



Development of a statistical tool for the estimation of riverbank erosion probability

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Riverbank erosion affects river morphology and local habitat, and results in riparian land loss, property and infrastructure damage, and ultimately flood defence weakening. An important issue concerning riverbank erosion is the identification of the vulnerable areas in order to predict river changes and assist stream management/restoration. An approach to predict areas vulnerable to erosion is to quantify the erosion probability by identifying the underlying relations between riverbank erosion and geomorphological or hydrological variables that prevent or stimulate erosion. In the present work, a innovative statistical methodology is proposed to predict the probability of presence or absence of erosion in a river section. A physically based model determines the locations vulnerable to erosion by quantifying the potential eroded area. The derived results are used to determine validation locations for the evaluation of the statistical tool performance. The statistical tool is based on a series of independent local variables and employs the Logistic Regression methodology. It is developed in two forms, Logistic Regression and Locally Weighted Logistic Regression, which both deliver useful and accurate results. The second form though, provides the most accurate results as it validates the presence or absence of erosion at all validation locations. The proposed tool is easy to use, accurate and can be applied to any region and river.

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