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## **Probabilistic evaluation of Flow Duration Curves**

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A flow duration curve (FDC) is one of the most informative methods of displaying the complete range of river discharges, from low flows to flood events. In this work, according to a probabilistic approach to the FDCs, the percentage of time is considered as a fraction of the year and the FDC is derived linking each discharge to the expected value of the fraction of the year during which such discharge is exceeded. The latter is considered as an estimation of the probability of not exceedence of the discharge and the flow curve is coincident with the cumulative distribution function (CDF). In most cases literature shows that a convenient way of constructing a probabilistic FDC is using a box-cox transformation on discharge, and often the lognormal distribution is adopted with parameters varying with the FDC's return time. This allows FDCs in some cases to be linearized and low and high-flow ends of the curve to be clearly displayed. In this work a different approach is proposed, introducing a boxcox transformed varying between the annual minimum and maximum daily discharge and following a Pearson Type 1 distribution (Beta function). The determination of a FDC with a fixed return time, in this way, is possible in three steps: the evaluation of the annual minimum and maximum daily discharge probability distributions and of the beta distribution, which influences the shape of the FDC. The methodology proposed seem to be promising in order to perform regional analyses and, to allow estimation in ungauged river catchments.