Geophysical Research Abstracts
Vol. 20, EGU2018-5726-1, 2018
EGU General Assembly 2018

Global-scale prediction of flood timing using atmospheric reanalysis and the Global Streamflow Indices and Metadata (GSIM) archive

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Understanding possible implications of anthropogenic climate change on flood seasonality is challenging at the global scale, as a result of the range of different mechanisms (e.g. rainfall seasonality; snow fall and snow melt; the synchronisation of catchment moisture stores with heavy rainfall events) that influence the time of year when floods are most likely to occur. Here we present a model based on regression trees to identify the key drivers of flood seasonality around the world. The model is trained to the new G-SIM dataset (Do et al.; Gudmundsson et al; submitted), which includes more than 30,000 streamflow gauges. Climatic characteristics generated from global reanalysis data at 0.5 degree resolution are used as predictors. This approach is designed to enable predictive models of flood seasonality to be developed based on easily accessible climate information. The model is evaluated by comparing the predicted and observed time that the peak annual flow occurs, and regions of low and high predictive skill are identified. The calibrated model can then be applied under changed climate regimes, enabling a rapid assessment of how changes to atmospheric conditions may lead to a change in flood timing in the future.

References

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