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Editorial

Editorial for the Special Issue “Remote Sensing in Coastal Zone Monitoring and Management—How Can Remote Sensing Challenge the Broad Spectrum of Temporal and Spatial Scales in Coastal Zone Dynamic?”

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Coastal zones are sensitive areas responding at various scales (events to long-term trends) where the monitoring and management of physico-chemical, biological, morphological processes, and fluxes are highly challenging. They are directly affected by anthropization (urbanization, industrialization, agri- and aquaculture) and climate change (e.g., river discharges, waves, sea-level rise). Coastal waters only represent 15% of the global ocean, but concentrate 90% of commercial fisheries, contribute to 25% of global biological productivity, and represent 80% of the marine biodiversity, while being associated with an intensive tourism-related economy.

The monitoring and management of coastal zones require past, present, and future observations adapted to quite diverse and dynamic environments. To complement field measurements, the use of remote sensing data provides useful information to map the hydromorphological (freshwater discharge, currents, shoreline evolution), physico-chemical (water transparency, temperature, salinity, oxygen, nutrients, and pollutants), and biological (habitats, phytoplankton blooms) properties of the coastal zones.

This special issue highlights how the monitoring of coastal zones benefits from both long-term (~40 years) and recent capabilities of remote sensing observations. It also provides new methodologies to optimize the combined use of multi-mission satellite/airborne data and field measurements for an integrated approach. Considering different types of coastal environments (bays, estuaries, sandy and muddy systems), several key land and water quality (vegetation, temperature, concentrations of suspended particulate matter and polychlorinated biphenyl, aquatic plants) and morphological (shorelines, mudbanks, wetlands) parameters can be remotely sensed at various spatial and temporal scales, using innovative methods and providing validated products.

In this special issue the capability of using multi-mission/airborne data and their combination with field measurements to study coastal, estuarine and marine environments has been addressed [1–5]. Dabuleviciene et al. [1] analyze a time series of multi-mission satellite data to characterize a coastal upwelling in the south-eastern Baltic Sea. Ventura et al. [2] map and classify ecologically

sensitive marine habitats combining the use of Unmanned Aerial Vehicle Imagery and Object-Based Image Analysis. In turn, Gray et al. [3] develop a method integrating drone imagery into high spatial resolution satellite remote sensing to assess estuarine environments. Hilton et al. [4] quantify polychlorinated biphenyl concentrations in San Francisco Bay using multi-mission satellite imagery. And finally using benthic temperature loggers, Brewin et al. [5] evaluate the operational retrieval of sea surface temperature at the coastline from Advanced Very High Resolution Radiometer satellite data.

The importance of using high spatial resolution remote sensing data to monitor coastal and wetland areas is shown in [6–10]. Abascal Zorrilla et al. [6] highlight the benefit of high spatial resolution satellite data for monitoring the dynamics of subtidal mudbanks along the coasts of French Guiana. Wang et al. [7] present and apply a new method to classify coastal wetland vegetation using high spatial resolution imagery. Larnicol et al. [8] use high-resolution airborne data to evaluate the validity of MERIS atmospheric correction and study intra-pixel variability in nearshore turbid waters. Pan et al. [9] apply a fusion method to Landsat-8/OLI and GOCI satellite data for hourly and high spatial resolution mapping of suspended particulate matter in the Yangtze (Changjiang) Estuary. Dogliotti et al. [10] show the potential of high spatial resolution ocean color imagery to detect and quantify floating aquatic plants in turbid estuarine waters (Río de la Plata).

Studies using long-term remote sensing observations highlight their importance in monitoring coastal zones [11–12]. De Sanjosé Blasco et al. [11] monitor the long-term (1875–2017) retreat of coastal sandy systems along the Cantabrian Coast (Spain) using geomatics techniques. In turn, Li et al. [12] examine land cover and greenness dynamics in Hangzhou Bay based on 30 years (1985–2016) of Landsat satellite data.

Finally, two review papers highlight (i) how 40 years of remote sensing data have changed our view of the coast [13] and (ii) how the resilience of coastal wetlands to extreme hydrologic events can be assessed using remote sensing as a primary tool [14].

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