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TITULO DE LA PONENCIA

Towards a Pan-American model of late Quaternary behaviour of fluvial systems under changing climate

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Resumen

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CONTENIDO DEL RESUMEN

In Peru, the behaviour of coastal fluvial systems during the late Quaternary has traditionally been interpreted in terms of tectonic and climate change. Aggradation and incision phases, often resulting in fluvial terraces, has often been related to changes in the dominance of the Milankovitch cycles. The precession cycle, in particular, has been viewed as the most important control on fluvial behaviour, as fluvial terrace chronology often showed jumps of 20-25 ka in age between progressively older terraces. It is known from paleoclimate records such as lake sediments and cave speleothems in the Andes, that a rise in summer insolation intensity during

the precession cycle led to a larger contrast in the Atlantic interhemispheric temperature gradient, thereby pushing the Intertropical Convergence Zone (ITCZ) southward. This in turn caused an increase in precipitation, leading to increased fluvial aggradation in the river valleys. Lessening of precipitation, as a result of a decrease in summer insolation, then favoured fluvial downcutting and fluvial terrace scarp formation. In recent years, a body of literature is emerging from studies on late Quaternary fluvial systems, not only from the Peruvian coast, but also from the Andes and Amazon regions. These studies, often employing chronological methods based on luminescence dating, show that the precession cycle was only dominant during the onset of the last glacial period, roughly between ~120 and ~80 ka. After that, the intensity of the precession cycle weakened and instead, the influence from cold-climate events such as the Heinrich and Younger Dryas stadials, also originating from the North Atlantic, became the main drivers in controlling the position of the ITCZ in the Amazon, Andes and coastal desert regions. An excellent example of this behaviour is from a recent publication of the Lima fluvial fan, on which the capital city of Peru is built. Its stratigraphy shows a consistent trend of coarsening and fining upward cycles in grain size that are related to increases and decreases in discharge of the main river, the Rimac River, in the area. These phases, in turn, chronologically coincided with the precession cycle and North Atlantic Heinrich events. The Andean-Amazonian fluvial systems are apparently capable of reacting almost immediately to changes in climate and constitute therefore important sedimentary archives to investigate the links between source and sink areas in fluvial systems. As the position of the ITCZ controls climate in large portions of Andean-Amazonian South America, e.g., also in Ecuador and Colombia, these new findings may also be of importance to foster a better understanding of late Quaternary fluvial systems in these countries. The few publications on fluvial systems that exist for Colombia certainly point in this direction. I therefore advocate for an integrated, Pan-American approach of the study of late Quaternary fluvial systems in South America.