

Application of Hydrological Forecasts in Mongolia

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1. Introduction

Nowadays, the need of hydrological forecasting to improve water resources management systems to protect their investments, improve their utilisation and better manage the limited and scarce water resources, to protect settlements along the flood plain undoubtedly, become of paramount importance.

Therefore it is very important to improve the accuracy of the hydrological forecasting and to investigate users requirements and help them use the products of hydrological forecasting efficiently.

Purpose of this article is to demonstrate briefly the application of hydrological forecasts in Mongolia and case study results of forecasting. The main objective of the case study was to investigate possible links between sea surface temperature (SST) anomalies averaged over the 4 regions extracted from Database of the Climate Prediction Center of USA with Hovd river runoff and to find the predictability of the Hovd river flood by using probability procedure.

2. Application of hydrological forecasts

At the present, runoff formation processes and its peculiarity, water regime and resources, their spatial and temporal distribution are basically considered as quite well investigated in Mongolia. Surface runoff of Mongolia mainly forms from rainfall, snow and ice melting. Most of floods or about 75 per cent of them are caused by rainfall. Therefore, many different variables such as precipitation, snow water equivalent, air temperature, dis-

charge and atmospheric circulation are used for hydrological forecasts relationships.

In Mongolia different methods and models such as method of corresponding levels, the unit hydrograph, Muskingum flood routing method, Muskingum-Cunge model, Single linear reservoir and Nash Cascade models calibrated by Ouyunbaatar D.[3] are used for river daily discharge and summer flood with lead time 1-3 days. At present, short range forecast is produced at 13 river systems with forecasting efficiency of 70 percent which meets today's requirement and brings their valuable contributions to flood control or mitigation in the densely populated areas of the lower river valleys. But the application of the hydrological long range forecasting in Mongolia is quite limited. We are producing only forecast on the monthly discharge and date of the ice cover occurrence on the river and date of the ice melting forecasts at 20 rivers with lead time 1 month from April to September for each year by method of analogy or by using some stochastic models such as linear regression and Tomas-Fering model. The efficiency of long range hydrological forecast is around 60%. For snow fed rivers in the western Mongolia, snow water equivalent, determined from snow surveys is used for spring flood forecast. Unfortunately, snow measurements are difficult to obtain upper river basin. Therefore, the usefulness of satellite data has also been investigated, and promising results have been obtained with spring flow forecasts for the Hovd river.

References

Adiyabadam G., Ochirhuyag L., Use of remote sensing

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- data for river spring flood forecasting, The 2nd Asian Space Conference (2nd ASC) Satellites, Applications, Socio-Economics and Regulatory Regimes Melia Hotel, Hanoi, Vietnam, 8-11 November 20
- Adyabadam G., A possibility of the use of teleconnections for the forecasting of monthly flows in Hovd river, Scientific papers of Academy of Sciences, 2005
- Oyunbaatar D, Application results of the unit hydro graph model in small river basin, Special issue of Scientific papers of Institute of Meteorology and Hydrology Ulaanbaatar, 1996 (eng), pp.222-230