# 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 proportional distribution of water using the algorithm presented in [1].
- Implement evaporation of water over time [1].

## 2 Progress

Proportional distribution of water was achieved by pre-calculating the amount of water that each lower neighbour wanted, and then distributing them fairly according to the following formula: $\Delta w_i = \Delta w \frac{h_i}{sum}$ where $\Delta w_i$ is the quantity of water that should be distributed to neighbour $i$, $\Delta w$ is the total amount of water being transferred from the current location, $h_i$ is the initial difference in height between the current location with its water and the neighbour with its water, and $sum$ is the accumulation of all the initial lower differences between the current location and its neighbours. [1]

Water is also being evapourated, currently just at a constant rate so as to not use extra time each timestep to calculate this rate per vertex. This works as follows: $w_{t+1} = w_t e^{-K_e} - T$ where $w$ represents the water level at different timesteps, $e^{-K_e}$ is a constant defined rate and $T$ is a threshold level at which the water is just considered to be zero. The treshold is irrelevent at the moment because the rate is a constant, but the rate is meant to increase exponentially so as to simulate smaller amounts of water evapourating faster in accordance with the following formula: $w_t = w_0 e^{-K_e t} - T$. [1]

The results show more accurate erosion than previously. See Figure 1, which shows the standard fBm terrain through 200 and 2000 steps of erosion, and a curvey terrain through 2000 steps of erosion.

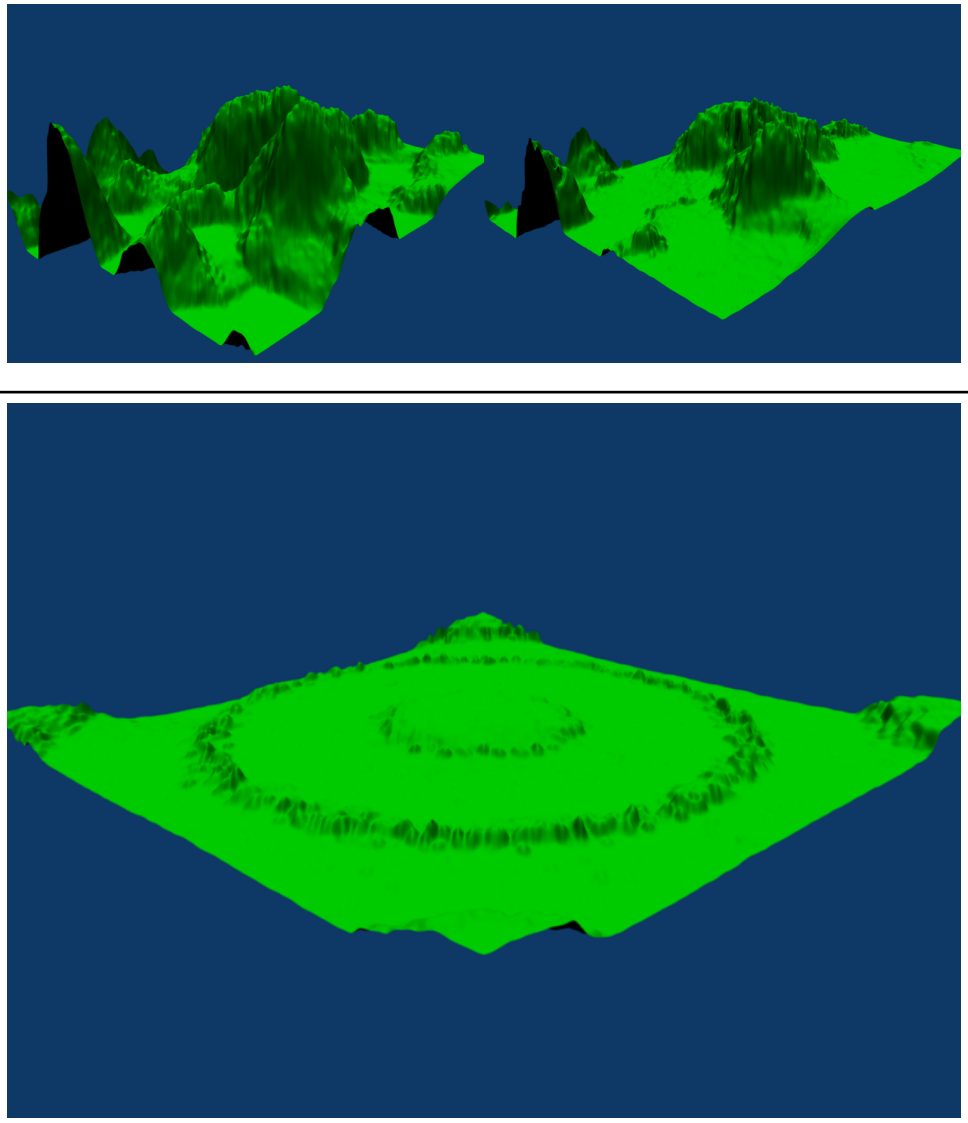

Figure 1: Terrain Erosion

# 3 Problems

None.

# 4 Objectives for Next Week

- Distribute the water and sediment in a more random fashion, so as to get variation on the ground plane of the terrain.

# References

[1] Bedrich Benes and Rafael Forsbach. Visual simulation of hydraulic erosion. In *WSCG 2002 Conference*, 2002.