

GEOGRAPHIC INFORMATION SYSTEM AND REMOTE SENSING AS TOOL TO ANALYSE THE RISK OF DETACHMENT OF SOLID PARTICLES WHICH REACH THE PARAIBUNA RIVER IN JUIZ DE FORA – MG – BRAZIL

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ABSTRACT

Nowadays, society is debating a lot about environmental issues, so there is a necessity to change the relation between the mankind and the environment, obligating the government and the civil people to pay special attention to this subject.

Geographic Information System (GIS) is a powerful tool to support actions in that area. The GIS permits to make projects which need fast and efficient processing of huge amount of data. Satellite images and GIS are very useful to update thematic maps, and to allow a quick and real access to the basic requirements to generate complex maps, which need of a lot of parameters to be made. These maps are very important to make decisions by governmental and private organizations.

As the first step in this process, the present work aims to supply subsidies to classify areas as the degree of risk of solid particles detachment. Modern GIS tools were applied to help rehabilitation actions for the Paraibuna River, in the sub-basin section, in Juiz de Fora city, Minas Gerais state, Brazil. The river cross the city and a lot of contribution sources can be found, such as industries, mining, diffuse sources and so on.

The abundance of solid particles which reach the river prejudices the water flowing, it may cause inundation, hindering the people's life. A lot of financial and human resources are involved in the removing task, but that activities are just a palliative solution because they do not finish off the problem. In this context, one can observe that actions must be organized in the source to avoid the detachment of solid particles and so to solve definitely the problem.

Then, this work aims to present a methodology to localize regions of detachment risk and classify them accordingly to the degree of risk.

Some information was utilized to make the answer map. A Digital Terrain Model (DTM), landscape map, obtained from TM/Landsat digital classification, hydrographic and geologic maps were inserted in a model to estimate the risk.

The use of different kinds of spatial inference techniques allows a comparative analyze, classifying the most efficient algorithm to solve specific problems. After that, results and discussions about Boolean technique, Analytical Hierarchy Process (AHP) and Fuzzy-Gama analyze were presented what permitted a trustworthy determination of the risk of solid particles detachment which causes the Paraibuna River silting up.

The comparative study indicated that the AHP process was the most efficient method to reach the previous planned goals of the work. The AHP structure permits apply weighted information to the analyses, so it allows staying nearer to the dynamic imposed by nature.