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Wetland dynamics at the transition between humid and semiarid environments of inland Brazil: São Francisco river morphodynamics and implications for the Pandeiros wetland.

Diego Alves de Oliveira[1,2], Cristina Helena Ribeiro Rocha Augustin[2], Trevor Hoey[3], and Cristina Persano[4]

[1]Coordenação de Geografia, Federal Institute of Education, Science and Technology of Minas Gerais, Ouro Preto, Brazil (diego.oliveira@ifmg.edu.br)
[2]Post-Graduation Program in Geography, Instituto de Geociências, Federal University of Minas Gerais, Belo Horizonte, Brazil (chaugustin@hotmail.com)
[3]Brunel University London, Uxbridge, United Kingdom (trevor.hoey@brunel.ac.uk)
[4]School of Geographical & Earth Sciences, University of Glasgow, Glasgow, United Kingdom (cristina.persano@glasgow.ac.uk)

The presence of wetlands as a result of local fluvial and hydrological conditions constitutes a frequently observed feature of such rivers. Therefore, they are important elements of the basin, because besides functioning as buffer zones for CO_2 and sediments they also house important ecosystems, playing an important role in the control of water circulation. Brazilian wetlands have different typologies and sizes, varying from huge swamplands such as the Pantanal do Mato Grosso, to flooded savannas called “veredas” or oxbow lakes. Their distribution in inland areas depends on the variety of flood pulses mainly linked to seasonality with the presence of distinct dry and wet seasons (Junk et al., 1989). This strong seasonality affects the São Francisco River (SFR), the 4th largest river in Brazil, which has frequent marginal lakes and swamps as it passes through five Brazilian states. This research aims to analyze the effect of the variation of the SFR level from 1925 to 2018, on the flow of the Pandeiros River which is one of many tributaries on the left side of SFR and on its wetland (“Pantanal Mineiro”). This wetland is hydrogeomorphologically linked to the SFR and receives water inputs during SFR flood periods. Measurements of the SFR water level performed once daily in the morning were obtained from gauging station n^{o} 44200000 belonging to the Companhia de Pesquisa de Recursos Minerais (CPRM) [altitude 445 m; 15°56'57.84"S; 44°52'4.68"W. The hydrological year starts at the end of the dry season on October 1st. Time series analyses (level duration curve, Seasonal Trend Decomposition (STL) of the daily level data, monthly level, mean, maximum, minimum level for each day of the year) were conducted to describe the hydrological regime and to assess temporal changes of the SFR levels and how these affect the magnitude, frequency and duration of flooding of the Pandeiros’s River wetland. Field observations (March 14, 2018) show that when SFR, which is Pandeiro’s base level, reaches a level of 5.0 m this leads to flooding conditions of the Pandeiros River wetland. Over the full period of record (1925-2018) the average level of the SFR was 3.86 m, with a minimum annual average of 2.43 m during the dry season (winter) and maximum of 5.98 m during the wet season

(summer), with an average annual range of 3.55 m between both seasons. The SFR was above the 5.0 m threshold flooding level for 20% of the time 1925-2018, which corresponds to an average of 77.8 days of flooding per year in the wetland. The longest period of inundation was 178 days in 1926, when the SFR reached its maximum recorded level, and the shortest was 1 day in 2015, when it reached its minimum. The number of days per year of inundation have decreased over the full record, but that this is mainly due to a significant decrease since 1985. Prior to this, cyclic differences between wetter (1925 and 1985) and drier periods (1925 to 1945, 1945 to 1965) are observed.