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Lesser Syrtis (South of Tunisia): Phosphate industry contamination assessment
using a multidisciplinary approach

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The Gulf of Gabes, located in the southern part of Tunisia is presently well known to host a unique coastal oasis. However, its marine environment was in the past unique and very diverse. At the beginning of the 20th century, large *Posidonia oceanica* meadows characterized this Gulf providing an ideal nursery habitat for many marine species, including fishes and invertebrates. It was, indeed, a “hotspots” of marine biodiversity in the Mediterranean Sea.

At the beginning of the fifties, the Tunisian government started to develop the phosphate industry, which in turn, increased the ore phosphate extraction and the construction of several industrial complexes to treat the extracted ore phosphates, also called phosphorites, into phosphoric acid, which is mainly used as raw material for fertilizer. The treatment of phosphorites generates large amounts of waste products such as phosphogypsum. Phosphogypsum contains several pollutants such as, phosphorus, fluor, heavy metals and radioactive elements and represent a serious risk for the environment. Since the seventies at Gabes the entire industrial waste is directly discharge into the marine environment without treatment. The environmental consequences of this industrial pollution have been observed since the seventies and since then the deterioration of the ecological and environment conditions have decreased to reach alarming conditions in the present days.

The present study presents for the first time an investigation over a large area in the southern part of the Tunisian coasts. The analyses carried out include sedimentary phosphorus, sedimentary organic matter, pollutants (e.g. phosphorus and heavy metals) in seawater, mineralogical composition of sediments, grain size, sedimentary facies, seagrass distribution, coral fragment distribution, and living (stained) foraminiferal assemblages.

The phosphate industry pollution has an impact on the marine fauna and induces the decline of macrofauna. The coral *Cladocora caespitosa* has been severely impacted and is not living anymore in the inner part of the Gulf of Gabes. Quantitative and qualitative data of living (stained) foraminifera confirm the geochemical data and highlight the negative ecological condition within the Gulf of Gabes. However, the eastern coast of Djerba Island does not seem negatively impacted by the phosphate industry. Here the sensitive alien foraminifera *Amphistegina* spp. can proliferate after its migration from the Indian Ocean and Red Sea. Although, the Djerba lagoon, located on the eastern edge of Djerba Island, undergoes intense touristic activity and it hosts a unique ecosystem and high benthic foraminiferal diversity.

In Summary, the investigation of the southern part of Tunisia has highlighted bad environmental and ecological conditions in the Gulf of Gabes. The entire Gulf shows signs of heavy pollutions, however, the most severe environmental deterioration is observed in the vicinity of the industrial waste discharge at Gabes were high content of different pollutants (e.g. phosphorus, heavy metals) were measured. Also the region of Skhira (northern part of the Gulf of Gabes) and the western coast of Djerba Island seem to be impacted. Although the eastern coast of Djerba Island can be considered as “clean”. However, its offshore shows the first signs of contamination.

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