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Variograms: Forewarning Disaster

The purpose of this investigation was to create a user-friendly geostatistical analysis computer application. Presently, software is either too complicated or lacks maintainability. My application suite bridges the current gap by utilizing a strong server backend controlled by a simple Graphical User Interface (GUI) usable by scientists worldwide without hiring computer programmers. This will make research cheaper and quicker. Before creating a GUI, the server backend needed to be created. Once a scientist uploads a Digital Elevation Model (DEM), it is converted into an indexed database so analysis can be initialized. Multi-processed and written in C++, C, and Python, the server backend is much faster and expandable than currently available commercial software. At this point, the scientist uses the GUI to specify a grid of areas within the DEM where variograms will be calculated as well as the parameters for the analysis. These parameters include a minimum n-value and the step sizes for which roughness will be compared. A scientist can specify default parameters for their projects so all variograms are consistent and comparable. Finally, all data is accessible via a website so collaboration between scientists is incredibly simple. Also included in the website is an exporting engine so, if needed, scientists can correlate the generated variograms with project specific data. Geostatistics can be applied to any study involving the topography and processes that alter it. Therefore many branches of science could benefit from this geostatistical analysis computer application.