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Erosion risk assessment in the southern Amazon – Data Preprocessing, data base application and process based modelling

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The study region along the BR 16 highway belongs to the "Deforestation Arc" at the southern border of the Amazon rainforest. At the same time, it incorporates a land use gradient as colonization started in the 1975-1990 in Central Mato Grosso in 1990 in northern Mato Grosso and most recently in 2004-2005 in southern Pará. Based on present knowledge soil erosion is one of the key driver of soil degradation. Hence, there is a strong need to implement soil erosion control measures in eroding landscapes.
Planning and dimensioning of such measures require reliable and detailed information on the temporal and spatial distribution of soil loss, sediment transport and deposition. Soil erosion models are increasingly used, in order to simulate the physical processes involved and to predict the effects of soil erosion control measures.
The process based EROSION 3D simulation model is used for surveying soil erosion and deposition on regional catchments. Although EROSION 3D is a widespread, extensively validated model, the application of the model on regional scale remains challenging due to the enormous data requirements and complex data processing operations. In this context the study includes the compilation, validation and generalisation of existing land use and soil data in order to generate a consistent EROSION 3D input datasets. As a part of this process a GIS-linked data base application allows to transfer the original soil and land use data into model specific parameter files.
This combined methodology provides different risk assessment maps for certain demands on regional scale. Besides soil loss and sediment transport, sediment pass over points into surface water bodies and particle enrichment can be simulated using the EROSION 3D model. Thus the estimation of particle bound nutrient and pollutant inputs into surface water bodies becomes possible.
The study ended up in a user-friendly, timesaving and improved software package for the simulation of soil loss and deposition on a regional scale providing essential information for the planning of soil and water conservation measures particularly under consideration of expected land use and climate changes.