Geophysical Research Abstracts
Vol. 20, EGU2018-8434, 2018
EGU General Assembly 2018

Quantifying the uncertainty in isotope-based estimation of contributions of runoff components to streamflow in a glacierized basin, Central Asia

Zhihua He (1), Sergiy Vorogushyn (1), Katy Unger-Shayesteh (1), Abror Gafurov (1), Stephan Weise (3), Olga Kalashnikova (4), Bruno Merz (1,2)

(1) GFZ German Research Centre for Geosciences, Potsdam, Germany (zhwork3533@163.com), (2) University of Potsdam, Institute of Earth and Environmental Science, Potsdam, Germany, (3) UFZ Helmholtz Centre for Environmental Research UFZ, Department Catchment Hydrology, Halle (Germany), (4) CAIAG Central Asian Institute of Applied Geosciences, Department Climate, Water and Natural Resources, Bishkek, Kyrgyzstan

Water stable isotope data has been successfully used for the estimation of contributions of runoff components to streamflow in glacierized basins. However, uncertainty in the isotope-based estimation needs to be paid more attention in these basins, considering the rather limited accessibility of water sampling, and the strong spatial and temporal variabilities in isotope signatures of water sources. We collected water samples from different water sources during 2013-2017 period in the Ala-Archa basin, Central Asia. Electrical conductivity measurement and two isotope signatures (^{18}O and ^{2}H) were used to quantify the contributions of various runoff components, including groundwater, rainfall, snow and glacier melt, to the streamflow. Uncertainties in the estimation were separately quantified by a Gaussian Error approach (GE) and a Bayesian modeling approach at seasonal and annual scales. Our objectives are: 1) to estimate the contributions of runoff components to streamflow using water isotope data taking into account the quantification of uncertainty, in the study basin in Central Asia; 2) to compare the performance of the Gaussian Error and Bayesian modeling approaches for the quantification of uncertainty in the isotope-based estimation of contributions of runoff components. The four years water sampling campaign could help to improve our understanding of the contributions of runoff components to streamflow in the glacierized basin.