Seasonal climate forecasting information can be utilized by water resource managers for planning activities reducing uncertainty with the additional predictive information. However, actual basin-scale use of this information is still limited due to limitations in accuracy and lead time. The aim of this study was to determine the predictability of extremely dry and wet conditions by looking into past extreme events and simulating at the basin-scale how well these extreme events can be reconstructed in the Pampanga river basin, Philippines. A 3-month seasonal climate forecast model derived from the MIROC-5 Ocean Atmosphere Global Circulation Models were used to drive the water and energy budget-based Distributed Hydrological Model. Extremely dry and wet years in 1982-2000 were selected and integrated into the hydrological model WEB-DHM. The improved seasonal climate forecast system of the experimental season was constructed using the System for Prediction and Assimilation (SPAM) derived from the Ocean-Atmosphere global circulation model MIROC 5.0. This was used as input for the hydro-meteorological parameters in the distributed hydrological model and incorporated to drive the basin simulations for the selected basin. Results showed that the SCFs were able to predict the severity of extreme events in the basin of up to 2 years. Accuracy in the prediction of extreme events such as floods and droughts is difficult. Basin-scale predictability of extreme events is important in local livelihoods and industries within the communities. Adaptation measures to address these extreme events were identified to minimize its negative impacts.

WEB-DHM

The distributed basin-scale hydrological model, WEB-DHM (Wang et al., 2009a, 2009b, 2009c), enables continuous simulation of the exchanges of CO2, water and energy during land-atmosphere interactions in the soil-vegetation-atmosphere transfer (SVAT) system, at the basin-scale.

The Standard Anomaly Index (SA)

The SA fulfills a distribution pattern to the monthly hydrological parameter values from the inputs and outputs of the WEB-DHM simulations. This is then transformed to the normal distribution standardized by taking the difference of the parameter value from its climatic mean (long-term monthly mean) and divided by the standard deviation of the transformed parameter.

Seasonal Climate Forecasting:

The Pampanga River Basin

The Pampanga River Basin supports around 97% of the domestic water requirements of Metro Manila. However, this basin is quite sensitive to the occurrence of extreme events such as floods and droughts. It is also the rice bowl of the country hence, forecasting of extreme events is important in the agricultural sector.

CONCLUSIONS AND CURRENT STATUS:

The information provided by meteorological (3 months) and hydrological (outputs of the hydrological model) data especially in basins strongly affected by El Niño, in predicting when the drought signals occur can be used in basin management. For the case of agricultural basins such as the Pampanga River basin, prior knowledge of droughts even for the first 2 months during the planting season can minimize crop losses by putting into place appropriate soft and hard structures that can supplement possible water deficiency during drought. We recognize that the SPAM forecast data will need further calibration to improve its quantitative accuracy.

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