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## Examination of Causes for Decrease in the Water Level of Beysehir Lake and Shrinkage in the Lake's Surface Area.

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This study investigates the reasons for the decrease in the water level of Beysehir Lake and the shrinkage in the lake's surface area in recent years. For this purpose, the lake water level was determined from multi-mission satellite altimeter data, and the lake area was calculated using high-resolution optical satellite images. Data from Copernicus Global Land Service was used for multi-mission satellite altimeter data, and the lake level trend between 1993-2022 was calculated with the least squares method. European Space Agency's (ESA) Sentinel-2 high-resolution optical images were used to determine the change in the lake surface area between 2015 and 2020. These high-resolution optical images were processed with The Sentinel Application Platform (SNAP) software. The Normalized Difference Water Index (NDWI) and Modified Normalized Difference Water Index (MNDWI) were calculated based on processed optical images, and these indexes reflect the changes in water surface area. From the satellite altimeter data, a decreasing trend of  $2.5 \pm 0.5$  cm/yr in the lake water level in the last ten years and shrinkage of approximately  $8 \text{ km}^2$  in the last 6 years from the satellite images were determined. The possibility of one of the most important reasons being drought was emphasized, and monthly average air temperature data and monthly average precipitation data were obtained from the Turkish General Directorate of Meteorology. With these data, 3- and 12-month Standardized Precipitation Evapotranspiration Index (SPEI) were calculated. Regarding these calculated drought indexes, moderate, extreme, and severe hydrological drought has been determined in the region. According to the analysis, drought is thought to be the most important reason for the decrease in the lake water level and shrinkage in the lake surface area.

Keywords : Geodesy for Climate, Lake Water Level, Satellite Altimetry, In-situ observation, Sentinel-2