



## **A MATLAB function for 3-D and 4-D topographical visualization in geosciences**

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Combining topographical information and spatially varying variables in visualizations is often crucial and inherent to geoscientific problems. Despite this, it is often an impossible or a very time-consuming and difficult task to create such figures by using classic software packages. This is also the case in the widely used numerical computing environment MATLAB.

Here a MATLAB function is introduced for plotting a variety of natural environments with a pronounced topography, such as for instance glaciers, volcanoes and lakes in mountainous regions. Landscapes can be visualized in 3-D, with a single colour defining a featured surface type (e.g. ice, snow, water, lava), or with a colour scale defining the magnitude of a variable (e.g. ice thickness, snow depth, water depth, surface velocity, gradient, elevation). As an input only the elevation of the subsurface (typically the bedrock) and the surface are needed, which can be complemented by various input parameters in order to adapt the figure to specific needs. The figures are particularly suited to make time-evolving animations of natural processes, such as for instance a glacier retreat or a lake drainage event. Several visualization examples will be provided alongside with animations. The function, which is freely available for download, only requires the basic package of MATLAB and can be run on any standard stationary or portable personal computer.