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Preface

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This special issue of the *Boletín de la Sociedad Geológica Mexicana* represents a renewed effort to reflect the spectrum of research work on Marine Geosciences that is currently being done by Mexican scientists and their foreign counterparts in the Atlantic and Pacific basins of Mexico, mainly in the economic exclusive zone. Also, some articles present the results of similar studies done in other regions (e. g. Tamil Nadu, in the southern coast of India). This compilation was incepted during the cruise of R/V "El Puma" in May 2007, devoted to the search and study of fluid seepage and venting in the Wagner and Consag basins of the Northern Gulf of California. There, the editor-in-chief of the *Boletín* together with two members of the editorial committee outlined an initial proposal. Following this idea, a formal announcement of the special issue was made in October of 2008. The motivation to compile this special issue of the *Boletín* lies on a specific fact and an intention:

a) Geological and geophysical studies of the Mexican seas published in the *Boletín* are scarce, only in issues 48 (1) of 1987 and 26 (2) of 1963;

b) We aim to promote research in Marine Geosciences at Mexican scientific institutions, and to strengthen the interaction between marine geoscientists, thus consolidating interinstitutional and interdisciplinary groups.

This issue presents thirteen papers, including one technical note. All the manuscripts received were carefully reviewed by experienced national and foreign specialists in different areas of Marine Geosciences who are based in institutions from eleven countries: Gladys R. Bernal Franco, Nehru E. Cherukupalli, Iran Carlos Stalliviere Corrêa, Luiz Drude de Lacerda, Kinardo Flores Castro, Thomas E. Gill, Óscar González Yajimovich, Donn Gorsline, Luis C.A. Gutiérrez Negrín, Jacobus Le Roux, Jayagopal Madhavaraju, Marcelo Manassero, Ismael Mariño Tapia, Enrique H. Nava Sánchez, Sandra Ortega Lucach, Federico Páez Osuna, Ken Peters, Felipe Ríos Rodríguez, Alberto Sánchez, Roger Urgeles, and many anonymous reviewers. We are grateful for their invaluable suggestions, corrections and remarks.

The spectrum of the papers published in this issue covers a wide range of topics, including coastal lithology and lithodynamics, sediment mineralogy and geochemistry, seawater chemistry, and ecology of submarine hydrothermal environments.

Kasper-Zubillaga establishes four source areas for sediments in the Sonoran coast of the Gulf of California, based on roundness analysis of quartz grains, and deduces the roles of eolian and fluvial transport, wind selectiveness, as well as of erosive processes affecting plutonic and low-grade metamorphic rocks.

Sánchez *et al*. analyze the suitability of three classic models of sediment transport in the Bay of Todos Santos, along the northwestern coast of the Baja California peninsula. This paper explains the directions of sediment transport and its driving forces in different parts of the study area, and depicts the processes of resuspension and transfer of the sedimentary material in the deep zones of the bay.

Sánchez *et al*. describe some granulometric and geochemical properties of surface marine sediments collected off Sonora and Sinaloa, and analyze the effect of shrimp fishing on bottom trawling. A detailed assessment of sediment characteristics, such as calcium carbonate concentration and the contents in organic carbon and nitrogen, as well as the C/N ratios and the stable nitrogen and carbon isotopic composition, allowed the authors to conclude that the sea bottom of these zones is still well preserved and undisturbed by human activity.

Demina *et al*. report the bioaccumulation of a variety of major and trace elements in some species of the biota from two hydrothermal sites of the Southern Trough of the Guaymas Basin, central Gulf of California. Trace metals were found not only in the organs and tissues of such biota containing endosymbiotic chemosynthetic bacteria, but also in the organs that do not bear them. High contents of most metals were detected in the soft body of the hydrothermal clam *Nuculana grasslei*, while the highest Mn content was detected throughout the whole body of Spongia. The authors

show a wide range of selective accumulation of trace metals by the organisms from the hydrothermal fields, with a bioconcentration factor of the metals ranging within three orders of magnitude: 5 for Mn, and up to 3 x 10^4 for Cd.

Scholz-Böttcher *et al*. characterize the relative importance of natural and anthropogenic sources of hydrocarbons in the southern Gulf of Mexico based on biomarker analysis. The analysis of samples collected from cold seeps and asphalt volcanoes of the Campeche Sound reveals biomarkers that are characteristic of the subseafloor oil reservoirs. On the other hand, some surface sediment samples clearly show an anthropogenic contribution, attributable to the offshore oil production operations.

Rodríguez-Meza *et al*. describe the major and trace element composition of surface sediments of Concepción Bay, western central Gulf of California. Spatial distribution patterns of element concentrations reveal general trends and associations of elements, as well as a peculiar behavior of some elements near a shallow submarine gasohydrothermal system. In the same area, Estradas-Romero *et al*. evaluate the influence of the hydrothermal fluids on the abundance and diversity of phytoplankton. This study concludes that the hydrothermal activity favors the development of diatom and cyanophyte communities in the area.

Escobar-Briones and García-Villalobos present an analysis of the distribution of total organic carbon (TOC) and total nitrogen (TN) in deep-water sediments from the southwestern Gulf of Mexico. This study demonstrates that TOC and TN are essentially controlled by depth, and that the origin of organic matter has an inter-year variability.

The statistical treatment of heavy mineral data of the sediments of La Paz Lagoon (La Paz Bay, southwestern Gulf of California) and a description of the surrounding rocks and drainage basin were used by Choumiline *et al*. to evaluate the contribution sources inland of this sedimentary environment. The three sedimentary provinces recognized are: eastern (influenced by arroyos eroding volcaniclastic sequences and an intrusive granitic complex), southeastern (arroyos that go through extrusive and non-marine volcaniclastic rocks) and northwestern (defined by eroded El Mogote sandbar sediments brought by littoral, eolian and wave transport, probably from the El Cien marine formation).

Srinivasalu *et al*. present a characterization of the coastal sediments associated with the 2004 tsunami in Tamil Nadu, southeastern India. This study demonstrates that the foraminifer content of the deposits is an effective tool to identify the sedimentary material carried to the coast from the near-shore area (mainly from 45 m deep sediments) by the tsunami. The location, thickness and textural characteristics of tsunami deposits strongly depend on the morphology of the coast line and on the lithology of adjacent marine sediments.

Álvarez and Suárez-Vidal characterize the bathymetry and active geological structures in the Upper Gulf of California, thus finding the predominance of narrow, NW-SE trending tidal ridges with intervening troughs up to 50 km long that run across the shallow shelf to the edge of the Wagner Basin. Shallow tidal ridges near the Colorado River mouth are proposed to be active, while segments in deeper waters are considered as either moribund or already in a burial stage. Two major ridge-trough structures may be related to tectonic activity in the region, in particular, to active geological structures that are mimicked by the deep basin geometry in the Wagner Basin.

The detailed bathymetry and water column hydrology features of the Wagner and Consag basins, Northern Gulf of California, obtained during the cruise of R/V "El Puma", in May 2007, are shown by the paper of Vázquez-Figueroa *et al*. This oceanographic campaign resulted in the discovery of numerous gas flares associated with disruptions of the sediment structure.

Tidal level variations, water currents induced by the tides, coastal geothermal manifestations, salinity gradients in the Colorado River estuary and submarine hydrothermal vents are natural phenomena occurring in the Northern Gulf of California. They are reviewed in a technical note by Hiriart-Le Bert and regarded as potentially suitable renewable energy resources.

In the future, we would like to present special issues of the *Boletín* devoted to specific topics of marine geology, namely the role of the primary and secondary biological production, upwelling and oxygen minimum zones, events such as hurricanes and earthquakes and their effect in marine sedimentation, carbon and other element biogeochemical cycles, paleoceanographic and paleoclimatic studies and their prediction potential for future climatic and environmental changes, mineral resources of the seafloor, and multidisciplinary aspects of hydrothermal systems, both of deep water and marginal marine environments.

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