Journal of
Marine Science and Engineering

MDPI

Editorial

Advances in Sedimentology and Coastal and Marine Geology

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The Special Issue "Advances in Sedimentology and Coastal and Marine Geology" has collected significant research articles advancing the state of the art of the corresponding sub-disciplines. Beach rocks, hybrid event beds and quaternary marine sedimentation and shallow gas represent important topics contained within this Special Issue. Different areas have been studied, including both Mediterranean and extra-Mediterranean areas. In the Mediterranean areas, the Bay of Naples and the Cilento offshore (Southern Tyrrhenian Sea, Italy) have been studied, along with the Red Sea (Saudi Arabia). The Bay of Naples displays the physiographic domains of the Somma–Vesuvius volcanic complex, the Campi Flegrei volcanic complex, the Ischia and Capri islands, and the Sorrento Peninsula. The Cilento offshore, studied by two papers of the Special Issue, is the marine area surrounding the Cilento Promontory and represents a structural high resulting from the seaward prolongation of the Licosa Cape's high structure, bounded northwards and southwards by two half-graben basins: the Salerno Valley and the Policastro Gulf. The Red Sea, studied by two papers within the Special Issue, separates the coasts of Egypt, Sudan, and Eritrea to the west from those of Saudi Arabia and Yemen to the east. The Red Sea contains some of the world's warmest and saltiest seawater, and its name is derived from the colour changes observed in its waters. Normally, the Red Sea is an intense blue-green; occasionally; however, it is populated by extensive blooms of the algae *Trichodesmium erythraeum*, which, upon dying off, turn the sea a reddish-brown colour. In the extra-Mediterranean areas, Quanzhou Bay and the South China Sea (China), the Taiwan Strait (Taiwan), and north-western Borneo (Malaysia) have been examined. Quanzhou Bay is a semi-enclosed bay located in the southeast coast of China, with its mouth opening towards the Taiwan Straits. Two rivers, the Jinjiang and Luoyang, carry sediments to the bay and are connected to the Taiwan Straits. The sediments are also introduced to the bay from the open sea and the anthropogenic factors have a strong influence on the bay. The South China Sea is a marginal sea south of China, included in the Pacific Ocean, and encompassing an area from Singapore to the Taiwan Strait. The sea stretches in a southwest to northeast direction, whose southern border is 3 degrees. The Gulf of Thailand covers the western portion of the South China Sea. The South China Sea overlies a drowned continental shelf; during recent ice ages, the global sea level was hundreds of meters lower, and Borneo was part of the Asian mainland. The Taiwan Strait is an arm of the Pacific Ocean, 160 km wide at its narrowest point, lying between the coast of China's Fukien province and the island of Taiwan (Formosa). The strait extends from southwest to northeast between the South and East China seas, reaching a depth of about 70 m. Borneo is the third-largest island in the world and the largest in Asia. At the geographic centre of Maritime Southeast Asia, in relation to major Indonesian islands, it is located north of Java, west of Sulawesi, and east of Sumatra. The island is politically divided among three countries: Malaysia and Brunei in the north, and Indonesia to the south.

Beach rocks, which are the subject of two papers of this Special Issue, are carbonate-cemented sandstones, individuating on the shoreline of tropical and warm temperate beaches. Beach rocks represent a good potential indicator of sea-level position. Their location within the intertidal zone makes beach rocks potentially good indicators of former

Citation: Aiello, G. Advances in Sedimentology and Coastal and Marine Geology. *J. Mar. Sci. Eng.* **2023**, *11*, 329. https://doi.org/10.3390/jmse11020329

Received: 17 January 2023
Revised: 19 January 2023
Accepted: 19 January 2023
Published: 3 February 2023

sea level, particularly if the tidal range is small. Most beach rocks are found in low-latitude locations, although there are particularly extensive outcrops around the Mediterranean Sea. In the studied areas, beach rocks mainly consist of calcareous biogenic remains (Red Sea, Arabian Gulf); alternatively, they consist of siliciclastic grains in near the tectonically active areas (Gulf of Aqaba).

Hybrid event beds are the deposits of such flows which do not resemble traditional end-member sediment gravity flow facies (debris flows or turbidites), as they result from a combination of turbulent, transitional and laminar transportation mechanisms, all as part of the same event. Hybrid event beds include transitional flow deposits, slurry beds and matrix-rich sandstones. Hybrid event beds comprise up to five (H1-H5) vertically stacked divisions, including a basal matrix-poor turbidite sandstone (H1), overlain by a banded sandstone (H2) with alternating matrix-rich and matrix-poor bands; this gives way to a matrix-rich sandstone (H3) which constitutes the 'linked debrite'. The matrix-rich sandstone of H3, typically contains mudstone clasts, mud chips, dispersed clay matrix, mica flakes, sand injections, pseudo nodules and organic matter. A couple of thin, well-structured sandstones/siltstones (H4) and a mudstone (H5) complete the typical sequence of hybrid event beds.

Aiello and Caccavale [1] have shown the depositional environments of the Cilento offshore based on marine geological data, including sedimentologic and seismo-stratigraphic data and seismic stratigraphy. Based on marine geological mapping, coupled with seismo-stratigraphic interpretation and confirmed by the sedimentological data, littoral, inner shelf and outer shelf environments compose the highstand system tract of the Late Quaternary depositional sequence. The seismo-stratigraphic results are basic for further developments of Aiello and Caccavale on shallow gas in the same area [2]. The first area, distinguished by acoustic blanking is located offshore from the Licosa Cape promontory at water depths ranging between 30 and 90 m; the second area, distinguished by shallow gas pockets, is located in the northern Cilento promontory from the seaward prolongation of the Paestum Plain to the Tresino Cape; the third area, distinguished by shallow gas pockets and by the seismic units impregnated by gas ("gassy sediments"), is located on the northern Cilento promontory, starting from the offshore prolongation of the Paestum Plain up to the Licosa Cape promontory, at water depths ranging between 10 and 60 m.

Aiello [3] has studied the seismo-stratigraphic setting of the eastern Bay of Naples, recognizing new seismic units and correlating them with buried tuff rings; these were compared with the Porto Miseno, Archiaverno and Averno and Astroni tuff rings onshore (Campi Flegrei) and a new seismic unit, recognized offshore the Somma–Vesuvius volcano, correlating with the fallout deposits representing the base of the AD 79 eruptive sequence based on isopach maps available in the literature. The impact of PDCs (pyroclastic density currents) on this area, both onshore and offshore, has been discussed, due to the dispersal, thickness and extent of the pyroclastic deposits, corresponding with seven plinian and sub-plinian eruptions.

Ghandour et al. [4] studied the lithofacies characteristics, petrographic, XRD, and stable isotope data of Al-Mejarma beach rocks, located in the Red Sea, Saudi Arabia, to reconstruct its geologic evolution. Beach rock was deposited during the Middle-Late Holocene as a shoreface-beach barrier in two stages, attesting a landward migrating sediment accumulation and a rapid marine cementation. The beach rock consists of massive, planar, and ripple cross-laminated sand with foresets trending parallel to the slightly oblique Red Sea coastline. Six vertically stacked lithofacies have been distinguished through the textural characteristics and the sedimentary structures. The obtained results are basic for the subsequent paper of Mannaa et al. [5], dealing with the use of beach rocks as palaeo-shoreline indicators.

Hybrid event beds in deep marine environments have been studied by Jamil et al. [6]. In particular, these authors have discussed the development of hybrid event beds in submarine lobes, analyzing proximal-to-distal, frontal-to-lateral relationships and evolution during lobe progradation. A geological survey was carried out on the Late Paleogene

Crocker Fan to understand the relationship between the character of hybrid bed facies and lobe architecture. The obtained results have shown that the hybrid facies are well developed in proximity to medial lobes, whereas distal lobes are mainly parallel to cross-laminated clean-to-muddy hybrid facies. Deep marine environments usually include a fan lobe system and only locally hybrid event beds. Muddy sandstone and clay-rich hybrid event bed facies negatively affect the reservoir potential of sandy lobe intervals, hindering the pore network and connectivity for lateral and vertical migration of fluids from sandstone reservoirs.

Shan et al. [7] have analyzed the effects of the mineralogic composition of the clays on the dynamic properties and fabric of artificial marine clays. In particular, the marine clays found in the South China Sea deltas have been studied. Raw non-clay minerals (such as quartz, albite) and clay minerals (such as Na-montmorillonite and kaolinite) have been used to produce artificial marine clay, whose dynamic properties were studied through the mineralogic composition. Dynamic triaxial laboratory tests for artificial marine clay comprising various clay minerals have been carried out, showing that marine clay with a high montmorillonite content exhibited slower development of strain than the clay with a low montmorillonite content. The obtained results have shown that the clay minerals, especially montmorillonite, strongly control the dynamic properties of large strain.

Xiao et al. [8] detailed an integrated modeling of Quanzhou Bay (China), associating the geomorphologic evolution and the oceanographic parameters. Based on the topographic and hydrological data of the bay, a numerical model was used to simulate the hydrodynamics of the bay under the influence of human activities. The coupling relationship between human activities and the evolution of geomorphology and hydrodynamics in the urban bay at different stages of industrialization has been discussed. This study has demonstrated the anthropogenic impact on geomorphology and oceanography in highly industrialized settings.

Finally, He et al. [9] have studied the sedimentary evolution of the Western Taiwan Shoal Area during the Late Pleistocene. A new pollen analysis and major and trace element contents has been carried out on a gravity core recovered from the Taiwan Shoal (sand ridges), south of the Taiwan Strait. The variations in the pollen assemblage and concentration have highlighted the climate change in the Taiwan Shoal and the strength of the Zhe-Min Coastal Current. Five phases of the sedimentary evolution in the Taiwan Shoal area have been distinguished based on the analysis of pollen and major trace elements with the combination of the AMS ^{14}C dating results.

Funding: This research received no external funding.

Conflicts of Interest: The author declares no conflict of interest.

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