



Development of a water balance model for Shortan lake, Northern Kazakhstan

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Lakes are recognised as having a high sensitivity to environmental change and human interventions. This is particularly the case with 'closed' lakes due to the fact that their water volume is not controlled by outflow from a river outlet. This study reports on the development of a water balance model for Shortan closed lake located in Burabay National Nature Park in Northern Kazakhstan. The Park was established in order to preserve and restore the unique landscape of the region, which plays an important role in ecologic, scientific and recreational dimensions. The monthly water volume of the lake is estimated by a water balance model that estimates daily open water and grass evaporation, runoff produced by snowmelt and precipitation, and groundwater flow. Monthly surface water and groundwater abstraction values from the state water agency were obtained and incorporated into the model. The model was validated against monthly observed water levels. Derivation of the water balance for Shortan lake reveals valuable information on regional climate variability between 1986-2016 as well as the impact of long term human activities from surface and groundwater abstraction.