

Temporal Variability of Atmospheric Elements in Iraq Marine Water, Northwest of Arabian Gulf

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Abstract

An understanding of climate variability in coastal regions is essential for several aspects of maritime activities in such systems. Even though fluctuations in atmospheric parameters have been widely recorded in a number of Arabian Gulf locations, such variations in the Iraq marine waters are not well understood. This study looked at the atmospheric parameters (atmospheric pressure AP, wind field, air temperature AT) measured between 2017 and 2022 off the coast of Iraq's marine water to estimate the temporal variation of these parameters. However, the results revealed that these parameters vary annually and seasonally. The limitations of AP are alternately at their peak and lowest throughout the winter and summer seasons, respectively. The maximum AP recorded during the study period was 1030.80, while the minimum AP was 989.04 mbar. The AT was at its lowest and highest during the winter and summer, respectively. Correspondingly, the winter wind speeds are lower than the summer wind speeds. Higher wind speeds are frequently caused by the shamal (northwest) wind. However, during the study period, the highest recorded wind speed was 19.9 m.sec⁻¹. Correspondingly, AP oscillates more notably in the winter and spring and less notably in the summer and autumn, while AT oscillates more frequently and over a larger frequency range in the autumn and spring and less frequently in the summer and winter, according to our data. These results can be useful for future developments along the entire coastline of the region in terms of coastal constructions and coastal protection strategies.

Keywords: Atmospheric pressure, wind, Iraq Marine Water, Arabian Gulf

Introduction

An understanding of climate variability has a high priority for coastal activities, particularly the management of harbors and ports (Almazroui et al., 2012; Al Senafi and Anis, 2015; Tonbol et al., 2019; ElBess et al., 2021). Additionally, the study of climate variability is essential in coastal systems due to their direct impact on the environmental stability of such

and may raise mortality and morbidity rates (Maia-Silva et al., 2020). Furthermore, changes in AP have a variety of effects on coastal areas. The sea surface can freely respond to changes in the AP in a given area. The inverse relationship is well-documented since a rise in atmospheric pressure of 1 mb causes a 1 cm drop in the sea surface (Pugh and Woodworth, 2012). Additionally, wind patterns are very important to coastal hydrodynamics. Higher wind speeds,