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The ecohydrology of stream networks

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Abstract Stream ordering approaches to the study of entire stream networks are relatively simple and provide only crude estimations of the physical makeup of river ecosystems. These fail to acknowledge the importance of the hierarchical organisation of rivers and consequently use very crude variables when characterising stream networks. We provide an alternative typology for characterising the physical structure of rivers, which focuses on a specific level within the geomorphic river hierarchy, and employs a set of regional, catchment and valley criteria for developing a quantitative river characterisation scheme. Fifteen geomorphic variables were extracted from digital data using automated geographic information system modules and evaluated using a series of multivariate analyses. This allowed distinct river types within a stream network to emerge. Our approach was demonstrated in the Ovens River, Australia. The physical structure of the Ovens River stream network was further analysed using a series of community metrics: richness, composition and diversity of river types.

Key words riverine networks; geographic information system (GIS); physical diversity; complex systems; river characterisation