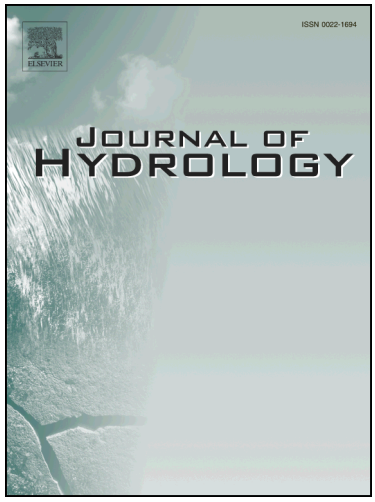

Drought prediction using a wavelet based approach to model the temporal consequences of different types of droughts

Rajib Maity, Mayank Suman, Nitesh Kumar Verma

PII: S0022-1694(16)30309-2
DOI: http://dx.doi.org/10.1016/j.jhydrol.2016.05.042
Reference: HYDROL 21286

To appear in: *Journal of Hydrology*

Received Date: 23 February 2016
Revised Date: 27 April 2016
Accepted Date: 21 May 2016

Please cite this article as: Maity, R., Suman, M., Verma, N.K., Drought prediction using a wavelet based approach to model the temporal consequences of different types of droughts, *Journal of Hydrology* (2016), doi: http://dx.doi.org/10.1016/j.jhydrol.2016.05.042

Drought prediction using a wavelet based approach to model the temporal consequences of different types of droughts

Rajib Maity[1], Mayank Suman and Nitesh Kumar Verma

Department of Civil Engineering, Indian Institute of Technology Kharagpur,

Kharagpur – 721302, West Bengal, India

Abstract: Droughts are expected to propagate from one type to another – meteorological to agricultural to hydrological to socio-economic. However, they do not possess a universal, straightforward temporal dependence. Rather, assessment of one type of drought (successor) from another (predecessor) is a complex problem depending on the basin's physiographic and climatic characteristics, such as, spatial extent, topography, land use, land cover, climate regime, etc. In this paper, a wavelet decomposition based approach is proposed to model the temporal dependence between different types of droughts. The idea behind is to separate the rapidly and slowly moving components of drought indices. It is shown that the temporal dependence of predecessor (say meteorological drought) on the successor (say hydrological drought) can be better captured at its constituting components level. Such components are obtained through wavelet decomposition retaining its temporal correspondence. Thus, in the proposed approach, predictant drought index is predicted using the decomposed components of predecessor drought. Several alternative models are investigated to arrive at the best possible model structure for predicting different types of drought. The proposed approach is found to be very useful for foreseeing the agricultural or hydrological droughts knowing the meteorological drought status, offering the scope for better management of drought consequences. The mathematical framework of the proposed approach is general in nature and can be applied to different basins. However, the limitation is the requirement of

[1] Corresponding author: Email: rajib@civil.iitkgp.ernet.in, Ph No.: +91 3222 283442, FAX: +91 3222 282254