

Are the Alps growing or shrinking?

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The Alps are growing just as quickly in height, as they are shrinking. This paradoxical result could be proven by a group of German and Swiss geoscientists. Due to glaciers and rivers about exactly the same amount of material is eroded from the Alp slopes as is regenerated from the deep Earth's crust. The climatic cycles of the glacial period in Europe over the past 2.5 million years have accelerated this erosion process. In the latest volume of the science magazine "*Tectonophysics*" (No. 474, S.236-249) the scientists prove that today's uplifting of the Alps is driven by these strong climatic variations.

The formation of the [Alps](#) through the collision of the two continents Africa and Europe began about approximately 55 million years ago. This led to the upthrusting of the highest European mountains, which probably already achieved its greatest height some millions of years ago. At present, however, the Swiss Alps are no longer growing as a result of this tectonic process.

Swiss geodesists, who have already been measuring the Alps with highest accuracy for decades, have observed, however, that the Alp summits, as compared to low land, rise up to one millimetre per year. Over millions of years a considerable height would have to result. But why then are the Alps not as high as the Himalayas? Researchers from the GFZ German Research Centre for Geosciences were able to calculate that mountains eroded concurrently at almost exactly the same speed.

"This mountain erosion cannot even be determined using the highly precise methods of modern geodesy" explains Professor Friedhelm v.

Blanckenburg from the GFZ. "We use the rare isotope Beryllium-10, which develops in the land surface via [cosmic radiation](#). The quicker a surface erodes, the fewer [isotopes](#) of this type are present therein". Therefore, von Blanckenburg, and the GFZ geoscientist, Dr. Hella Wittmann, have analysed this "cosmogenic" isotope in the sand of the Swiss Alps rivers and, thus, in the direct products of erosion.

How does it come about now that the Alps erode at the same speed that they rise? "Here pure upthrusting forces are at work. It is similar to an iceberg in the sea. If the top melts, the iceberg surfaces out of the water by almost the same share" explains von Blanckenburg. Thus this paradoxical situation with the Alps that through wind, water, glaciers and rock fall, they are being constantly finely eroded from the top but on the other hand, regenerated from the Earth's mantle. This phenomenon, even if already postulated theoretically has now been proven for a complete mountain range for the first time.

Thus, the Alps are constantly rising, although they have been deemed "dead" in a tectonic sense. Instead of plate forces it is the strong [climatic variations](#) since the beginning of the so-called quaternary glacial before approximately 2.5 million years, to which mountain slopes in particular have been reacting so sensitively. This holds the Alps in motion.

Source: Helmholtz Association of German Research Centres ([news](#) : [web](#))

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