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Temperature and DO mixing assessment of Lake Tahoe by using Biwa-3 D model

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Lake Tahoe is the second deepest lake in U.S., with a maximum depth of 505 m, the 16th deepest lake in the world. It is about 35 km long and 19 km wide and 116 km of shoreline and a surface area of 490 km2. The lake situates in the north-western of California and the Sierra Nevada mountain of Nevada. Lake Tahoe is the special clarity lake in lakes that their surface area about or over 500 km2.The clarity of Lake Tahoe has been declining since 1968.Transparency of Lake Tahoe in 1996 is about 23.4 m that is 75% of 31.3 m in 1968.In 2008 the annual average Secchi depth was approximately 21.03 m, much less than the standard. Then ongoing decline in Lake Tahoe`s water quality is a result of light scatter from fine sediment particles and light absorption by phytoplankton. Fine sediment particles are the most dominant pollutant contributing to the impairment of lake waters, accounting for roughly two thirds of the lake`s impairment. These kind of pollutant is difficult to return back. Because of the deeper bathymetry of lake Tahoe, the mixing of the water is rare to happen in the whole body of Lake Tahoe in vertical. In 1993 the condition of wind and air temperature was in a special case, the mixing of the whole water body was happened. This kind of mixing is very important for studying on the water quality of Lake Tahoe. In this research, we developed a three-dimensional model of Temperature and DO to do the mixing assessment of Lake Tahoe by using Biwa-3D model. We can use this model to do some forecast of mixing on the climate change. We also will try to do analysis on comparing the modeling value and the observed data.

Keywords: Lake Tahoe, Biwa-3D, mixing assessment, transparency