EGU21-9518
https://doi.org/10.5194/egusphere-egu21-9518
EGU General Assembly 2021

Sedimentological and environmental approach of the Llumeres offshore sediments (N Asturias-N Spain)

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The sedimentological and geochemical evolution of the internal platform located in front of the Llumeres cove (Asturias, North of Spain) has been studied, based on the analysis of selected sediment samples from 5 long corers, approximately 2 m thick, recovered for an offshore structures installation project. In each sample, a granulometric characterization has been carried out by the calculation of granulometric parameters (centile, mean, shorting, etc.) and the mineralogical composition (silica/biogenic carbonates). Geochemical analysis has also been made in the samples. The enrichment of selected heavy metals and metalloids (Zn, As, Cu, Pb and Hg) has been studied, applying the Geo-accumulation Index (Igeo) and the Enrichment Factor (EF). The results have also been subjected to multivariate and bivariate statistical analyzes that have allowed establishing the relationships between the elements and determining in a preliminary way their potential origin.

The sedimentological results point to the fact that the sediment was incorporated into the internal platform during the last stages of the sea level rise, which began some 20,000 years ago (Pleisto-Holocene transgression). At present, the zone enjoys stability, since no sedimentation is detected. These sediments are relict, without existing agreement with the siliciclastic sedimentation that is taking place at the moment in the coastal zone (Llumeres beach). Three main sandy lithologies have been analyzed: siliciclastic, mixed and carbonate sands which are distributed irregularly in the vertical. This is indicative of changes in the origin of the sediment (siliciclastic, due to the coastal drift current and bioclastic, typical from the platform), as well as the energy of the depositional agent with a clear decrease in size towards the top, detecting relatively large variations in size and the coarse sediments would correspond to moments of storm.

The geochemical results show that the area does not have a remarkable anthropic condition along the sedimentological profile. However, enrichment of some potential contaminants was detected in the more recent sediments (first centimeters of the boreholes), but the enrichment does not appear to pose an environmental risk and their origin seem to be related to nearby areas such as the Nalón River or the industrial area of Aviles that may export contaminants to the marine environment.