

Research trio claim landslides key to mountain longevity

June 27 2013, by Bob Yirka



Photo of White Mountain peak taken in the Alpine Zone. Credit: Jonathan Lamb/Wikimedia Commons

(Phys.org) —A trio of researchers, two from Aarhus University in Denmark and a third from the University of Melbourne in Australia, claim in a paper published in the journal *Nature* that mountain longevity is likely due to the type of landslides that occur at their base. They've created computer simulations that recreate the conditions that lead to mountain erosion and say landslide types can mean the difference between short- and long-lived mountain ranges.

Scientists have believed for many years that "quiet" mountain ranges—those that are geologically dormant—tend to erode mostly due to rivers that flow around them or down their sides, cutting away at their

bedrock. But until now, very little research has been done to find out why some mountain ranges last much longer than others.

To find out, the researchers in this latest effort built computer models that simulate the impact that [flowing rivers](#) have on [mountain ranges](#). They found that the type of sediments in the river water had a very large impact on erosion—the grittier the water, the larger the impact. That was not really new, other researchers have suspected as much. What was new was that the computer simulations showed that landslides had a far bigger impact than has been previously suspected. Interestingly, the computer models showed that they can cause mountains to erode faster than normal, or slower, depending on the type and location.

Typically, landslides cause a large amount of rock and dirt to fall into a river; if that material is gritty then the landslide will likely cause the mountain to erode faster than it would have otherwise. On the other hand, if a landslide causes a backup in the river, then dirt, rocks and silt can build up in a [river basin](#), effectively causing a slowing of [river flow](#) and thus erosion. Such slowing, the researchers found, could lead to a smoother landscape resulting in fewer landslides. This scenario would account for the vast differences found in mountain range ages. The Appalachian Mountains in the U.S., the researchers note, are several hundred million years old—older models suggest they shouldn't have lasted longer than tens of millions of years. The type of [landslides](#) they experienced over the years, the researchers assert, helped the Appalachians hold steady.

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