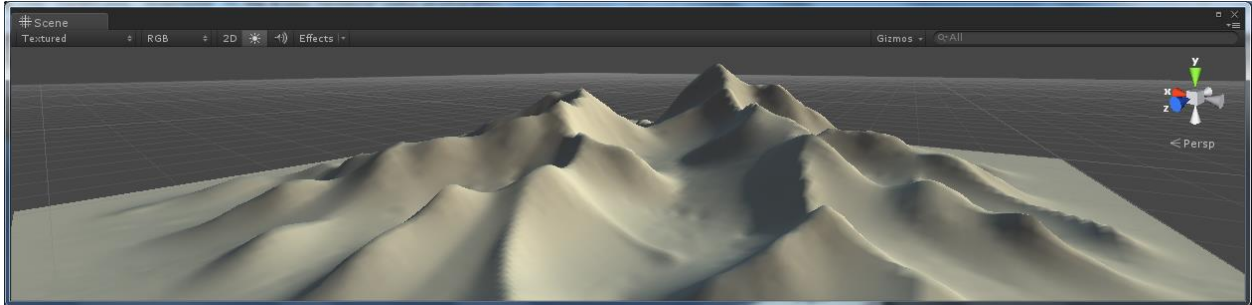# Terrain Water Erosion

Unity Editor Extension

Introduction

Terrain is essential part for most games and it is very important how it looks. Terrains which we use to see in real life contain footprints of water erosion and our eyes can detect them automatically. So, we want to see the same footprints in games. But it is impossible for most of the artists to make such terrain manually because water erosion is a long integral process influencing the whole surface simultaneously. The only way to make a terrain with water erosion is to model this process. There are several published algorithms and even professional tools for this purpose but for games we need something very simple and fast but nice looking. I designed this algorithm from scratch using just a common sense.

As a first step, I drop water on the terrain surface. I do it uniformly. After that water moves down proportionally to the gradient of the surface. The water can move the amount of soil proportional to the gradient as well. That's all.

The tool contains just a few dozen lines of code and can be easily modified for more complex tasks such as working with soils of different solubilities and creating editor brushes.

Start guide

Attach the **Terrain Water Erosion** component to any Unity Terrain object either by dragging and dropping the script onto the terrain object or by selecting it through the Component/Scripts menu. It's better to change one of the parameters in the terrain. It is the Pixel Error. This parameter increases the accuracy of land on the screen. To change it, select terrain and go to Settings. Set this parameter to 1.
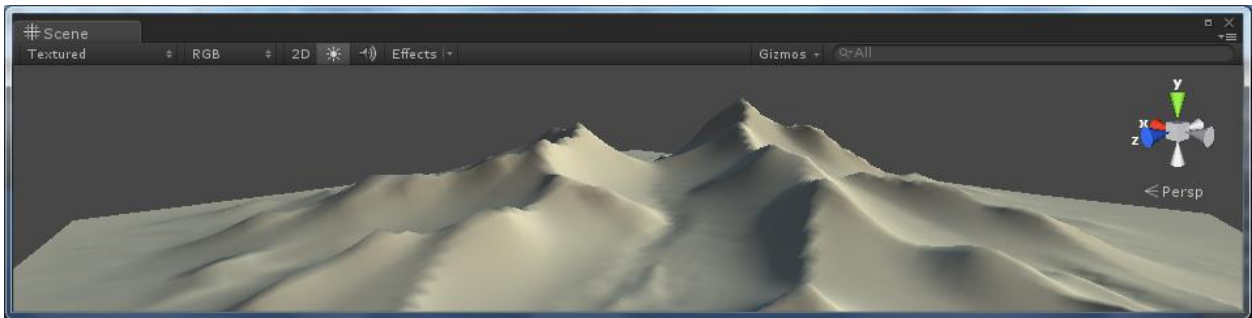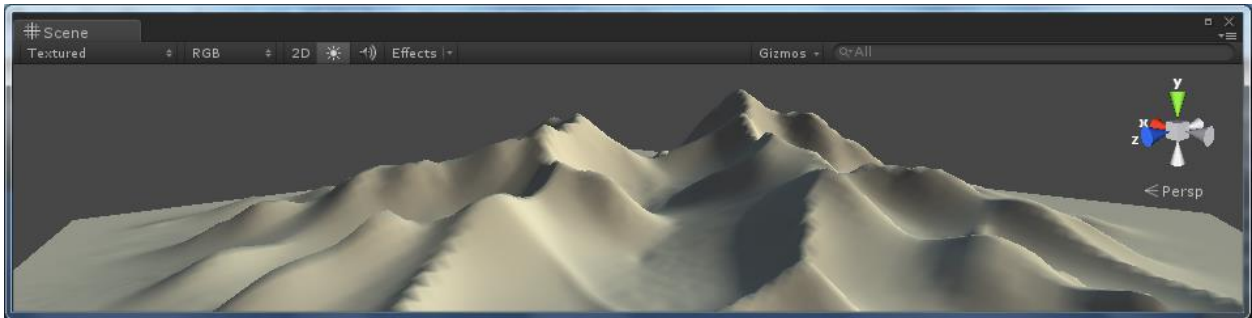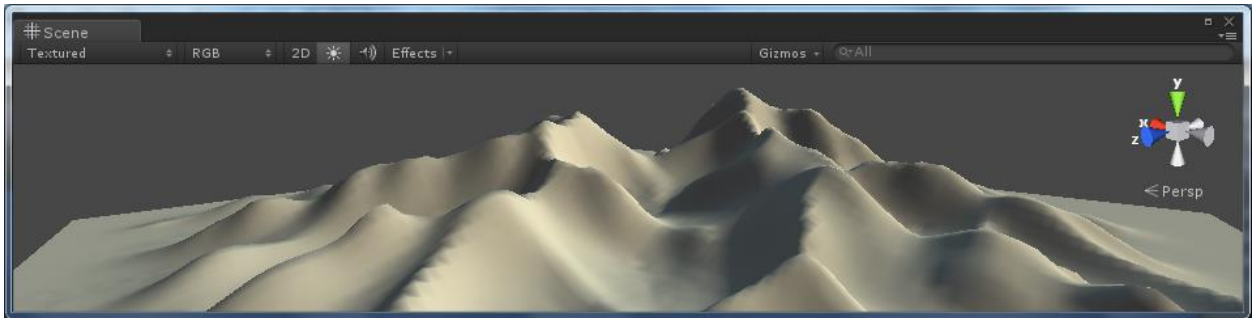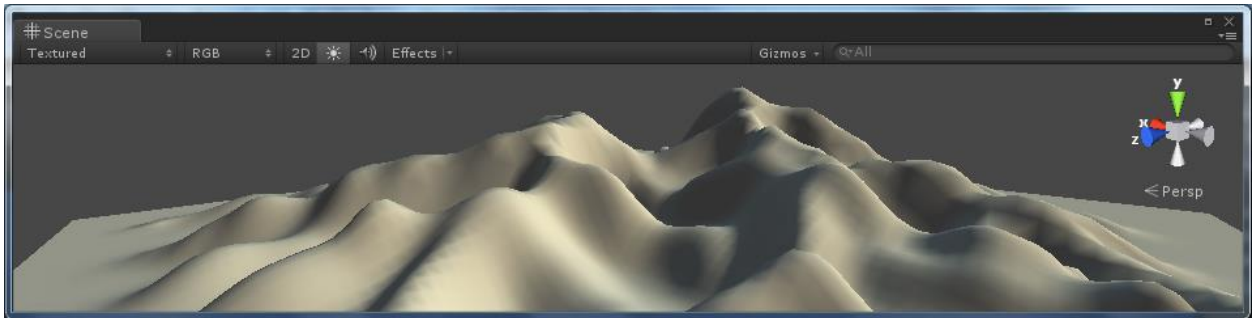
Usage

The interface of the **Terrain Water Erosion** component is very simple. Just set 3 values and press **Apply Water Erosion** button.
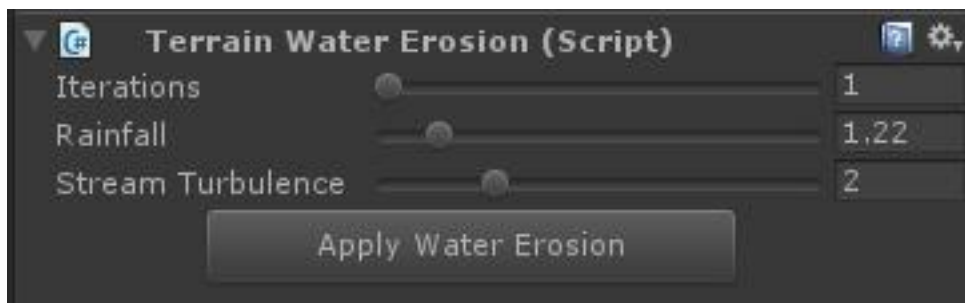
Let's consider these 3 values in more detail:

Iterations [int]

The number of times this filter is applied. Recommended value from 1 to 60. Here is the pictures for Iterations values 0, 20, 40, 80 respectively:
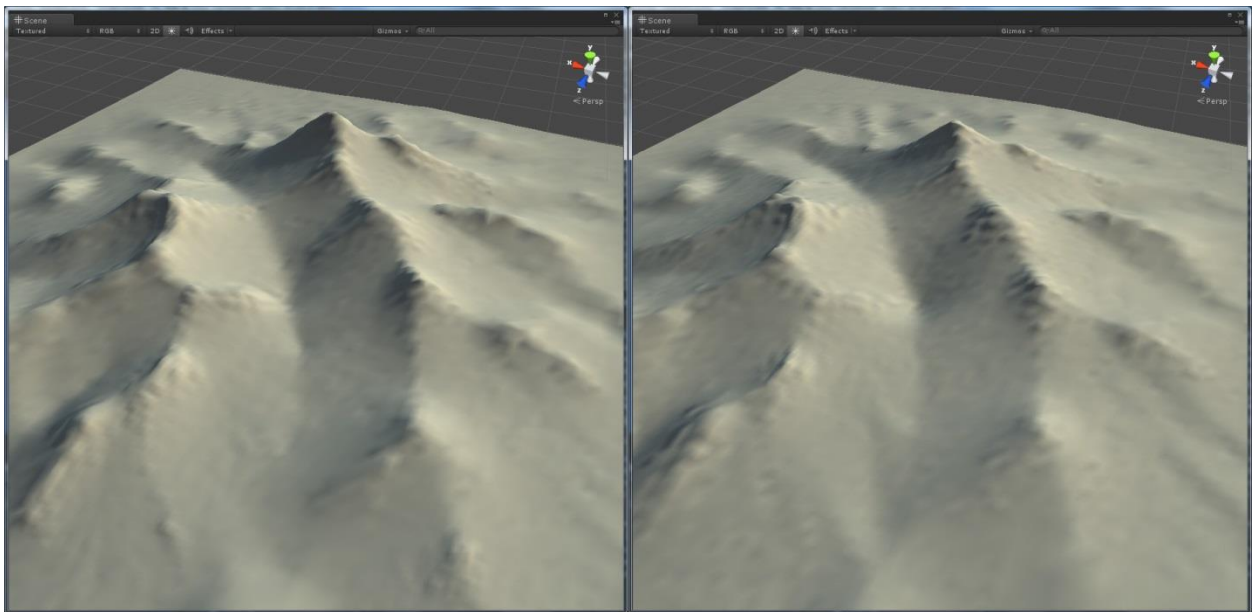
Rainfall [float]

The amount of water added to the system per iteration. The large this value the more dramatic and rough changes you can see in terrain for the same number of iterations. Here is the pictures for Iterations value 35 and Rainfall values 1and 3 respectively:
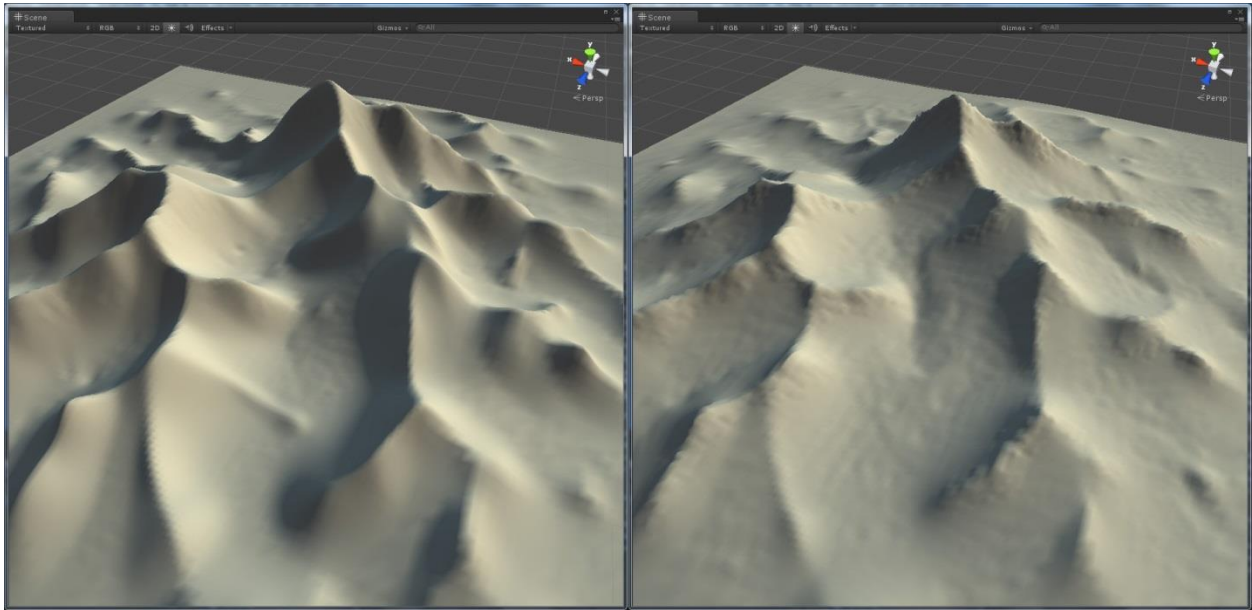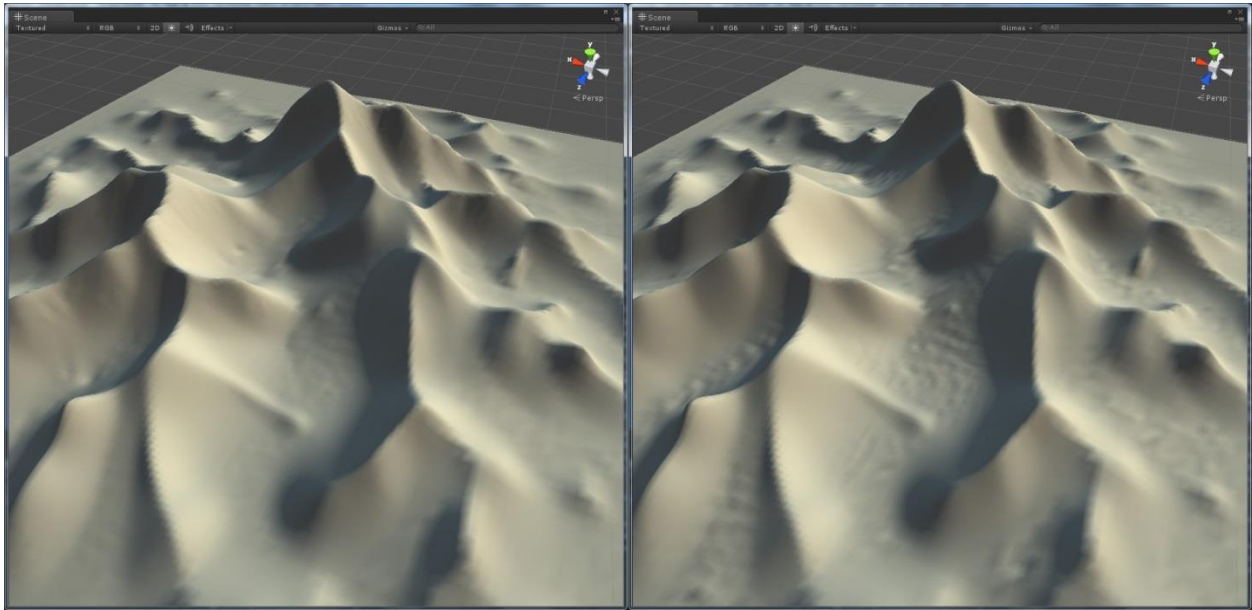

The next pictures for Rainfall 5 and 7 respectively:

Stream Turbulence [float]

This parameter controls the roughness of the soil which was washed down by water and precipitated as sediment. These pictures demonstrate the changes between Stream Turbulence 2 and 5 respectively:

Acknowledgements

Thanks to Sándor Moldán for his Terrain Toolkit which was taken as a structural basis for this Unity Editor Extension.