

EGU2020-13730

<https://doi.org/10.5194/egusphere-egu2020-13730>

EGU General Assembly 2020

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## Assessing groundwater sustainability and the influence of water transfer project in Sugan Lake Basin, northwest China

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In order to meet the ecological water requirement, a water transfer project that divert river flow from the Sugan Lake Basin to the Dunhuang Basin is under consideration. Inter-basin water diversion project is an effective tool to deal with the uneven distribution of water resources and climate change. However, there is still a lack of research on hydrogeology in the Sugan Lake Basin at present. In this study, FEFLOW software was used to establish a numerical model and it was well calibrated by FEPEST. The result shows that the infiltration of the river surged in 2017–2018 so that the groundwater storage significantly increased in resent year. Under four water transfer scenarios, model was used to predict and analyze the influence of transfer project. When the diversion plan had implemented, the groundwater drawdown gradually increased from west to east in the upstream zone and the gobi zone. The biggest groundwater drawdown were 51.10 m, 56.70 m, 62.34 m and 68.02 m in four transfer conditions. In addition, groundwater level of wetland at most decline by 3.80 m, 4.06 m, 4.30 m and 4.77 m. Water diversion also made a great impact on the spring flow in the basin. The rate of Middle Spring reduced to  $0.75 \times 10^8 \text{ m}^3/\text{a}$  –  $0.81 \times 10^8 \text{ m}^3/\text{a}$  after 100 year, and it would reduce to  $0.20 \times 10^8 \text{ m}^3/\text{a}$  –  $0.40 \times 10^8 \text{ m}^3/\text{a}$  when groundwater system was steady. Nevertheless, the direct discharge from groundwater to lakes basically was not affected. The developed model and results will help to make an effective management of water resources.