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Remote-sensing for the spatial analysis of land use in river corridors

and its impact on the ecological status of rivers

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The European Water Framework Directive aims at implementing strategies to restore the ecological status of water bodies. This ecological status, that can be characterized by physicochemical parameters and freshwater biodiversity indicators (plants, invertebrates, microphone-vertebrate, macro-vertebrate), is influenced by natural parameters (climate, topography, geological substratum...) as well as anthropic variables (water use, land use on the watershed, pressures of diffuse pollution and specific pollution...). Land use in the river corridor, and particularly riparian vegetation, has a significant influence on the ecological status of water-bodies : controlling it could therefore constitute a major element in the strategy of implementation of the Water Framework Directive. The presentation is dedicated to the characterization of land use in the river corridors, the definition of relevant spatial indicators and the analysis of correlation between these indicators and water-bodies ecological status indicators.

Remote sensing is a powerful tool for homogeneous mapping of land use along river corridors. Considering the size of these systems and the diversity of land cover multi-source data with high (10m) to very high (1 to 2m) space resolution are required, such as aerial photography (0.5 m.) and SPOT 5 XS (10 m.). Several protocols for multi-source multi-date classification, using object-oriented classification (eCognition software from Definiens), have been compared on a buffer of 1.2 km along 80 km of Hérault (France), in order both to select the best protocol and to assess the com-

plementarities of different images (space resolution, spectral information, date). Best classification reached an accuracy of 70 %.

Spatial indicators were computed from the resulting classification of land use along the river corridor, in order to characterize this land use in the vicinity and/or upstream of the stations where river ecological status indicators were measured. Both linear (length along the river of a given type of land use) and bi-dimensional (distribution of area in the river buffer of a given land use type) indicators were computed and their spatial distribution was analysed.

The influence of land use in the river corridor on the river ecological status can then be analysed through statistical approach (linear regressions PLS, Principal Component Analyze,...) between land use indicators and ecological status indicators. A preliminary approach based on Corine Land cover data will be presented.