LATE QUATERNARY CLIMATE-TECTONIC INTERACTION CONTROLS INCISION RATES IN THE CASANARE FLUVIAL BASIN, EASTERN CORDILLERA FOOTHILLS, COLOMBIA

DEL RIO, IAN (1); PUPIM, FABIANO (2); PARRA, MAURICIO (3); DE SOUZA, DANIEL (4); SAWAKUCHI, ANDRÉ (5)

1. Instituto de Geociências, Universidade de São Paulo, iandelrio@usp.br
2. Departamento de Ciências Ambientais, Universidade Federal de São Paulo, f.pupim@unifesp.br
3 Instituto de Geociências, Universidade de São Paulo, mparra@iee.usp.br
4. Instituto de Energia e Ambiente, Universidade de São Paulo, danielhsouza@usp.br
5. Instituto de Geociências, Universidade de São Paulo, andreos@usp.br

RESUMO – The Eastern Cordillera, in the Colombian Northern Andes, registered high deformation rates during the Quaternary, influencing the drainage network evolution in combination with orographic precipitation. To unravel the late Pleistocene-Holocene interaction between climate and fault activity, we applied optically stimulated luminescence (OSL) dating on quartz grains extracted from sediments deposited in fluvial terraces and an alluvial fan in the medium reach of the Casanare River. The OSL sensitivity of the samples was also analyzed to further understand the sedimentary history of the fluvial basin. Fluvial terraces ages varied between 111.2 ± 16.8 and 13.1 ± 1.5 ka, while alluvial fan ages varied between 10.5 ± 2.4 and 1.5 ± 0.3 ka. Combining the resulting ages with elevation differences between sample and current thalweg positions, translate into incision rates of 14 to 9 m/ka, approximately one order of magnitude higher than previously reported exhumation rates for the Eastern Cordillera. OSL sensitivity increases for younger samples which can be interpreted as different sediment sources for the terraces and alluvial deposits or as an increase in sediment recycling within the alluvial fan, possibly due to higher sediment reworking than in the fluvial terraces. Alluvial fan ages in combination with the deformation produced by fault reactivation confirm that these structures have been active throughout the late Pleistocene-Holocene. The deposition timing suggests that receding glaciers and drainage reorganization drove sediment supply the river system, being deposited in the fluvial terraces between 111.2 and 13.1 ka ago. After 13.1 ka, the river system shifted from a period dominated by fluvial terrace aggradation into an incision phase. OSL sensitivity suggests that sediments from fluvial terraces where reworked and later deposited in the alluvial fan during the Holocene. Fault activity occurring after 10.5 ka controlled alluvial fan incision though nearby rivers still produce local alluvial aggradation by avulsion processes.

Palavras-chave: Late Pleistocene, Luminescence dating, Sediment recycling, Fault reactivation, Climate change

Preparing document for printing...
100%
Cancel