixed-layer deepening, the advection pattern showed significant change before and after the typhoon, which could play a major role in controlling the variation of SS pCO2.

Chen and Skoog [9] chemically characterized organic aggregate in the Long Island Sound coastal waters. An enrichment factor analysis showed the preferential microbial degradation of particulate hydrolysable neutral aldose and glucose appeared as the most labile aldose. The increase in bulk POC and the decrease in the fraction of labile organic carbon (neutral aldose and amino acid) in the particulate phase resulted in an accumulation of uncharacterized (presumably more refractory) particulate organic matter.

To sum up, the Special Issue of journal *Water*, 'Marine Environmental Research', addresses some significant issues in marine environment (for coastal disaster reduction and environmental pollution prevention). The methodology developed by the authors fits into the current trends visible in the scientific literature. The authors proposed practical solutions that can be easily applied by marine services.

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