MSTA: a GIS tool for proxy analysis

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A large numbers of works aims to address the question of sediment movements through different approaches, from classical field observations to numerical modelling of particle motion. Between the two, McLaren (1981) defined the so-called sediment trend analysis (STA®) method using three descriptive granulometric parameters, *i.e.* the mean grain size (μ), the sorting (σ) and the skewness (γ). Transport vector fields are defined based on the comparison of parameters between samples along predefined lines (one dimensional approach, 1D). On the same base, Gao and Collins (1992) defined the grain size trend analysis (GSTA) which take into account surrounding samples (two-dimensional approach, 2D). Poizot et al. (2006) and Poizot et al. (2008) proposed enhancements of the GSTA method, in particular through the use of a geostatistical approach to better highlight the spatial characteristics of the studied parameters. Despite successive improvements (Poizot & Méar, 2008 ; Poizot & Méar, 2010), there are still works indicating discrepancies between GSTA results and field observations or measurements. We proposed (Baux et al., submit) to use three geochemical parameters (TOC, Ca and Si) in a GSTA like approach in order to infer sediment movements in a relative complex area off the Seine river estuary (mixed sediments of various origin, several hydrodynamic agents, high anthropic pressure). On the objective of a generalisation of this approach to an almost unlimited number of variables, we have developed the Multi-proxy Sediment Trend Analysis (MSTA) application, embedded in the QGIS software. Through a case study based on a data set sampled off the Orne estuary (Normandy, France), we propose to highlight profits of the MSTA approach in the determination of the true sediment transport.

Keywords : geographical information system, Python, plugging, sediment, transport, vector field

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