



## **Geochemistry of superficial marine sediments of the Wagner and Consag basins, Northern Gulf of California, Mexico.**

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The region of the northern Gulf of California is geologically complex due to the presence of the tectonic boundary between the Pacific and North America plates. It is also known for being one of the most dynamic shallow environments of Mexico due to several phenomena that occur in the region such as wind, water and gravity currents. During oceanographic cruises (2007 and 2010) a large number of morphological features (pockmarks and flares) was observed by echosounder and TOPAS (sub-bottom acoustic profiler) in the sedimentary sequences and above them, possibly related to the discharge of fluids through Wagner fault. Geochemical analyses of sediments recovered by dredging are used to characterize the potential sources of sedimentary materials and chemical anomalies that may be associated with fluid discharge. Thirty one surface sediment samples were collected during the first expedition and forty one in the second oceanographic cruise using a MacIntyre grab sampler, and later were examined for grain size as well as the bulk concentrations of 44 major (Al, Fe, Ca, Mg and organic carbon) and trace elements (Ba, S, P, Mn). Result processing included the calculation of enrichment factors (EF) using Sc as a normalizing element, and applying descriptive and multivariate statistics. The sediments grain size is characterized by textural homogeneity, being mainly muds ( $8.68 \pm 1.4$  ( $\phi$ )). The average contents of organic carbon and carbonate were of  $1.01 \pm 0.60$  y  $7.90 \pm 2.83\%$  wt. respectively. The comparison in composition of the sediments of the Wagner and Consag basins with the average the upper crust average abundances shows that most analyzed elements have similar concentrations, suggesting the natural contributions derived from the erosion of the Colorado River deltaic structure and a lower proportion of other tributaries and the Sonoran Desert. Significant enrichment in Ba and S (EF of 3.37 y 8.0 respectively) are highlighted, coinciding with the mineralogical features observed in the sediments in some stations, where besides the presence of feldspar, authigenic minerals such as barite, pyrite and calcite were observed. The geochemical description of the sediment samples from both cruises coincides with the features described. It is important to note that chemical anomalies were characterized by a spatial distribution associated with the trace of the Wagner fault. Varimax rotation factor analysis, performed at each of the databases, shows that three main factors describe the composition of the sediments: (a) terrigenous I, controlled by the Colorado River Delta and characterized by feldspar and clays; (b) the association of Ba with S (for barite), related to the discharge of hydrothermal "sedimentary" reducing fluids and (c) another factor terrigenous II, controlling the supply of heavy minerals into the sediments.