

## ***ABSTRACT***

In the plenty of water resources engineering applications, water quantities at the project site or discharge probabilities having certain values have been wanted to obtain but flow measurements are limited and only at the point of streamflow gauging stations (SGS). Because of that, flows have to be estimated when flow measurements are less, insufficient or not being. Flow duration curves (FDC) showing exceedance probabilities across flow value frequencies at specific time can be used for determining flow values having certain exceedance probability. But FDC have not been obtained at the place where flow measurements are not exist, so FDC or discharges having certain exceedance probabilities have been estimated by using different methods.

In this study, after FDC and certain exceedance probabilities are described, mean daily discharges having certain exceedance probabilities in yearly scale have been investigated to estimate by using area-ratio method at the place where flow measurements are not exist. For this purpose, it has been considered area ratio method can carry out or not for feasibility studies at our two adjacent basins.

For the purpose of that, discharges having %20, %30, %50 and %90 exceedance probabilities were chosen for estimating. %20 and %30 exceedance probabilities are effective on the turbine choosing of hydroelectric power plants, having %50 and %90 exceedance probabilities are used for projects relating to water especially. Chosen two basins having neighboring borders are 22-52 SGS and 2202 SGS in the Black Sea Basin, Turkey. 22-57 and 22-07 SGSs are in the area of 22-52 SGS, and 22-42 SGS is in the area of 2202 SGS. If it needs to be determined discharges having some exceedance probabilities at any project point in the area of 22-52 SGS or 2202 SGS, firstly considers to investigate area-ratio method can be carry out or not. Area-ratio method is mainly depended on a regression analysis between project site and the other basins or subbasins having long term data. Because the reliability of a regression analysis depends on correlation analysis and reliable data sets, every SGS using in the analysis has at least 10 years daily discharge data. %20, %30, %50 and %90 yearly discharge records have been obtained from 10 years discharge data of every SGS (22-52, 22-57, 22-07, 2202 and 22-42).

Regression analysis were applied between flow records of these SGS in the East Black Sea Basin, Turkey and drainage areas of these stations. 10 yearly discharge values and location data for each SGS, were obtained and drainage areas were determined. But yearly discharge records of every SGS sharing same tributaries at some areas are not the same year for each other unfortunately.

Flows having %20, %30, %50 or %90 exceedance probabilities and their regression equations associated with drainage area have been analyzed for the decision to use area-ratio method at the place where flow data is not exist but having more than one SGS. In the studies, regression equations of 22-52 SGS basin have between 0.814 and 0.911 coefficient of determination for considered exceedance probabilities, and 2202 basin equations have between 0.213 and 0.752. Finally, it has been found that area-ratio method is convenient for 22-52 SGS but is not convenient for all percentages of 2202 SGS (%50 and %90 are).

*Keywords: Flow duration curves, regression analysis, flow prediction*