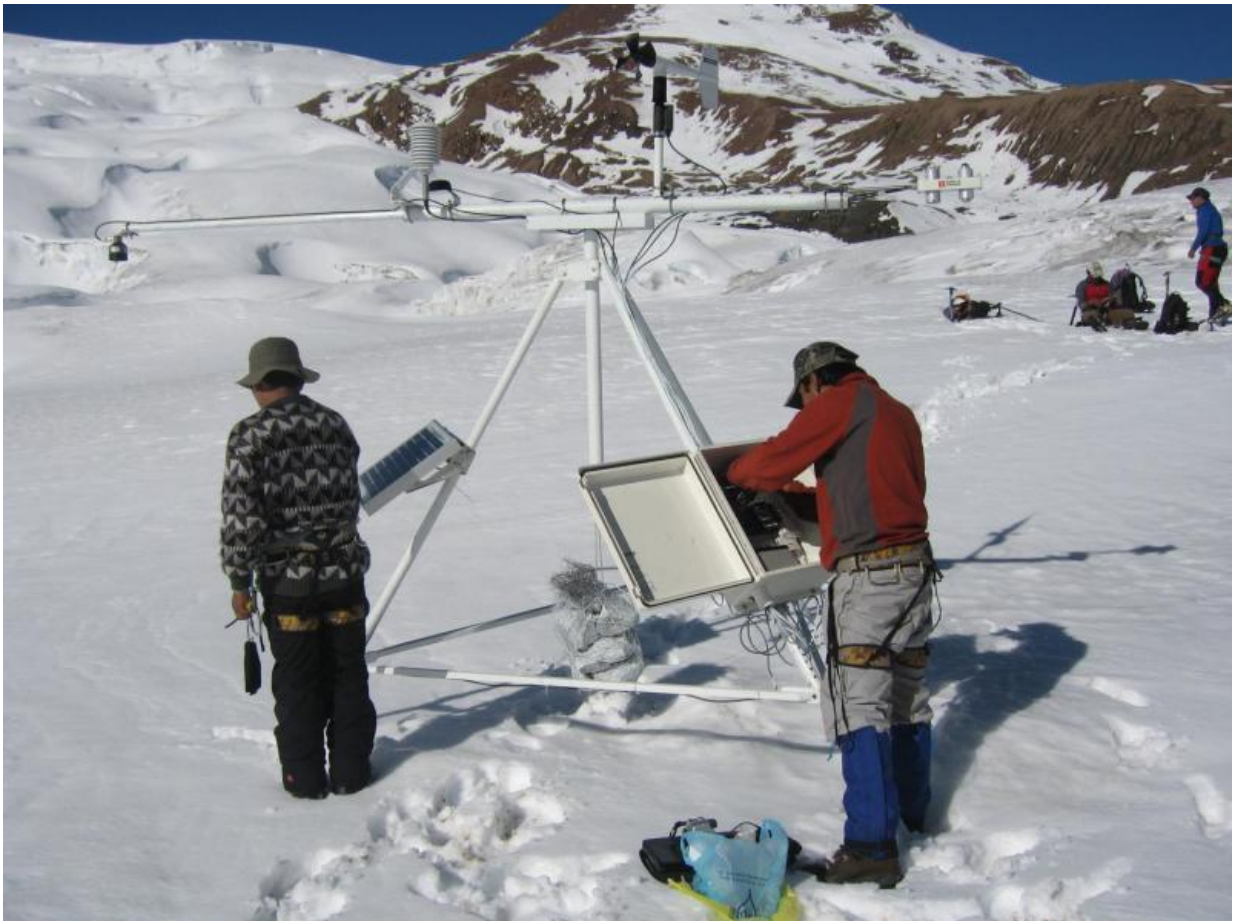


# Up to 30 percent less precipitation in the Central Andes in future

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Seasonal water shortages already occur in the Central Andes. In the future, the region could suffer from even greater aridity. Credit: Nadine Salzmann

Seasonal water shortages already occur in the Central Andes of Peru and Bolivia. By the end of the century, precipitation could fall by up to 30% according to an international team of researchers led by the University of Zurich. In a first for this region, the team compared current climate data with future climate scenarios and data extending back to pre-Inca times.

The population in the Central Andes already faces [water shortages](#) today. Now geographers at the University of Zurich have collaborated with Swiss and South American researchers to show that [precipitation](#) in the rainy season could drop noticeably - and this could happen within the next twenty years.

In contrast to conventional research projects, which often look at [climate](#) forecasts in isolation, the UZH scientists compared data taken from tree rings and ice cores from the past 1,000 years with model calculations for the future. Their research found that current precipitation is within the normal fluctuation range for recent centuries. But this is projected to change dramatically by the end of the [century](#): "Our model simulations suggest that the probability of dry years between 2071 and 2100 will be four times higher than in the pre-industrial era", says lead author Raphael Neukom.

## **Stronger westerly winds lead to more aridity**

It is difficult to realistically simulate precipitation in mountainous regions using current global climate models, which forced researchers to use alternative methods. They capitalised on the fact that precipitation in the tropical Andes is strongly influenced by wind speeds in the higher air layers. "These winds can be simulated much more reliably than the precipitation itself", says Raphael Neukom. "It is highly probable that the increase in greenhouse gases will strengthen the westerly winds over the Central Andes. But stronger [westerly winds](#) in the upper troposphere reduce the inflow of humid air from the Amazon region into

the Andes and thus lead to greater aridity."



Lamas and sheeps are shown in the region of Vilcanota in Peru. Credit: Nadine Salzmann

### **Clear long-term trend**

Although almost all model simulations point to a decline in precipitation, the scientists note that the model and climate scenarios still present some uncertainties. Nevertheless, &laquoalthough short-term predictions can be impacted by fluctuations that go against the overall trend, our data

clearly shows that over the long term, i.e. through to the end of the century, the trend towards greater aridity in the Andes is unambiguous", explains UZH glaciologist Christian Huggel. Moreover, other factors such as the deforestation of the Amazon rainforest and lower levels of glacial meltwater could exacerbate the trend.

According to Christian Huggel, there is therefore an urgent need to introduce affordable and low-risk measures that will adapt the region to the new climate conditions. Peruvian-Swiss projects are testing such measures, which include, for example, the collection of rainwater in artificial ponds. "The results of the basic research are coming at just the right time for deliberations on the dimensions of such ponds", concludes Christian Huggel.



Lake Sibiracocha is in the region of Vilcanota in Peru. Credit: Nadine Salzmänn

**More information:** Raphael Neukom, Mario Rohrer, Pierluigi Calanca, Nadine Salzmänn, Christian Huggel, Delia Acuña, Duncan A Christie and Mariano S Morales. Facing unprecedented drying of the Central Andes? Precipitation variability over the period AD 1000-2100. *Environmental Research Letters*. [DOI: 10.1088/1748-9326/10/8/084017](https://doi.org/10.1088/1748-9326/10/8/084017)

Provided by University of Zurich

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