

Stories of Other Worlds—How to Build a Landscape Badlands and Base Level—Common Q/A

Earth Science Essentials
by Russ Colson

So are all landscape formed by eroding down to base level?

No.

Base level is particularly significant in considering erosion and deposition by liquid water because liquid tends to pool in oceans and lakes, creating a base level. Since liquid water is a major player in landscape formation on Earth, base level is important. Base level is also important on other planets with liquids, such as Titan and Mars in the distant past. For example, when we look for ancient seas on Mars we often look for evidence of a shoreline cut at a particular base level.

Other types of erosion and deposition may be less tied to a base level. We already considered a couple of processes that don't depend on a typical base level—glacial processes and certain kinds of erosion and deposition under water. Also, wind deposits and erosion often are not tied as tightly to a base level. Cave formation is often linked to the water table, but not to a base level as we have been thinking of it

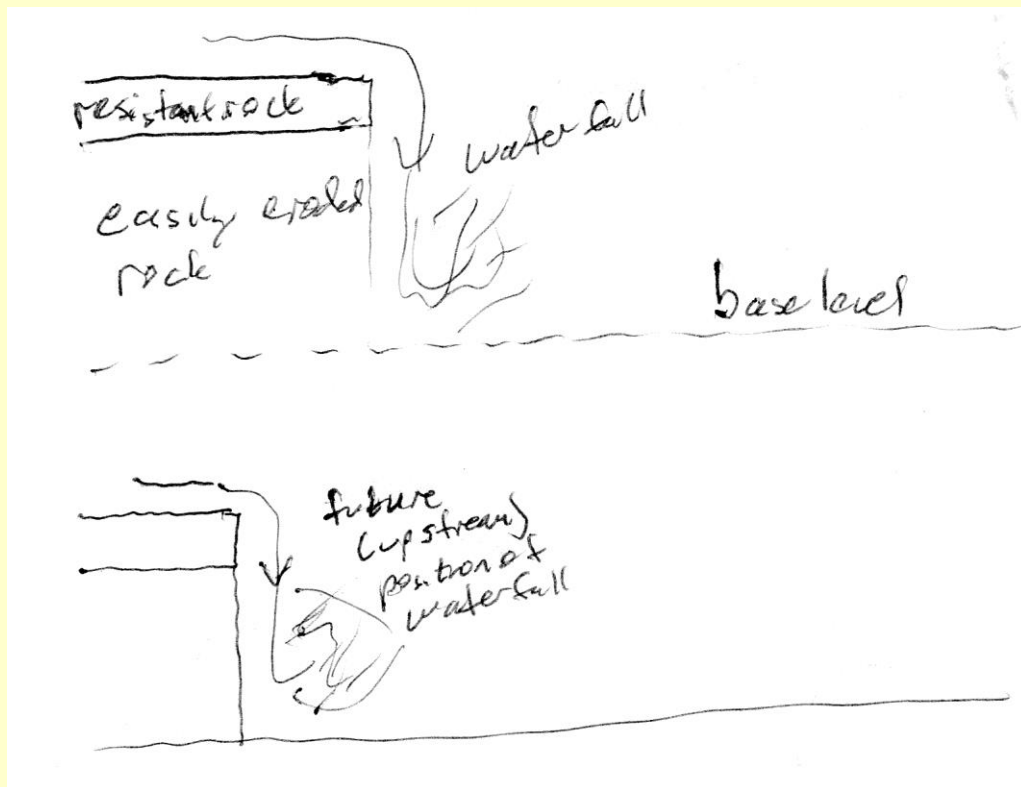
Other processes, like tectonic processes, often compete with base level erosion and deposition. For example, we considered the importance of base level in forming the Front Range of the Rockies, the incised meanders of the Colorado Plateau, and Santa Elena canyon—but without tectonic uplift, those features would not have formed.

Another process that can tend to flatten a landscape is viscous relaxation. Over long periods of time, the surface of a planet can behave like thick syrup, gradually flattening under the force of gravity.

What about Waterfalls? If rivers erode to a base level, then how can a waterfall be at two different elevations?

Video: [Base-level-Erosion-and-Niagara-Falls-Question](https://mediaspace.minnstate.edu/media/Base-level-Erosion-and-Niagara-Falls-Question/1_c5lb63cs) (0.54 min)
https://mediaspace.minnstate.edu/media/Base-level-Erosion-and-Niagara-Falls-Question/1_c5lb63cs

A water fall forms where erosion-resistant rock lies on top of easily-eroded rock. The resistant rock forms a temporary base level, but once it is breached, the river erodes quickly down to the next base level, producing a big drop in elevation over a short distance—a waterfall. As the caprock continues to erode, the water fall will migrate upstream.



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