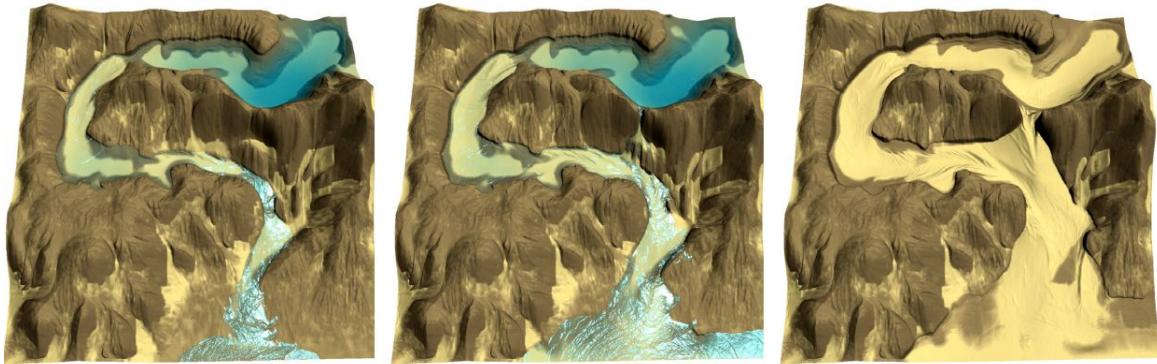


Interactive Layered Terrain Generation



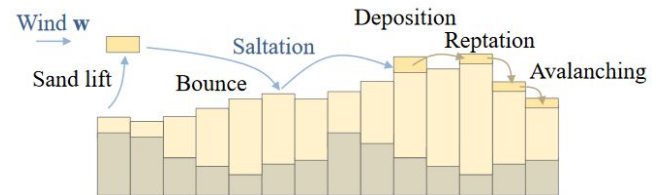
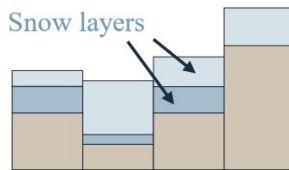
Description

Procedural landscape generation often relies on a layered representation, where each point of a grid is mapped to a stack of different materials (dirt, water, sand, snow, etc.). The goal of this project is to implement this representation in order to first reproduce classical erosion mechanisms [Št'ava08] and then imagine your own phenomena, drawing inspiration from subsequent works such as avalanches [Cordonnier18] or desertscape [Paris19] simulations.

The implementation must run at an interactive rate, and may include user input to add/remove matter to some layers (e.g. triggering rain around the mouse).

Constraints

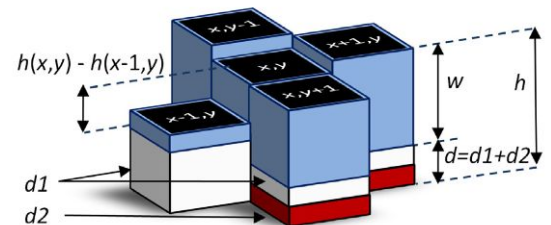
Layered representation is well suited for GPU programming, so use a language/framework that supports it. Suggested choices are C++ or Unity.



Difficulty

Mathematics: easy

Implementation : moderate for a first result, harder to switch on GPU.



Encadrement

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Références

- [Cordonnier18] Cordonnier, G., Ecornier, P., Galin, E., Gain, J., Benes, B., & Cani, M. P. (2018, May). Interactive Generation of Time-evolving, Snow-Covered Landscapes with Avalanches. In *Computer Graphics Forum* (Vol. 37, No. 2, pp. 497-509). <https://hal.inria.fr/hal-01736971/file/interactive-generation-time.pdf>
- [Paris19] Paris, A., Peytavie, A., Guérin, E., Argudo, O., & Galin, E. (2019, October). Desertscape Simulation. In *Computer Graphics Forum* (Vol. 38, No. 7, pp. 47-55). <https://hal.archives-ouvertes.fr/hal-02273039/document>
- [Št'ava08] Št'ava, O., Beneš, B., Brisbin, M., & Krivánek, J. (2008, July). Interactive terrain modeling using hydraulic erosion. In *Proceedings of the 2008 ACM SIGGRAPH/Eurographics Symposium on Computer Animation* (pp. 201-210). Eurographics Association. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.173.5239&rep=rep1&type=pdf>