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TITLE: Frequency-dependent Response of Landscapes to Climatic Forcings

AUTHORS (FIRST NAME, LAST NAME): Vincent Godard[1], Gregory E Tucker[2], Burch Fisher[3], Douglas W Burbank[3], Bodo Bookhagen[3]

INSTITUTIONS (ALL): 1. CEREGE, Aix-Marseille University, Aix-en-Provence, France. 2. Department of Geological Sciences, University of Colorado, Boulder, CO, United States. 3. Earth Research Institute, UC Santa Barbara, Santa Barbara, CA, United States.

ABSTRACT BODY: Whereas the existence of very pronounced orbitally-controlled periodicities is a major feature of Earth climate, its impact on landscape dynamics remains poorly understood. We use Landscape Evolution Models to systematically investigate the response of landscapes to a range of periodic oscillations in precipitation. The resulting sediment-flux evolution displays a pronounced sensitivity to the period of the input precipitation signal, such that, for a given erodibility, a specific period maximizes the amplitude of the response. This period of "resonance" scales as the inverse of the erodibility, but is progressively filtered out of the response when the intensity of hillslope diffusion increases. This frequency-dependent landscape behaviour displayed by our model provides a mechanistic perspective on Molnar's [2004] proposition that ubiquitous changes in Late Cenozoic continental denudation could result directly from modifications in the spectral content of the climatic signal.

KEYWORDS: [1815] HYDROLOGY / Erosion, [1824] HYDROLOGY / Geomorphology: general.

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Contact Details

CONTACT (NAME ONLY): Vincent Godard

CONTACT (E-MAIL ONLY): godard@cerege.fr

TITLE OF TEAM: