

erosion

Erosion is a natural, exogenic, geological process where soil or rock is removed from one location and transported to another, the distance of transportation can vary from just millimeters to kilometers. Typically erosion is a very gradual process that takes place of a long time. Landforms are constantly being affected by the erosive actions of rivers, waves, wind, soil and glaciers.

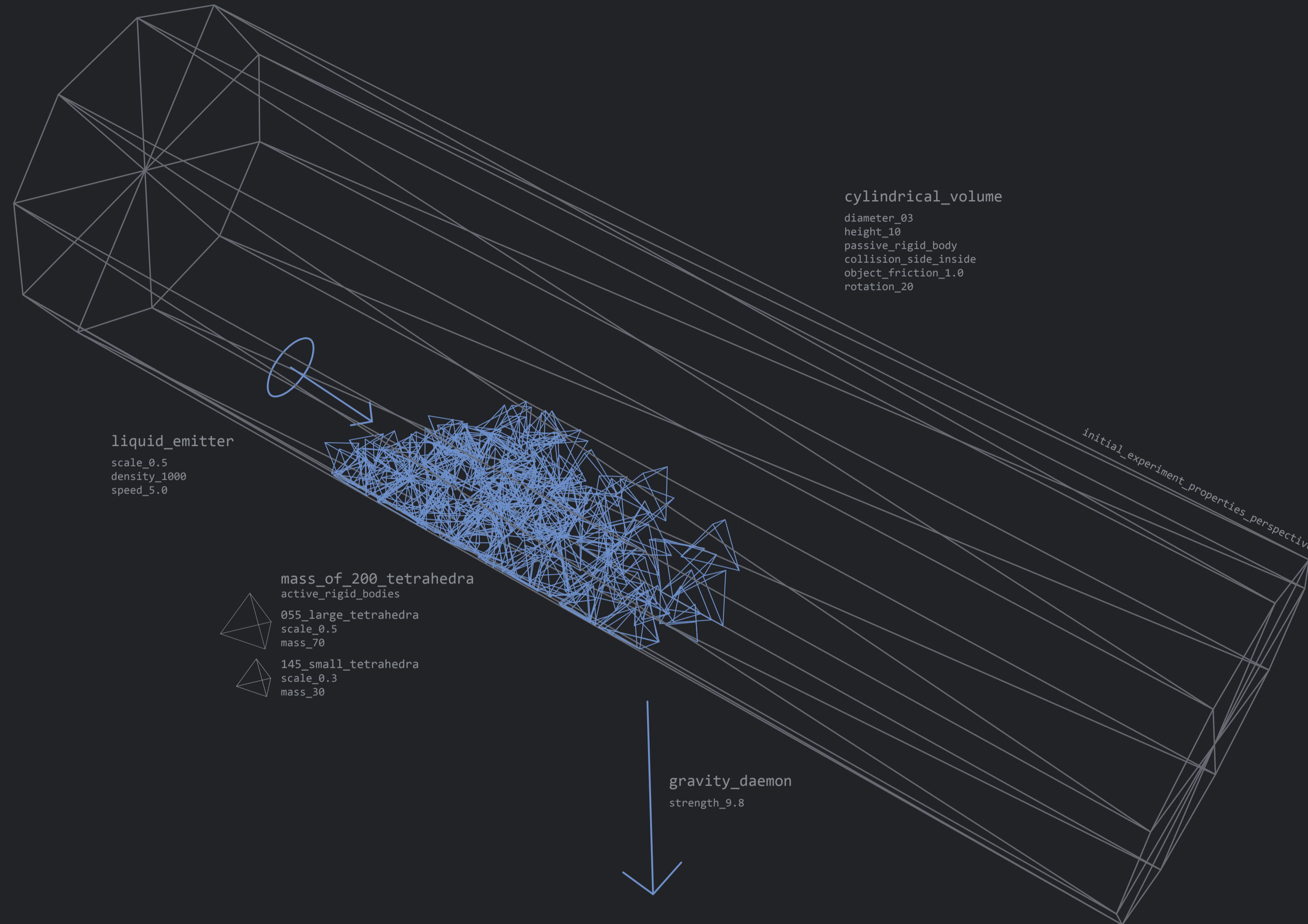
Each of these types is actually a collection of different processes. For instance there are four main forms of river erosion: hydraulic action, abrasion, attrition and solution.

In this experiment we will study the mechanical weathering process hydraulic action. Moving water forces itself into cracks and fissures of rock where the pressure builds causing sediment and particles to be dislodged. These rock particles are then transported in the flow causing additional erosion by abrasion.

There are a number of variables in hydraulic action: the velocity and volume of water; the density and classification of the bedrock; and most simply the water's path.

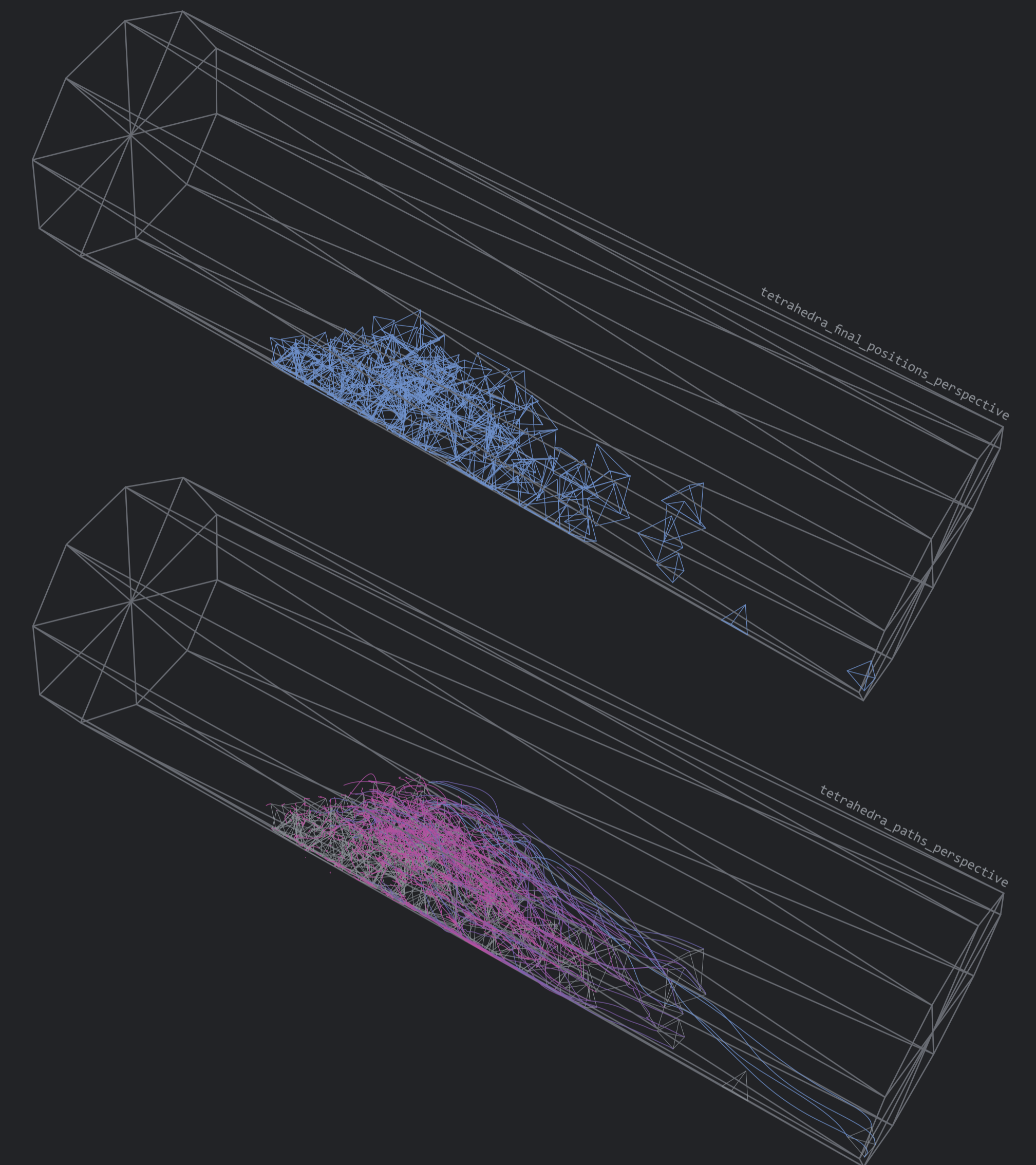
initial_scene

To model hydraulic action a number of tetrahedrons have been joined together within a cylindrical volume tilted at 20 degrees. A liquid emitter will pour particles at the mass of objects, building up pressure and causing fragments to break away. The paths of these fragments will then be tracked through the chamber.



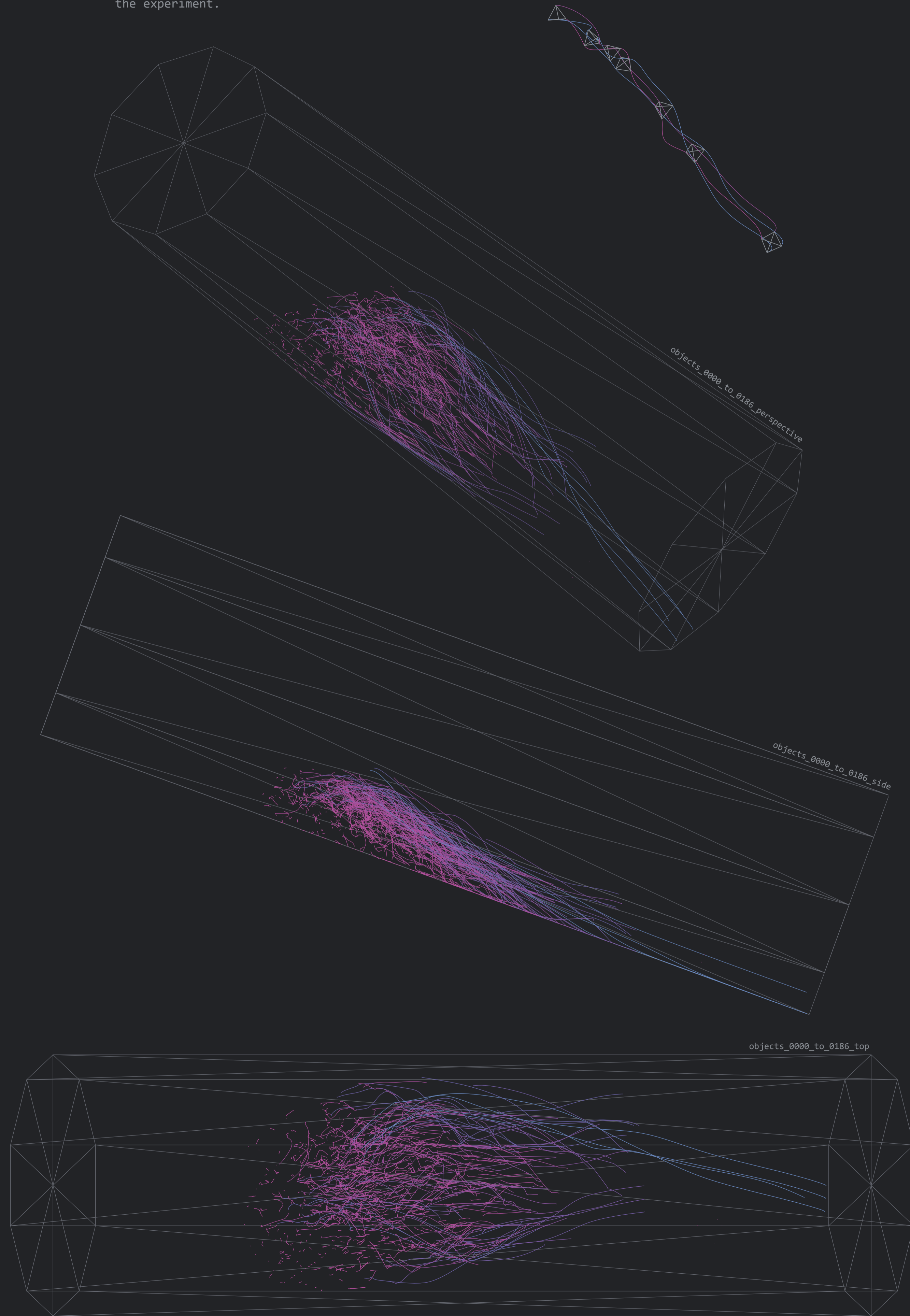
final_outcome

Hydraulic action is clearly evident in the final results, a significant number of object have been broken from their starting positions and transported significant distances. Attrition can also be observed in the experiment, broken fragments collide with the mass and cause additional fragments to dislodge.



object_trace

To illustrate the transportation of rock fragments each object within the scene is tracked by its vertices through the experiment.



particle_trace

The variation in particle paths between the start and end of the experiment illustrate the erosive power of the water particles as new paths are carved through the terrain.

