

EGU21-7633, updated on 08 May 2021

<https://doi.org/10.5194/egusphere-egu21-7633>

EGU General Assembly 2021

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



## Environmental drivers of planform change in the glacially-fed Rio Chubut, Argentina (42°S)

**Grace Skirrow**, Rachel Smedley, Richard Chiverrell, and Janet Hooke

University of Liverpool, Geography and Planning, Liverpool, United Kingdom of Great Britain – England, Scotland, Wales  
(g.skirrow@liverpool.ac.uk)

The eastern margin of the former Patagonian Ice Sheet was drained by large and dynamic river systems, which remain largely unstudied. New geomorphological mapping and luminescence chronology of the glacially-fed Rio Chubut reveal the preservation of large gravel outwash terraces up to 50 m above the modern river channel that previously acted as glacial spillways during the last glaciation. Also discovered is a gradual shift from a braided to a meandering planform between  $12.3 \pm 1.0$  ka and  $9.4 \pm 0.8$  ka, where the braided system experienced a decrease in energy and subsequent abandonment, transitioning into the meandering system that persists today. The coincidence of a new luminescence age from the innermost ice lobe in the Epuyen area ( $18.1 \pm 2.2$  ka), palaeoenvironmental records (Moreno et al. 2018, Whitlock et al. 2007, Iglesias et al. 2016) and the PATICE ice sheet reconstruction (Davies et al, 2020) suggest that the abandonment of the Rio Chubut braided planform was not a product of the river decoupling from the ice sheet. Alternatively, it was a response to the reduced water supply likely linked with the weakening and southward shift in the mid-latitude storm tracks and westerlies  $\sim 11.3$  ka (Moreno et al. 2018). These findings contradict the widely reported process of planform change in glacially-fed river systems whereby a river decoupled from a glacier experiences a loss in sediment supply, which leads to incision and the river confining to a single channel. Here at the Rio Chubut, braiding is sustained in a paraglacial landscape for  $\sim 5$  ka after the ice had retreated into the Andean mountains. A reduction in water supply related to precipitation changes in the early Holocene is identified as the key driver of planform change.

### References

Davies, B.J., Darvill, C.M., Lovell, H., Bendle, J.M., Dowdeswell, J.A., Fabel, D., García, J.L., Geiger, A., Glasser, N.F., Gheorghiu, D.M. and Harrison, S., 2020. The evolution of the Patagonian Ice Sheet from 35 ka to the present day (PATICE). *Earth-Science Reviews*, p.103152.

Iglesias, V., Markgraf, V. and Whitlock, C., 2016. 17,000 years of vegetation, fire and climate change in the eastern foothills of the Andes (lat. 44 S). *Palaeogeography, Palaeoclimatology, Palaeoecology*, 457, pp.195-208.

Moreno, P.I., Videla, J., Valero-Garcés, B., Alloway, B.V. and Heusser, L.E., 2018. A continuous record of vegetation, fire-regime and climatic changes in northwestern Patagonia spanning the last

25,000 years. *Quaternary Science Reviews*, 198, pp.15-36.

Whitlock, C., Moreno, P.I. and Bartlein, P., 2007. Climatic controls of Holocene fire patterns in southern South America. *Quaternary Research*, 68(1), pp.28-36.