

Streamflow In The Sapucaí River Watershed, Brazil: Probabilistic Modeling, Reference Streamflow, And Regionalization

Marcel Abreu¹, Micael Fraga², Laura Almeida³, Felipe Silva⁴, Roberto Cecílio⁵, Gustavo Lyra¹, and Rafael Delgado¹

¹Federal Rural University of Rio de Janeiro

²Water Management Institute of Minas Gerais

³Federal University of Viçosa Agricultural Science Centre

⁴Universidade Vale do Rio Verde - Campus Tres Coracoes

⁵Federal University of Espirito Santo

May 18, 2021

Abstract

This work aims to study the streamflow statistic patterns in the Sapucaí River watershed, state of Minas Gerais, Brazil. This study embraces the streamflow probabilistic modeling to determine the reference streamflow and, later, the streamflow regionalization to improve the water resources management. A 26-year-data series (1989 - 2014) of maximum, average, and minimum streamflow were used. Probability density functions were applied to the maximum and minimum daily streamflow to determine the recurrence periods. Long-term average annual and monthly streamflow were also calculated. Linear and non-linear regressions were adjusted for the streamflow regionalization. The drainage area and the streamflow equivalent to the total rainfall (with and without abstractions) were used as predictor variables. The probability density functions that best adjusted the maximum streamflow data set were the Generalized Extreme Values, and for the minimum streamflow was the normal distribution. Linear and non-linear regressions were efficient ($R^2 > 0.90$ and d Willmott > 0.97) in the regionalization process regardless of the predictor variables. However, a small statistical advantage was found for the adjustment of non-linear regressions that used the predictor variables drainage area and the streamflow equivalent to the total rainfall (without abstractions).

Hosted file

Hydrological Processes Research Article.pdf available at <https://authorea.com/users/284537/articles/522438-streamflow-in-the-sapuca%C3%AD-river-watershed-brazil-probabilistic-modeling-reference-streamflow-and-regionalization>





