

## ***Interactive comment on “Generalized drought assessment in Dongliao river basin based on water resources system” by B. S. Weng et al.***

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1. In section 3.1 of the article, the author said the centers of gravity of the GDT of various drought levels in various periods are all distributed in the middle reach of DRB (near Erlongshan reservoir). This is not clear – large scale water shortages do not typically occur around large reservoirs, especially in the reservoirs watershed. Answer: For the generalized drought times (GDT) of various drought levels, assessment units were chosen when their GDT were greater than or equal to the minimum of average GDT of sixty-four assessment units in five decades. Then, their centers were calculated using Mean Center in ArcMap 9.3. Here the centers of gravity equal to the geometrical center. They do not express the places where drought events happened most times.

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For the GDD or GDS of various drought levels, the maximum GDD (MGDD) or GDS (MGDS) of each unit was calculated firstly. Assessment units were chosen when their GDD or GDS was greater than or equal to the minimum of average MGDD or MGDS of sixty-four assessment units in five decades. Then, their centers were also calculated. So the centers of gravity of the GDT, the MGDD, and the MGDS of various drought levels in various periods are all distributed in the middle reach of DRB (near Erlongshan reservoir).

2. It is well known that reservoirs are the main engineering measures to regulate the temporal and spatial distribution of water resources. In the study area (Dongliao River Basin), there are 7 reservoirs. In your model, how do you consider the impacts of different reservoir operation rules on the spatial and temporal distribution of drought? Answer: We divide the Dongliao River Basin into 64 assessment units. The methods are as the following. Firstly, it is divided by the location of reservoirs in main stream (i.e. the Erlongshan Reservoir) and the layout of the upper, middle and lower reaches of the basin (i.e. the three segments of the Dongliao River Basin). Secondly, it is divided by the location of reservoirs (i.e. the Bayi Reservoir, the Jinman Reservoir et al.) or other main hydraulic engineering in tributary streams. Lastly, it is divided by the irrigation areas with considering the various crop planting structures. Each reservoir has its own water supply object. We collect a lot of data, and analyze clearly the relationship between the reservoir and the assessment unit. The generalized drought assessment index (GDAI) considers water supply and water demand using the water and energy transfer process model in DRB (WEP-DRB). The WEP-DRB model is a distributed model for simulating the land surface hydrological processes. It is developed and validated on the basis of considering the physical mechanism of hydrological cycle and the artificial system of water utilization in the basin. So it is to present the impacts of different reservoir operation rules by calculating water supply of each assessment unit, then to present the spatial and temporal distribution of drought.