IAHS2017-37
IAHS Scientific Assembly 2017

Mapping soil erosion susceptibility using limited data, remote sensing and GIS in Southern Brazil

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Erosion, besides generating soil degradation, is one of the main polluters of water resources. Problems associated with erosion in water resources include deposition of pollutants, eutrophication, loss of reservoirs capacity, changes in river channels, reduction of drainage capacity and flooding. In spite of its importance, erosion assessment becomes a challenge to managers in emerging countries where data availability is low and environmental monitoring is considered a cost rather than investment. This is especially important in Brazil, where erosion and deforestation is intricately tied to decisions on land use, and specifically, land for agricultural production in Brazil. Therefore, a simplified method of erosion prediction through map algebra with public availability data usage has been proposed in Brazil for the purpose of classifying areas susceptible to erosion, especially in the Amazon. The method requires maps of geology, geomorphology, land use and conservation practices, pedology and rainfall intensity and slope. Using the geographic information system (GIS), the observed values of each component intersected by map algebra where classified in a scale of susceptibility in order to evaluate soil vulnerability (morphogenesis) or stability (pedogenesis) to erosion in an integrated manner. This work applied the method of susceptibility indexes in a water catchment basin mainly used for human consumption in Southern Brazil, a region considerably different from the Amazon. Results showed a good agreement of the results with available data, indicating the validity of the proposed methodology for water resources management in regions with low availability of data.