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Dynamics Model to Simulate Water and Salt Balance of the Bosten Lake in Xinjiang, China

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Abstract: The largest inland fresh water lake, Bosten lake in China, similar to other lakes in arid and semi-arid regions, is facing lake area shrinking and environment quality decreasing under climate change and anthropogenic pressure. Bringing future demand in line with available supplies will require increasingly efficient water management practices and greater conservation of water resources. This paper employed System Dynamics as an effective methodology to estimate potential contributions of natural and socio-economic factors to water and salt balance of the Bosten Lake. The coupled system dynamics model of water and salt balance is proposed to grasp the interrelationships of the lake level and its salinity with interrelating hydrological and meteorological factors. The results showed that: (a) Increasing water exchange is propitious to both decreasing salinity of the lake and increasing water to the green corridor. (b) According to the accumulated value, average unproductive evaporation water amount equals/larger than half of the average water amount at the Boransumul water station. (c)Enlarging the agricultural area in the Konqi river area than Kaidu river area is in favor of decreasing the lake salinity, also good for decreasing total salt amount in the lake. (d) If water inflow of the lake decreased due to climate change and human activities, it is better choice to increase water outflow from the lake correspondingly for keeping the lake water with good quality. Also, it is good for decreasing unproductive water lost through evaporation.

Keywords: water resources, Bosten Lake, SD model, water balance, salt balance