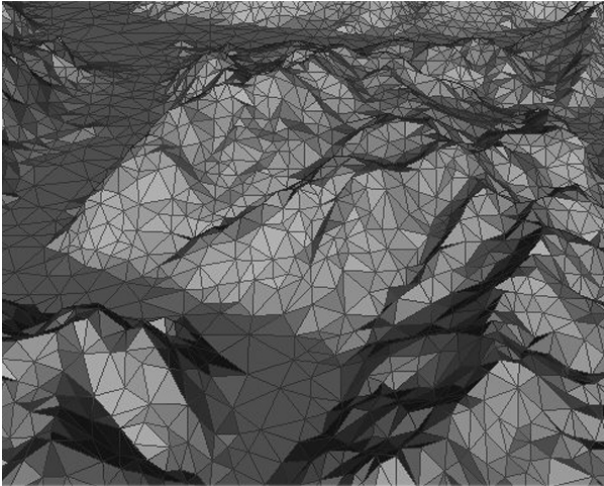


# Adaptive simplification of huge sets of terrain grid data for geosciences applications

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We propose and discuss a new Lepp-surface method able to produce a small triangular approximation of huge sets of terrain grid data by using a two-goal strategy that assures both small approximation error and well-shaped 3D triangles. This is a refinement method which starts with a coarse initial triangulation of the input data, and incrementally selects and adds data points into the mesh as follows: for the edge  $e$  having the highest error in the mesh, one or two points close to (one or two) terminal edges associated with  $e$  are inserted in the mesh. The edge error is computed by adding the triangle approximation errors of the

two triangles that share  $e$ , while each  $L(2)$ -norm triangle error is computed by using a curvature tensor (a good approximation of the surface) at a representative point associated with both triangles. The method produces triangular approximations that capture well the relevant features of the terrain surface by naturally producing well-shaped triangles. We compare our method with a pure  $L(2)$ -norm optimization method.