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Editorial: Impact of climate change on hydrology and water resources

The impact of climate change on water resources is a research area that is gaining prominence over time. Related research topics in this direction are the prediction of rainfall, temperature, streamflow/discharge, and other meteorological variables.

A special issue on the theme *Impact of Climate Change on Hydrology and Water Resources* is initiated to help researchers and other relevant stakeholders working in this area. This issue deals with estimation of runoff, floods and droughts, intensity-duration frequency (IDF) curves and evapotranspiration (ET). In addition, some of the miscellaneous topics related to hydrology are also part of the special issue. Brief but relevant information on the papers included in this issue is as follows.

Maciel da Silva *et al.* (2022) analyzed the possible impacts of climate change (CC) on the projections of the naturalized streamflows and affluent natural energy for the Brazil hydropower sector. They discussed the trends of the same for different regions. Supharatid *et al.* (2022) estimated changes in rainfall and temperature over mainland Southeast Asia by 18 models with two shared socioeconomic pathways (SSPs). They employed multi-model ensembles. A robust increase in precipitation is expected. They have suggested appropriate adaptation measures. These two papers considered the CMIP6 framework.

Grover *et al.* (2022) examined the effect of changes in temperature and precipitation on the Chenab basin, western Himalaya. They employed the Hydrologiska Byråns Vattenbalansavdelning (HBV) model for discharge computation. An increase in discharge is expected. Abdulahi *et al.* (2022) discussed the response of CC impact on future streamflow availability in the Upper Awash River basin, Ethiopia, using HBV. Streamflow is expected to increase. Ayalew *et al.* (2022) evaluated the impacts of CC on the Ribb catchment, Lake Tana Basin, Ethiopia. They used the Soil & Water Assessment Tool (SWAT). Future streamflow has decreased due to temperature increase and decrease in rainfall. Haleem *et al.* (2022) studied the effects of land-use change and CC in the upper Indus basin, Pakistan, and found that they impacted runoff depth. Yang *et al.* (2022) employed SWAT in the upper reaches of the Minjiang River to study the impact of CC. Results show that the runoff has a unique response to CC. Song *et al.* (2022) analyzed the effects of CC on surface water resources in China's upper Ganjiang River Basin. Temperature and runoff are projected to increase. All these papers considered the CMIP5 framework.

Takele *et al.* (2022) assessed the impacts of CC in the Upper Blue Nile basin. They employed SWAT and CORDEX data. Runoff is impacted due to CC. Kwakye & Bárdossy (2022) quantified the hydrological consequences of CC in a Black Volta catchment using flow duration curves. They employed HBV and CORDEX data. It is concluded that most of the rivers in the catchment are running dry for most of the year.

Hernández *et al.* (2022) found that CC impacts water quality. Zango *et al.* (2022) studied the effects of urbanization and CC in the Carp River watershed, Ottawa, Ontario. They employed SWAT for CMIP5 outputs. It is concluded that discharge will increase. Qin *et al.* (2022) studied the effects of environmental factors on the greenhouse gas change in the middle section of the Three Gorges Reservoir. Wu *et al.* (2022) studied the water environmental capacity of the Yongzhou Section of Xiangjiang River Basin. It was based on the SWAT-EFDC model. It is found to be helpful for this type of problem. Abbasi *et al.* (2022a) studied the effects of land-use changes and CC on green water security in Kashafrood Basin in the CMIP5 framework. They employed SWAT. Decrease in groundwater scarcity and vulnerability are predicted. Hussain *et al.* (2022) modelled the effects of land use and CC on the performance of the Al-Ameer district Storm Water Sewer System, Iraq. They employed SWMM. The effect of CC on the stormwater drainage system was more adverse than that due to land-use change.

Zhou (2022a) studied the segmentation of flood season and scheme optimization in the Yellow River. He opined that segmentation plays a major role in flood prevention. Shu *et al.* (2022) assessed the flood risk of Ya'an, Sichuan, China, based on the energy theory. The study provided a scientific framework for disaster relief initiatives. Laddimath *et al.* (2022) assessed the impacts of CC in CMIP5 framework on drought-prone areas in the Bhima sub-basin, India. They used Standard Precipitation Index (SPI). SPI showed changes over various RCPs. Zhang *et al.* (2022) studied ecological drought and its state assessment of the Yellow River estuary. It is concluded that studies of this nature are beneficial to reduce loss due to drought. Waseem *et al.* (2022) studied the impact of meteorological drought on maize crop production in Punjab, Pakistan.

Tayşi & Özger (2022) generated future IDF curves with short-duration rainfalls in CMIP5. Increases in short-duration rainfalls are expected. Yamoat *et al.* (2022) studied the temporal change of extreme precipitation in Thailand.

Wang *et al.* (2022a) discussed wetland ET in China's Sanmenxia Reservoir area. Wang *et al.* (2022b) employed Landsat images and the METRIC model to study ET.

Zhou *et al.* (2022) studied extreme precipitation variations in the Guangdong-Hong Kong-Macao Greater Bay area from 1961 to 2018. Sun *et al.* (2022) analyzed future precipitation variations in China's Yellow River Basin using deterministic and probabilistic projections. Samantaray & Ghose (2022) developed a hybrid technique integrating phase-space reconstruction with a firefly algorithm and support vector machine and used it to predict runoff. Tiwari *et al.* (2022) modelled runoff in the Kolar river basin, India, using a wavelet with an artificial neural network. They also used performance indicators for comparison. Yeditha *et al.* (2022) investigated the spatiotemporal characterization of streamflow of six unregulated catchments in India. They used global climate indices for the same. Pervin & Khan (2022) analyzed the variability and trends of climate extreme indices in Chattogram City, Bangladesh.

Tumsa (2022) assessed the performance of six bias correction methods for the upper Awash basin, Oromia, Ethiopia. Gong *et al.* (2022) felt that strong relationships between elasticity and most factors are observed. Zhou (2022b) made an urban water dissipation calculation. The methodology is applied to Zhengzhou, the capital city of Henan Province, China, and concluded that water dissipation inside a building could not be neglected. Kui-Feng *et al.* (2022) studied Holocene environmental evolution history in the Yellow River Delta. They propose a reconstruction of the Holocene environment using multi-proxy indices.

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