

## **Hydrologic Regionalization of Abbay River Basin, Ethiopia.**

To make accurate and reliable quantile estimates at ungauged catchments, an approach of hydrologic regionalization was followed and studied in Abbay River Basin, Ethiopia. Abbay River Basin was divided into 129 watersheds and 45 Geomorphologic and climate parameters were extracted for each watershed using Arc Hydro/ArcGIS, WinDisp and New\_LocClim software. Out of these 21 most important parameters were selected through Principal Component Analysis. The cluster analysis package of SPSS was used to cluster these 129 watersheds into a convenient number of groups depending on the similarity and difference of the 21 input parameters and with a reasonable classification threshold. This grouped Abbay River Basin into hydrologically homogeneous regions. This hydrologic regionalization was perceived from a hydroclimatological and physiogeographical point of view; and verified with representative recorded flow data from within the basin. After all, the research resulted in the delineation of five stable regions. Regions one and two cover much of the area of the eastern half of the basin, while region three is the area covering most of the boundary of the lakes Tana and Finchaa. Region four mainly covers the area following the western border of the study area where as region five covers the southern portion of the western half of the basin. Out of these five, regions one, two, four and five have adequate number of recorded flow data. These four regions were tested for homogeneity and heterogeneity using discordance tests and H statistics respectively, and found homogeneous. Flow information can be accurately transferred from gauged sites to ungauged sites in regions one, two, four and five. In region three, where there are no observed flow data, methods that do not require the availability of long term time series of hydrological records may be better than data transposing from gauged site of different regional taxonomy.