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MONITORING THE RISE OF SEA LEVEL AROUND AN ISLAND IN THE UNITED ARAB
EMIRATES USING DIGITAL ELEVATION MODELING (DEM)

Abstract

According to a published report by the UN Inter Governmental Panel on Climate Change, United Arab Emirates is expected to have a land loss of about 1 percent - 6 percent i.e., around 2000 km² - 5000 km² by the end of 21st Century. The rising of sea level is closely related to the recent climate abnormalities due to Global Warming which also causes disturbances in the ocean dynamics. It is assumed to have a profound effect on the coastal areas which becomes the most concerning issue for future generation, particularly for communities located near the coastal area. The annual rise of sea level is driven by oceanic thermal expansion, melting of ice caps and glaciers in the polar region and due the aggravated storm events. This can cost the government increased economic damage for the relocation of low lying urbanized areas and cities such as the Palm Islands in Deira, Jumeirah and Jebel Ali, The World Island which is an archipelago of various small islands constructed in the rough shape of a world map and Abu Dhabi city which is situated on an island around 250 meters away from the mainland. The monitoring of the Sea Level has become a priority that should be closely evaluated to predict natural calamities over such low-lying cities and man-made islands. By using Orbital Remote Sensing, the governmental authorities can deliver environmental relevant, long-term datasets suitable for analyzing changes in area, structure and with the aim of providing guidance on the use of these data in risk assessment by monitoring the topography around the coastal border of the land by comparison of constructed Digital Elevation Models (DEM). These Digital Elevation Models are three-dimensional representations of a surface constructed using the data obtained from an Orbital Sensor using a Geographic Information System (GIS) computing software like ArcGIS. The statistics relating to Elevation Data or Contour Line Data obtained from the orbital sensor is used to map a three-dimensional model of the coastal line and the level of the sea is observed.