EVALUATING AND COMPRESSING HYDROLOGY ON SIMPLIFIED TERRAIN

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We present a metric based on the potential energy of water flow to determine the error introduced by terrain simplification algorithms. Typically, terrain compression algorithms seek to minimize RMS (root mean square) and maximum error. These metrics fail to capture whether a reconstructed terrain preserves the drainage network. A quantitative measurement of how accurately a drainage network captures the hydrology is very important for determining the effectiveness of a terrain simplification technique. Having a measurement for testing and comparing different models has the potential to be widely used in numerous applications (floods, erosion, pollutants, etc). In this paper, we first define a metric that maps the reconstructed drainage network onto the original terrain and computes the amount of energy needed for the water to flow. Two novel terrain simplification algorithms are presented that use a targeted compression to preserve the important hydrology features. These methods and other simplification schemes are then evaluated using the potential energy error metric to determine how much hydrology information is lost using the different compression techniques.