The goal of this thesis is to design a suitable method for lossy compression of heightmap terrain data. This method should accept blocks of float samples of dimensions $2^n \times 2^n$ as an input, for which it should be able to perform progressive decompression of mip-maps (lower-resolution representations). It should keep the reconstructed data within a certain maximum per-sample error bound for each mip-map level. This bound should be in the unit of meters and adjustable by the user. Given these constraints, it should be as efficient as possible. Our method is inspired by the second generation of progressive wavelet-based compression scheme modified to satisfy the maximum-error constraint. We simplified this scheme by factoring out unnecessary computations in order to improve the efficiency. Our method can compress a 256x256 block in about 30 ms and decompress it in about 2 ms. Thanks to these attributes, the method can be used in a real-time planet renderer. It achieves the compression ratio of 37:1 on the whole Earth 90m/sample terrain dataset transformed and separated into square blocks, while respecting the maximum error of 5m.