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## Hydrodynamic Modeling of the Gulf of Aqaba

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### Author(s)

Ahmed Sayed Mohamed Ahmed, Mohamed E. Abou-Elhaggag, Hesham El-Badry

### ABSTRACT

The Gulf of Aqaba (GOA) is unique as it contains significant percentage of the world's natural marine biodiversity. This unique environment is potentially vulnerable to pollution particularly at its northern tip. One of the major activities affecting the environment of the gulf is the man-made desalination plants that abstract sea water and dispose desalinated brine. In this context, the paper discusses the impact of the abstract and disposal activities on the GOA environment. A 3D hydrodynamic model was developed to cover the GOA. Relevant data were collected for 3D hydrodynamic modeling construction. Delft-3D model developed by Deltares was applied in this study. The 3D model reliability was confirmed since the model results have revealed the existence of a structure of primary eddies along the axis of the Gulf which was previously reported by different researchers. Further numerical simulations were carried out by incorporating various alternatives of seawater abstraction and desalinated brine disposal off the north and north east coast of the GOA. The developed GOA hydrodynamic model, at the present stage, is preliminary where the results provide qualitative assessment on the potential impacts on the water circulation. Accordingly, this study is considered a pace ahead for a better model development and validation in the future studies.

### KEYWORDS

3D Hydrodynamic Simulations; Gulf of Aqaba; Circulation; Delft-3D; Desalination

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