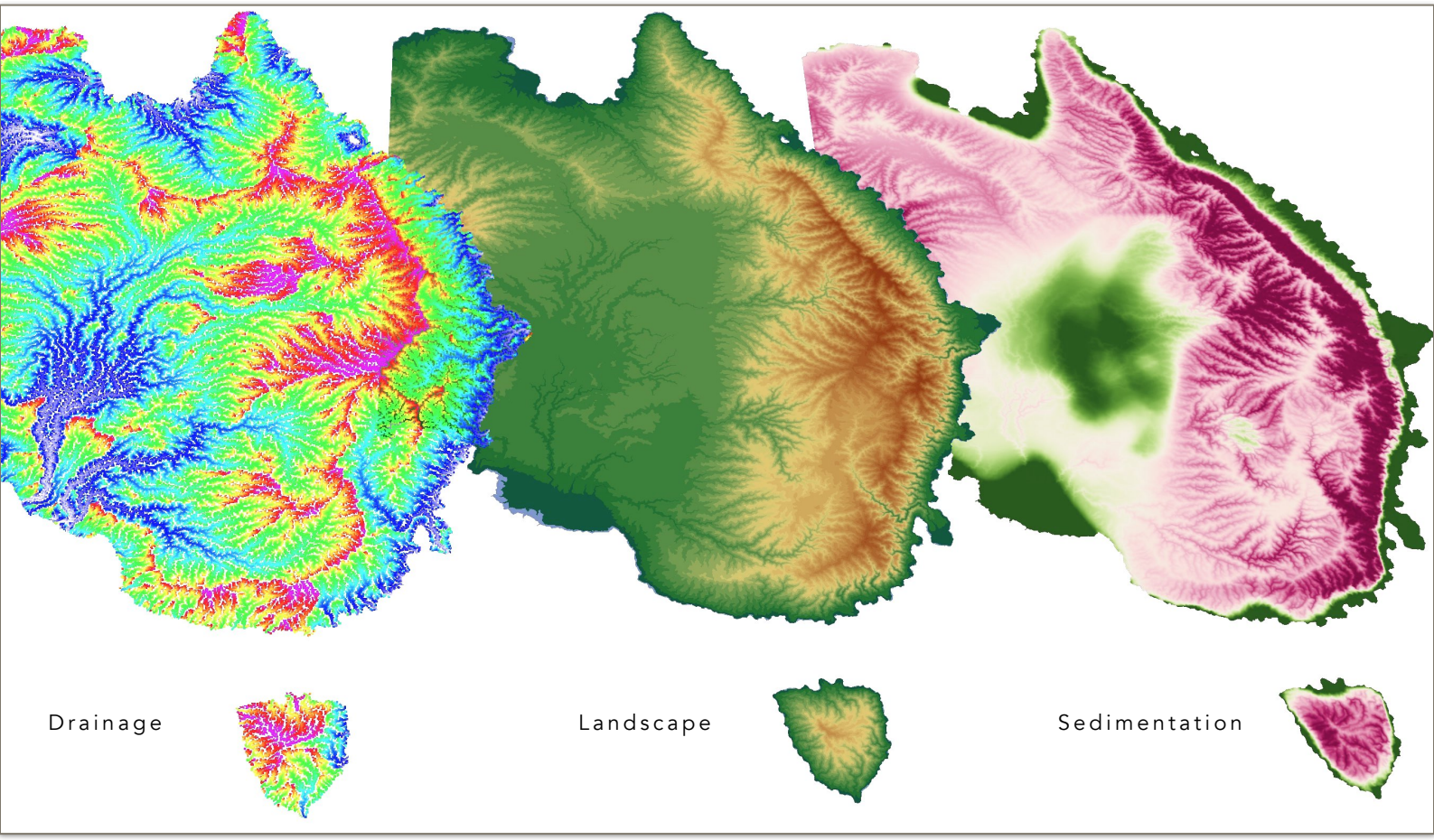

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Continental-Scale Landscape Dynamic

Over the last year, within the ARC Basin Genesis Hub, I have started the development of a new numerical framework to better quantify the fundamental feedbacks between mantle flow, geodynamics, landscape dynamics and associated sediment transport at continental scale. The approach relies on **Badlands** (a finite volume code which simulated geomorphological evolution and stratigraphic records under various climatic and tectonic forcing). Here I present how this new framework can be used to **quantify the impact of dynamic topography on Australian landscape evolution over the last 150 Ma.**

Based on a mantle convection model (CITCOMS), a dynamic topography evolution since the Late Jurassic has been reconstructed.
We use these predictions as forcing conditions within **Badlands** in addition to a history of varying climate and sea-level and predefined sedimentary materials derived from paleo-environment maps. The model simulates the time dependence of erosion and deposition as well as the evolution of catchment dynamics, drainages capture and flow network reorganisation. The model shows that the motion of Australian plate has resulted in significant changes in river drainage, intercontinental erosion and sedimentation. In particular, we show how the model is able to reproduce today's main features of Australia Great Dividing Range. The model outputs have been compared in terms of denudation rates, paleo-drainage and river profiles.

Despite limitations, this first-order coupling approach between the mantle convection model and the surface process one shows promising results and reflects on the fundamental link between dynamic uplift, fluvial erosion and depositional pulses in basins distal to passive margin highlands.