

EVALUATION OF THE INFLUENCE OF CANTAREIRA SYSTEM ON THE PIRACICABA RIVER BASIN, USING COMPLEXITY ANALYSIS

Lázaro Souto ARAÚJO^{1,2}
José Rodrigo S. SANTOS^{1,3}
Moacyr CUNHA FILHO¹
Borko D. STOSIC¹
TatijanaSTOSIC¹

- **ABSTRACT:** *In this work we apply methods Sample Entropy, Cross-Sample Entropy and Multiscale Sample Entropy to analyze the complexity of stream flow and rainfall temporal series at locations that are close to the water reservoirs of Cantareira System. The Cantareira System was built in 70 ties and 80 ties to export $31\text{m}^3\text{s}^{-1}$ from the basin to the metropolitan region of São Paulo city. Previous studies based on classical statistical analysis of monthly data for the period 1947 a 1991 showed the increasing tendency for rainfall for the whole basin and decreasing tendency for stream flow at locations that are close to the water reservoirs. The objective of this work is to evaluate the influence of Cantareira System on the dynamics of hydrological processes in the Piracicaba river basin by applying the methods of complexity analysis. The results show that after the construction of water reservoirs the complexity of stream flow temporal series was altered, while the precipitation dynamics showed different behavior, indicating the influence of water reservoirs.*
- **KEYWORDS:** *Stream flow, rainfall; sample entropy; cross-sample entropy; multiscale sample entropy.*

¹ Universidade Federal Rural de Pernambuco - UFRPE - Departamento de Estatística e Informática, PPGBEA, CEP: 52171-900 - Dois Irmãos, Recife, PE, Brasil. E-mail: moacyr@deinfo.ufrpe.br; borkostosic@gmail.com; tastosic@gmail.com

² Universidade Federal da Paraíba - UFPB, Departamento de Ciências Fundamentais e Sociais, Campus II, CEP:58397-000, Areia, PB, Brasil. E-mail: lazaro.souto@hotmail.com

³ Universidade Federal de Sergipe - UFS, Departamento de Estatística e Ciências Atuariais, CEP:49100-000, São Cristóvão, SE, Brasil.E-mail: rodrigo.ufs@gmail.com