Automatic procedures for river reach delineation: Univariate and multivariate approaches in a fluvial context (Martínez-Fernández et al. 2016) [1]

Segmenting the continuum of rivers into homogeneous reaches is an important issue in river research and management. Automatic procedures provide significance, objectivity, and repeatability. Although univariate techniques are frequently used to identify river reaches, multivariate approaches offer a more integrative context. Three nonparametric methods (multi-response permutation procedures (MRPP) with an advance in the significance level estimation, the Pettitt and Mann–Kendall tests) are applied for segmenting the river based on three geomorphic variables (valley width, active channel width, and channel slope) systematically measured in a GIS environment.

The cited techniques have been applied to the Curueño River (NW Spain) to illustrate the methods, we analyse reach distribution along the river longitudinal profile. The methods successfully characterize the evident transitions along fluvial systems and also others less noticeable. The three methods provide more reaches according to valley width and less reaches according to channel slope (18.0 and 3.7 reaches on average, respectively). In contrast to the Mann–Kendall test, MRPP and Pettitt tests provide more stable segmentations when significance level varies. However, the Pettitt test provides irregular segmentations for regular patterns.

The MRPP both univariate and multivariate applications enables a wider scope for the segmentation issue, which is useful in diverse aspects of fluvial domain

Keywords: River segmentation; River reach; Permutation method; GIS; Randomization

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Links
[1] https://reformrivers.eu/automatic-procedures-river-reach-delineation-univariate-and-multivariate-approaches-fluvial-context
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