

## **Space–time variability of rainfall and hydrological trends in the Alto São Francisco River basin**

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**Abstract** The main objective of this study is to obtain a better understanding of the space–time variability of rainfall and trends of streamflow in the Alto São Francisco River basin using statistical tools. This basin covers one of the most important hydrological regions of Brazil and includes several states. A detailed statistical analysis applied to the river streamflow and rainfall time series of all gauges indicates that rainfall is highly temporally variable and there is a decrease in the annual rainfall amount for the period studied (1978–2007). The annual streamflow variation has a cyclic behaviour with a period length of approximately 10 years. In addition, a cross wavelet transform analysis between the monthly rainfall and reservoir inflows is applied, showing phase behaviour in all significant sections. However, there are no signs of any significant rainfall reduction in the basin, and in fact, some raingauges show a small rainfall increase during the recent decades.

**Key words** streamflow; cluster; tendencies; hydrometeorology