Analyzing the relationship between temperature indices of Enso and the average temperature of the Abarqo-Sirjan basin

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Abstract

Temperature is a fundamental component of climate knowledge and is influenced by various factors, including teleconnection patterns. These patterns have simultaneous or non-synchronous effects of elements and phenomena located much farther away. Therefore, this study aims to investigate the relationship between the ENSO indices and the average temperature of the Abarqo-Sirjan basin, as well as the impact of these indices on basin temperature. To achieve this, we analyzed monthly data from ERA-Interim with a resolution of 0.25 * 0.25 degrees for the period between 1979 and 2019. Additionally, we utilized data from the Nino1+2, Nino3, Nino3.4, and Nino4 indices during the same period. Covering the entire basin, 338 data points were considered based on the basin's area and the resolution of the data. Pearson's correlation test and linear regression were applied both simultaneously and with time delays ranging from 1 to 12 months. The results of these analyses revealed that the Nino1.2, Nino3, and Nino3.4 indices exhibited an inverse correlation, while the Nino4 index showed a direct correlation with basin temperature. Notably, these indices displayed the strongest correlations with basin temperature during colder months. Our simultaneous multivariate regression results highlighted the months of April, July, and November, along with varying time delays in April, October, and November, as periods when ENSO indices exerted the most significant influence on basin temperature. Spatially, in November, a greater portion of the basin exhibited correlations with teleconnection indices. These correlations were inverse, reaching a significance level of 99% in the southern region of the basin and 95% in other parts, while the central regions of the basin showed no significant correlation.

Keywords: Enso, Teleconnection, Temperature, Abarqo-Sirjan basin.