Evolution of a drainage network in collisional context - Insights from experimental modeling of the Southern Alps, New Zealand

GUERIT, Laure, et al.
Evolution of a drainage network in collisional context - Insights from experimental modeling of the Southern Alps, New Zealand


*Department of Earth Science, University of Geneva, Geneva, Switzerland (laure.guerit@unige.ch)
**University of Montpellier, Montpellier, France
***Ecole Normale Supérieure de Lyon, Lyon, France

River networks are primary features of the Earth surface, and they are of main importance for many geomorphological processes. Understanding the processes that create and/or influence the evolution of river network, and thus, landscape evolution, is a motivating question. We work on the specific example of New Zealand, where the morphology of the Southern Alps is characterized on one side by short rivers generally perpendicular to the main divide, whereas on the other side, the rivers are large and rotated. It has been suggested that this specific pattern could result from the oblique collision that affects the South Island. We develop a laboratory experimental setup to investigate river pattern evolution over a doubly-vergent orogenic wedge growing in a context of oblique convergence. We use a rain-fall system to introduce erosion, sediment transport and river development. The evolution of this prism is fully recorded though space and time and we are able to follow the drainage deformation. The first results are in good agreement with previous models of river pattern deformation in New Zealand and suggest that the present-day river network morphology of the Southern Alps is strongly influenced by the regional tectonic regime.