Progress Report

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A Procedural, Minimal Input, Natural Terrain Plug-in for Blender

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1 Previous Objectives

- Fix the erosion [2] implementation.

- Write a summary of [1].

2 Progress

The erosion implementation now appears to be working on the whole: before some code rewriting there were nasty artifacts that appeared in the terrain, such as extreme spikes and lows, but that was a problem with my understanding of the literature [2]. The process does not use two distinct time arrays at all times, just for the current grid location, which is then updated before calculating the next location. This makes it deterministic and it therefore makes a difference which location the algorithm starts from, which explains some of the output gained from symmetric objects.

The erosion process is working but still has some bugs which need to be ironed out, because the extreme high and low values still occur, possibly something to do with rain and water content on the surface of the terrain continually impacting the grid. Refer to Figure 1: the left images being before erosion and the right being after, the top image is a 10x10 grid after 200 steps of erosion and the bottom a 400x400 grid after 5000 steps of erosion.

The extreme spikes at the edge of the terrain have now been dealt with by adding a border cell around the grid and not returning this to the renderer. The border cell is set at the beginning of erosion to a zero level and absorbs the abnormalities that occur at the edges. Spikes within the grid seem to have been eliminated too, but instead extreme lows occur. As mentioned this is possibly something to do with static water on the surface, which will need to be investigated.

A summary of [1] was completed too.

3 Problems

The erosion spikes.

4 Objectives for Next Week

- Fix the now vaguely functional terrain erosion.

- Try erosiding a variety of surfaces and checking the results don't contain artifacts.

- Try eroding a flat surface to see what kind of results can be expected in terms of completely naturla erosion.

References

[1] Fares Belhadj and Pierre Audibert. Modeling landscapes with ridges and rivers: bottom up approach. In *GRAPHITE '05: Proceedings of the 3rd international conference on Computer graphics and interactive techniques in Australasia and South East Asia*, pages 447–450, New York, NY, USA, 2005. ACM Press.

[2] F. K. Musgrave, C. E. Kolb, and R. S. Mace. The synthesis and rendering of eroded fractal terrains. In *Proceedings of the 16th annual conference on Computer graphics and interactive techniques*, pages 41–50. ACM Press, 1989.
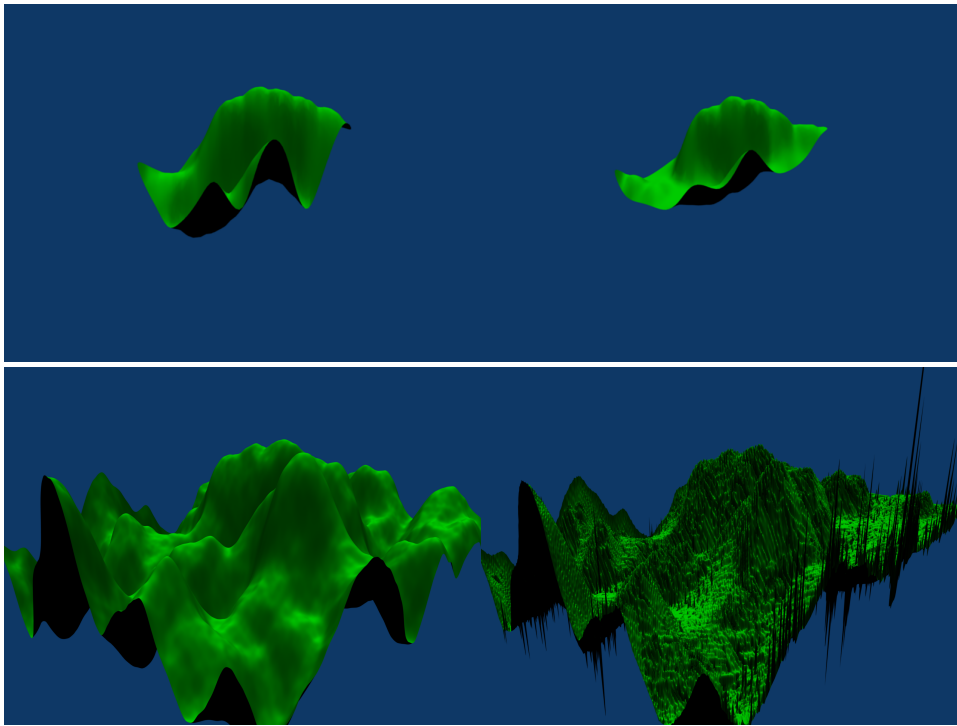
Figure 1: Erosion output