Prediction of China's groundwater change under future scenarios using machine learning methods.

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The groundwater depletion in China has become a big problem. This aims to find the relationship between influencing drivers and groundwater change (ΔGW) derived from Gravity Recovery and Climate Experiment (GRACE) and Global Land Data Assimilation System (GLDAS). The selected influencing drivers include climate and human related factors. We construct three models using Random Forest (RF), Support Vector Regression (SVR) and Convolutional Neural Network (CNN) based on the data of 2003-2015, respectively. Comparative performances of RF, SVR and CNN have been evaluated with correlation coefficient () , Root Mean Square Error (RMSE) and variance explained between the actual and fitted (for training dataset) or predicted (for test dataset) values of ΔGW. We have found that all the models performed by three methods above can better reflect the groundwater change during the periods from 2003 to 2015. The constructed model was then used to predict ΔGW for the period of 2020-2050 based on future climate projections and shared socioeconomic pathways. The results imply that the groundwater in most regions of China will decrease in the future.