

Meteorological modeling of the effect of Zeriwar Lake on the supply and demand of energy surrounding areas

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Abstract

With the proliferation of regional climate simulation software, it is possible to simulate various scenarios such as the impact of filling a lake with water or drying of water of a lake and its impact on the climate surrounding area, in the computer virtual world. This lake, as one of the major lakes in the North West of the country, sometimes in periods of drought, is facing the threat of loss of water. This factor can be effective on climate components of the surrounding areas including HDD and CDD indices changes as components for energy supply and demand. Therefore, in this study, using the software TAPM, two scenarios of a Lake full of water (the real condition of the lake) and drying lake were done to simulate the HDD and CDD indices changes for town of Marivan, which is located in the vicinity of the lake. But before that, on the basis of actual and daily data of minimum and maximum temperatures for 1990 to 2010, the HDD and CDD was calculated for Marivan. According to the long-term observations, it was determined that there is a significant process only for the HDD and CDD index for March. These changes, respectively for the HDD and CDD indices, with statistics ($R = -0.54$; $t = -2.20$) and ($t = 0.38$; $R = 0.41$) confirm reducing the need for heating energy and increased demand for cooling energy in this month. Also, the outputs show that, in the scenario of dry lake, the HDD has increased in most cold months compared with a lake filled with water, and on the other hand, the CDD also show an increase in warm months. On the other hand, based on an annual average, the findings showed that drying lake will reduce 30- degree day calorie of energy demand for heating and increase 111 degree-days calorie of energy demand for cooling.

Keywords: Meteorological modeling, Climatology scenario, Demanded energy, Zeriwar Lake.