Characterising river character, pattern and behaviour in the Bislak Catchment: towards a geomorphic template to inform river management in the Philippines

Pamela Louise Tolentino1, John Edward Perez1, Esmael Guardian1, Carlos Primo David1, Richard Boothroyd2, Kirstie Fryirs3, Gary Brierley4, Trevor Hoey5, and Richard Williams2

1University of the Philippines, Philippines (plmtolentino@gmail.com)
2University of Glasgow, United Kingdom
3Macquarie University, Australia
4The University of Auckland, New Zealand
5Brunel University London, United Kingdom

The design and implementation of water management strategies in the Philippines, where precipitation is abundant and groundwater reserves are substantial, are compromised by extreme hydrometeorological events that create hazards such as flooding, bank erosion and landslides. Additionally, structural and institutional factors, such as responsibility for land and water management being divided among 38 agencies, inhibit integrated land and water management. Such a fragmented context threatens the sustainability of water resources and provide challenges for risk management. Integrated river basin management and master plans have been formulated to address catchment-related concerns which include water resources, disaster risk, biodiversity, mineral resources, and socio-economic development. These plans typically include assessment on physical variables such as hydrology and geology. One critical aspect that is missing is baseline understanding of dynamic river geomorphology. Such understanding of river character, behaviour and pattern is required to underpin scientific guidance from a rational evidence base that informs management applications. The Bislak Catchment (593 km²), north-western Luzon Island, is underlain by interbedded clastic sedimentary and volcanic rocks. It has a Type I climate which is described as having distinct dry and wet seasons. Early this year, the region suffered a prolonged drought which resulted to huge agricultural damage. In 2018, two severe tropical storms hit the area that caused destructive flooding to communities and infrastructure. In response, flooding and erosion are currently being mitigated by new and repaired defences such as gabion walls and concrete dikes. Satellite images from 1970 to 2019 show spatially variable channel change, in response to channel network and valley geometry. Here, the morphodynamic units throughout the catchment are described using the River Styles Framework which provides a geomorphic template to assess management trajectories. This approach is demonstrated for the Bislak Catchment, and is proposed as a template wider use in the Philippines.