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Impact of Phosphogypsum waste on the Geochemistry of the coastal water of Ghannouche -Gabes (SE of Tunisia).

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The littoral Ghannouche – Gabes (SE of Tunisia), has been known since the 1970's, an important industrialization especially after the installation of the chemical complex for the treatment of phosphates. These industries are at the origin of various waste materials, the most significant one is phosphogypsum (PG) which is released into the sea.
The aim of this paper is to identify and to analyze the different entropic and natural factors, which govern the chemical composition in major elements, dissolved oxygen, pH and temperature of Ghannouche –Gabes coastal water, while studying, in particular, the impact of PG waste on the spatial distribution of these parameters.
The result of the chemical analyses of the samples taken in June 2003, show that Na, K and Cl are conserved in solution and they evolve with constant Na/Cl and K/Cl ratio. The values of these ratios are similar to sea water average. The concentration of the other elements are controlled, first, by processes of precipitation or dissolution of the carbonated (Ca, Mg and HCO3) or sulphated (Ca and SO4) minerals, and second, by dilution or evaporation phenomena and by the phosphogypsum waste.
The spatial distribution of these elements, of the pH, the dissolved oxygen and the temperature and the result of the saturation index with respect to calcite, gypsum and fluorite, by using of the PhreeqC program, show that the zone, located at north of the study area, between the commercial and the fishing port, is highly influenced by the PG waste.
In this area, where the PG is released and which is relatively sheltered by the dams of the commercial and fishing port, waters are characterised by the highest temperatures values, and the lowest pH and the dissolved oxygen values. This water is supersaturated with respect to the fluorite, under saturated with respect to CaCO3 and gypsum. In this zone, the poured gypsum undergoes a quasi-total dissolution. This dissolution would be supported by the acidity of water and the highest temperature values.

Keywords: Major ions - Sea water – Phosphogypsum - Saturation indices – Gulf of Gabes - Tunisia.