



Sectoral Drought Vulnerability and Drought Period Forecasts in Van Lake Basin, Turkey Until 2100.

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Van Lake Basin consists of critical regions in regards to drought events. Specifically, the droughts have an impact on the socio-economic level, which is considered to be the most extreme phase of the drought in that area. Besides, it began to trigger the migration from the basin due to the intense drought event. Therefore, drought conditions that may occur during the future periods on this basin have been determined by drought indices. In addition to this, vulnerability analysis were conducted for 5 different sectors (drinking-use, agriculture-livestock, tourism, industry and ecosystem) in the basin. Drought calculations were made for different indices (SPI, scPDSI, scPHDI, SRI and NDVI) by using in situ measurements: precipitation, temperature, evaporation, flow values, and satellite images to determine the drought intensity and period of the basin. The indices were computed in different time periods (1, 3, 6, 9, 12...48 months) and the indices types and periods that could represent the basin for different drought conditions (meteorological, agricultural and hydrological) were determined. Additionally, hydrological model of the basin was conducted for the actual situation by MIKE-NAM model. The annual changes of the hydrological components which are the overland flow, interflow and baseflow were examined and compared with the results deduced from indices calculations. Over and above, the hydrological model of the basin has been re-run over the years (2017-2100) by using the climate projections including precipitation, temperature and evaporation. Thus, the flow values of the basin were obtained during the projection period. The hydrological model enables flow forecasts and using SRI for the hydrological drought prediction throughout the climate projection period. After that, the indices were recalculated to cover the projection years and compared with each other again. The findings obtained from the first and the last indices comparisons indicate that the same indices types and periods give the best result for the basin. Furthermore, the hydrological components of the basin can also be analyzed annually during projection periods. The results of drought analysis were then combined with the water susceptibility, economic value and the adaptability of each sector in the basin against drought on the basis of sub-basins. The sectoral vulnerability analysis of the basin were examined in four main classes (slight, moderate, severe and extreme) until 2100. The inferences play a crucial role in determining the precautions for the government decision-makers who are responsible for the drought mitigations.