



## **Alternate bar amplitude with suspended load**

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River bars are the most important fluvial sediment patterns, shaped by the complex interactions between hydrodynamics and sediment transport. Regarding the latter, the role of suspended load in bar formation has been little investigated so far. River bars originate from the instability of the plane riverbed to an infinitesimal perturbation, which grows in time to eventually reach a finite-amplitude. We have determined an analytical relation for the finite-amplitude of alternate bars, which accounts for both bed- and suspended loads. The results show that suspension enhances bar instability and it affects the bar wavelength (linear analysis) and amplitude (weakly nonlinear analysis, performed through Center Manifold Projection). This proves the importance of considering suspended load for practical purposes. Field observations are used to validate the model outcomes.