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Observations of hydrographic properties, dissolved oxygen (DO) and chlorophyll-a (Chl-a) (phytoplankton biomass) within the exclusive economic zone (EEZ) of Qatar (central Arabian Gulf)

Mohammad Fazle Rakib*, Ibrahim A. M. Saleh Al-Ansari

*Environmental Science Center, Qatar University, P.O. Box 2713, State of Qatar

Corresponding author email address: isalansari@qu.edu.qa

In situ observations of physical, chemical, and biological parameters of the Qatari water column were conducted to understand the temporal (seasonal) and spatial (regional) variability in the vertical and horizontal distribution of oceanographic properties within the exclusive economic zone (EEZ) of Qatar. Samples were collected from 5 different offshore shallow and deep stations covering the northern and eastern marine regions of the Qatar EEZ during two seasons: late summer (September 2014) and winter (January 2015). Eighteen (18) water samples were analyzed for temperature, salinity, density, dissolved oxygen concentration, dissolved oxygen saturation (DO%), and chlorophyll-a concentration (Chl-*a*). These data reveal several interesting and unique features that are related to surface warming that give rise to a large excess of evaporation over precipitation, resulting in the formation of several high salinity water masses. The deep offshore EEZ of Qatar was characterized by stratification (seasonal thermocline and pycnocline) during summer when deep water temperature was about 23.5°C (colder than the surface 32.6°C) where reduced stratification appeared to dominate in winter. Well-oxygenated water exists within the surface layer (0-23 m) during both summer and winter. Oxygen saturation layer (concentration 4.53 ml/l; saturation 94.49%) in the deep water extends to bottom (63 m) in winter however oxygen level falls below the summer thermocline (1.35 ml/l corresponding to 28.95% saturation) at Station 5 (63 m depth). Chl-*a* concentration was high in summer due to high primary productivity but remained sustained at moderate levels in winter. The procedures and methods were carefully applied to ensure the accuracy of the study results. In-situ measurements have high reliability in detecting hydrographic properties; however, it is costly, time consuming, requires ship time and as well as large number of scientific personnel and resources.

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