EGU21-2637
https://doi.org/10.5194/egusphere-egu21-2637
EGU General Assembly 2021

Stochastic analysis of time-series related to ocean acidification

Georgios Vagenas, Theano Iliopoulou, Panayiotis Dimitriadis, and Demetris Koutsoyiannis
National Technical University of Athens, School of Civil Engineering, Department of Water Resources and Environmental Engineering, Athens, Greece

Since the pre-industrial era at the end of the 18th century, the atmospheric carbon dioxide concentration (CO_2) has increased by 47.46% from the level of 280 ppmv (parts per million volume) to 412.89 ppmv (Mauna Loa – NOAA Station, November 2020). These increased concentrations caused by natural & anthropogenic activities, interact with the aquatic environment which acts as a safety valve. Nevertheless, the absorbed CO_2 amounts undergo chemical transformations, resulting in increasing ionized concentrations that can significantly reduce the water's pH, a process described as ocean acidification. Here, we use the HOT (Hawaii-Ocean-Time series) to perform time series analysis for temperature, carbon dioxide partial pressure and pH. More specifically, we analyze their temporal changes in month and annual time lag. Then, we proceed in comparisons with relevant studies on atmospheric data to evaluate the produced results. Finally, we make an effort to disentangle the results with simplified assumptions connected with the observed impact of ocean acidification on the aquatic ecosystems.