

EGU21-9928, updated on 28 Oct 2021

<https://doi.org/10.5194/egusphere-egu21-9928>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Change of channel pattern and construction of fluvial terraces driven by SAMS since the LGM in southeastern South America: records from Tietê River, Brazil

Caio Breda¹ and Fabiano Nascimento Pupim²

¹University of São Paulo, Institute of Geosciences, Sedimentary and Environmental Geology, São Paulo, Brazil (bredacaio@usp.br)

²Universidade Federal de São Paulo - UNIFESP, Departamento de Ciências Ambientais, Diadema, SP, BR

The last 30 ka is a period marked by well-documented abrupt environmental changes on Earth. Despite the growing efforts to investigate the effects of past environmental changes in the fluvial dynamics, there is a lack of studies in intraplate tropical regions. Here, we applied geomorphological, sedimentological, and optically stimulated luminescence dating (OSL) technics to investigate the effects of environmental factors on the evolution of the Upper and Middle Tietê River during the Late Quaternary. Tietê River is one of the most important rivers of the southeast of Brazil, flowing from steepest to low-relief intraplate terrains, and under tropical climate. In order to understand the responses of the Tietê River system to environmental changes during the Late Quaternary, two main questions were tentatively answered: (i) what are the most important allogenic factors for the evolution of this system?; (ii) how did climatic fluctuations affect river dynamics over time? We recognized a sequence of seven terraces, from 2 to 105 m above the channel, in the Middle Tietê valley. These terraces are formed by thin deposits (< 10 m), composed of sandy and conglomeratic sediments. The high and intermediate terrace levels of the Middle Tietê River are strath, while the low terraces of the middle reach are cut-and-fill. The formation of seven terrace levels in the Middle Tietê River was controlled by the combination of low erosion resistance of the lithological substrate and high stream power and coarse bedload that increase the erosion efficiency of the channels. OSL dating of sedimentary deposits in different terrace levels indicate 5 periods of aggradation in the Middle Tietê valley since the Last Glacial Maximum: 18.5 ± 2.0 ka; 9.8 ± 1.0 to 8.6 ± 0.8 ka; 7.1 ± 0.7 to 5.8 ± 0.5 ka; 4.2 ± 0.4 to 3.1 ± 0.3 ka; and 0.6 ± 0.06 ka. The results indicate that the activity of the South American Monsoon System induced the occurrence of climatic fluctuations and changes in vegetation cover in the river valleys of southeastern Brazil over the past 20 ka. The aggradation periods are correlated with more arid environmental conditions and sparser vegetation, while the incision events in the valley developed under transitions to humid environmental conditions and stimulated by vegetation recovery.

Key-words: Tietê River, fluvial evolution, fluvial terraces, Quaternary geochronology.