remote sensing

MDPI

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?"

David Doxaran [1,*], Javier Bustamante [2], Ana I. Dogliotti [3], Tim J. Malthus [4] and Nadia Senechal [5]

1 Laboratoire d'Océanographie de Villefranche UMR 7093–CNRS/SU, France
2 Estación Biológica de Doñana, CSIC–Dept. Wetland Ecology–Américo Vespucio 26, Spain; jbustamante@ebd.csic.es
3 Instituto de Astronomía y Física del Espacio (IAFE), CONICET/UBA, Argentina; adogliotti@iafe.uba.ar
4 Coastal Sensing and Modelling Group–Coastal Development and Management Program–CSIRO Oceans and Atmosphere Business Unit, Canberra, ACT 2601, Australia; Tim.Malthus@csiro.au
5 University of Bordeaux, OASU/UMR 5805 CNRS, 33615 Pessac CEDEX, France; nadia.senechal@u-bordeaux.fr
* Correspondence: doxaran@obs-vlfr.fr

Received: 26 April 2019; Accepted: 26 April 2019; Published: 30 April 2019

check for updates

Keywords: coastal zones; management; monitoring; river plumes; estuaries; applications; optically complex waters; shoreline; morphology

---

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].

Author Contributions: The authors contributed equally to all aspects of this editorial.

Funding: This research received no external funding.

Acknowledgments: The authors would like to thank the authors who contributed to this Special Issue and to the reviewers who dedicated their time for providing the authors with valuable and constructive recommendations.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Dabuleviciene, T.; Kozlov, I.; Vaiciute, D.; Dailidiene, I. Remote Sensing of Coastal Upwelling in the South-Eastern Baltic Sea: Statistical Properties and Implications for the Coastal Environment. *Remote Sens.* **2018**, *10*, 1752. [CrossRef]
2. Ventura, D.; Bonifazi, A.; Gravina, M.; Belluscio, A.; Ardizzone, G. Mapping and Classification of Ecologically Sensitive Marine Habitats Using Unmanned Aerial Vehicle (UAV) Imagery and Object-Based Image Analysis (OBIA). *Remote Sens.* **2018**, *10*, 1331. [CrossRef]
3. Gray, P.; Ridge, J.; Poulin, S.; Seymour, A.; Schwantes, A.; Swenson, J.; Johnston, D. Integrating Drone Imagery into High Resolution Satellite Remote Sensing Assessments of Estuarine Environments. *Remote Sens.* **2018**, *10*, 1257. [CrossRef]
4. Hilton, A.; Bausell, J.; Kudela, R. Quantification of Polychlorinated Biphenyl (PCB) Concentration in San Francisco Bay Using Satellite Imagery. *Remote Sens.* **2018**, *10*, 1110. [CrossRef]
5. Brewin, R.; Smale, D.; Moore, P.; Dall'Olmo, G.; Miller, P.; Taylor, B.; Smyth, T.; Fishwick, J.; Yang, M. Evaluating Operational AVHRR Sea Surface Temperature Data at the Coastline Using Benthic Temperature Loggers. *Remote Sens.* **2018**, *10*, 925. [CrossRef]
6. Abascal Zorrilla, N.; Vantrepotte, V.; Gensac, E.; Huybrechts, N.; Gardel, A. The Advantages of Landsat 8-OLI-Derived Suspended Particulate Matter Maps for Monitoring the Subtidal Extension of Amazonian Coastal Mud Banks (French Guiana). *Remote Sens.* **2018**, *10*, 1733. [CrossRef]

7. Wang, M.; Fei, X.; Zhang, Y.; Chen, Z.; Wang, X.; Tsou, J.; Liu, D.; Lu, X. Assessing Texture Features to Classify Coastal Wetland Vegetation from High Spatial Resolution Imagery Using Completed Local Binary Patterns (CLBP). *Remote Sens.* **2018**, *10*, 778. [CrossRef]
8. Larnicol, M.; Launeau, P.; Gernez, P. Using High-Resolution Airborne Data to Evaluate MERIS Atmospheric Correction and Intra-Pixel Variability in Nearshore Turbid Waters. *Remote Sens.* **2018**, *10*, 274. [CrossRef]
9. Pan, Y.; Shen, F.; Wei, X. Fusion of Landsat-8/OLI and GOCI Data for Hourly Mapping of Suspended Particulate Matter at High Spatial Resolution: A Case Study in the Yangtze (Changjiang) Estuary. *Remote Sens.* **2018**, *10*, 158. [CrossRef]
10. Dogliotti, A.; Gossn, J.; Vanhellemont, Q.; Ruddick, K. Detecting and Quantifying a Massive Invasion of Floating Aquatic Plants in the Río de la Plata Turbid Waters Using High Spatial Resolution Ocean Color Imagery. *Remote Sens.* **2018**, *10*, 1140. [CrossRef]
11. De Sanjosé Blasco, J.; Gómez-Lende, M.; Sánchez-Fernández, M.; Serrano-Cañadas, E. Monitoring Retreat of Coastal Sandy Systems Using Geomatics Techniques: Somo Beach (Cantabrian Coast, Spain, 1875–2017). *Remote Sens.* **2018**, *10*, 1500. [CrossRef]
12. Li, D.; Lu, D.; Wu, M.; Shao, X.; Wei, J. Examining Land Cover and Greenness Dynamics in Hangzhou Bay in 1985–2016 Using Landsat Time-Series Data. *Remote Sens.* **2018**, *10*, 32. [CrossRef]
13. Splinter, K.; Harley, M.; Turner, I. Remote Sensing Is Changing Our View of the Coast: Insights from 40 Years of Monitoring at Narrabeen-Collaroy, Australia. *Remote Sens.* **2018**, *10*, 1744. [CrossRef]
14. Tahsin, S.; Medeiros, S.; Singh, A. Assessing the Resilience of Coastal Wetlands to Extreme Hydrologic Events Using Vegetation Indices: A Review. *Remote Sens.* **2018**, *10*, 1390. [CrossRef]