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Impervious Surface Analysis of Terrestrial Watersheds: Implication for Sustainable Landuse and Land Management Practices in the Puding Area of Guizhou Province, China

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Abstract

Increasing population, roads, commercial and industrial development are gradually replacing natural terrestrial environments such as grasslands and forests in most parts of China. One of the principal effects of development and urbanisation is the conversion of pervious surfaces into impervious surfaces. Research over the past decades has indicated that increased quantities of impervious surfaces are closely associated with environmental degradation, with the amount of impervious surfaces in a watershed being inversely correlated with the health of that watershed. Regularly classifying and quantifying land cover within a watershed, particularly the amount of impervious surfaces, is, therefore, important in monitoring the health of the watershed. Hence the main goal of this proposed study is to execute a change analysis of impervious surfaces using historical and current remote sensing imagery and classification mapping, and to document a protocol for monitoring changes of impervious surfaces, based on the terrestrial watershed draining to enable land managers to assess landuse changes and focus on areas for protection and/or restoration. Landscape-specific infiltration coefficients, classification mapping and change analysis software such as the Impervious Surface Analysis Tool (ISAT), will allow for an in-depth analysis of impacts. Landsat MSS scenes, one for the years 1995 and the other for the year 2002, historical baseline data collection, current data collection, and ground-truthing will be valuable sources of the database for this study. Landsat-based processing and classification should provide critically important, consistent and multi-date data for any area of Puding. It is envisioned that this data and updates, will contribute significantly to improved monitoring programs and management decisions that will lead to more sustainable land-use and land management practices in the area.

Keywords: Impervious surface, infiltration coefficient, land cover, puding area, remote sensing, watershed