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The possibility of using photogrammetric and remote sensing techniques to model lavaka (gully erosion) development in Madagascar

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Gully erosion is a worldwide problem for it has a number of undesirable effects and their development is hard to follow. Madagascar is one of the most affected countries for its highlands are densely covered with gullies named lavakas. Lavaka formation and development seems to be triggered by many regional and local causes but the actual reasons are still poorly understood. Furthermore lavakas differ from normal gullies due to their enormous size and special shape. Field surveys are time consuming and data from two-dimensional measurements and pictures (even aerial) might lack major information for morphologic studies. Therefore close range surveying technologies should be used to get three-dimensional information about these unusual and complex features.
This contribution discusses which remote sensing and photogrammetric techniques are adequate to survey the development of lavakas, their volume change and sediment budget. Depending on the types and properties (such as volume, depth, shape, vegetation) of the lavaka different methods will be proposed showing pros and cons of each one of them.
Our goal is to review techniques to model, survey and analyze lavakas development to better understand the cause of their formation, special size and shape. Different methods are evaluated and compared from field survey through data processing, analyzing cost-effectiveness, potential errors and accuracy for each one of them. For this purpose we will also consider time- and cost-effectiveness of the softwares able to render the images into 3D model as well as the resolution and accuracy of the outputs.
Further studies will concentrate on using the three dimensional models of lavakas which will be later on used for geomorphological studies in order to understand their special shape and size.
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