EXPLORING THE POTENTIAL OF MODIS VISIBLE AND THERMAL CHANNELS IN MONITORING AND ASSESSING THE IMPACT OF DESALINATION PLANT DISCHARGES IN THE ARABIAN GULF

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1. INTRODUCTION

Sea water desalination has experienced an unprecedented growth in the GCC countries to meet the ever growing demand of water for household consumption as well as for industrial and agricultural purposes. However, the current technologies used in water desalination are also accompanied by negative environmental impacts especially on the surrounding marine ecosystems. Since major seawater desalination plants are located by the shoreline, the main environmental considerations in desalination are water intakes and sea outfall discharges. This study is focusing on the impact of desalination plant discharges usually used to dispose of brine waste stream.

The arid climate of the Arabian Gulf contributes to sedimentation through increased wind action and the infrequent but heavy rainfalls which cause flash floods. Additionally, high water temperatures with high evaporation rate and low water inflow through rivers and precipitation cause a circulation pattern that favor inorganic carbonate precipitation contributing to frequent and visible development of sediments (as shown in MODIS image).

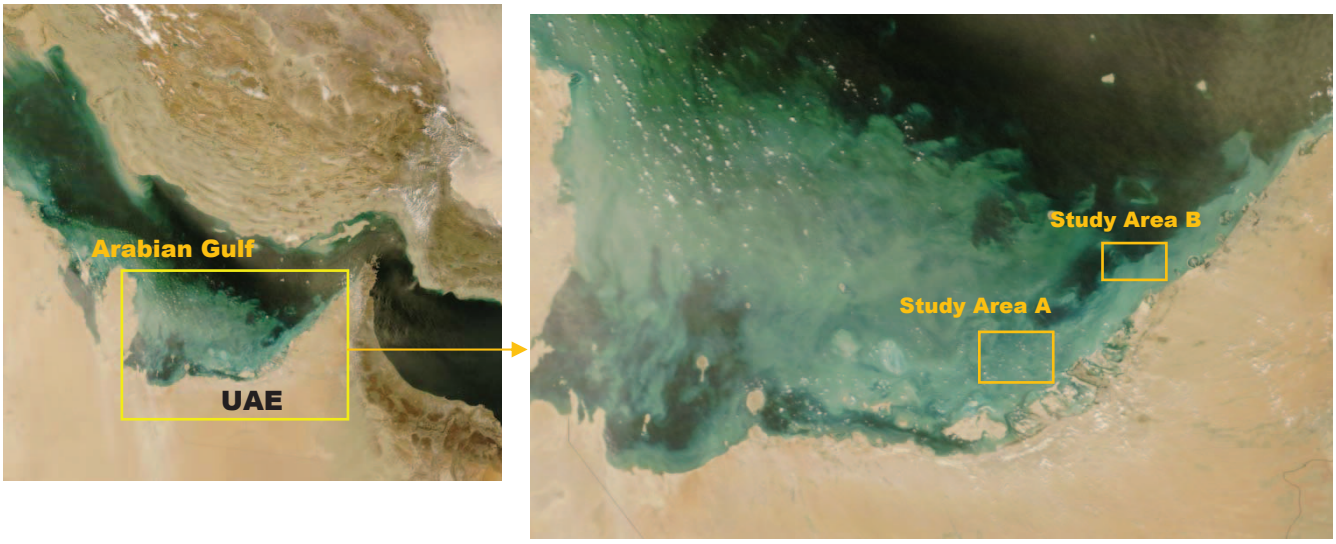

Figure 1: Study area shown in a true-color MODIS composite acquired by EIAST ground station on February 21, 2008

The objective of this project is to develop an automated approach for monitoring water quality and temperature (thermal properties) surrounding the discharges of desalination plants in the UAE coastal areas. Visible and thermal measurements provided by MODIS sensors on board of Terra and Aqua satellites are used in this project. The first four bands (visible) and band 31 & 32 (thermal) were selected. Parameters of interest include chlorophyll concentration, temperature, color, and total suspended solids. Future multi-spectral data from DubaiSat-1 (5-m resolution) will be also used to detect small changes in water color that cannot be detected with the MODIS data (250 m).

Different existing tools such as the Ocean color Chlorophyll (OC4) algorithm will be also tested. This algorithm, which is a four-band maximum band ratio formulation, has been successfully used to estimate *chl-a* concentration. Similar MODIS-based algorithms have also been developed to map the Total Suspended Matter (TSM) distribution and Sea Surface Temperature (SST) [1-3].

11. REFERENCES

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