



Investigation of the Impacts of Dust and Climate Change on Ocean Productivity in the Red Sea

Wenzhao Li (1), Hesham El-Askary (1), Mohamed A Qurban (2), Manolis E Proestakis (3), Michael J Garay (4), Olga V Kalashnikova (4), Vassilis Amiridis (3), Antonis Gkikas (3), Eleni Marinou (3), and Kp Manikandan (2)

(1) Chapman University, Orange, CA, United States (li276@mail.chapman.edu, elaskary@chapman.edu), (2) King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia (mqurban@kfupm.edu.sa, manikand@kfupm.edu.sa), (3) National Observatory of Athens, Athens, Greece (proestakis@noa.gr, vamoir@noa.gr, agkikas@noa.gr, elmarinou@noa.gr), (4) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, United States (michael.j.garay@jpl.nasa.gov, olga.kalashnikova@jpl.nasa.gov)

The World Meteorological Organization reported that 2013-2017 could be warmest five-year period on record, indicating accelerating global warming. During the same time, our studies revealed significant negative correlation between the sea surface temperature and Red Sea and chlorophyll-a anomalies, as well as diurnal water temperature fluctuations. We also found a positive relationship between dust deposition and chlorophyll-a anomalies; implying there is nutritional fertilizer effect of dust. Long term climate model indicates temperature in the region will continue to rise, causing increasing water temperature and continuing dry trend, leading to an overall increase regional dust events and deposition. Which of these two opposite factors will dominate the change of primary production of Red Sea? In-depth study should be taken for the mechanism of variations of water temperature (e.g. upwelling, reduced radiation by dust). On the other hand, new aerosol retrieval algorithms should also be developed to detect the source area of dust dust properties (size distribution and refractive index). The significance of studying the Red Sea depends on its extremely high biodiversity of the Red Sea, economical importance of fisheries, and its uniqueness as a natural laboratory for understanding the effects of climate change, especially on coral reefs.