

# fact sheet

## Sensitive Alps



**The Alps are a unique living space, with a very sensitive environment. Air pollution, traffic noise and climate change are having more severe consequences here than in flat regions. Moreover, space for settlements is limited and constantly threatened by avalanches, rock falls, mudslides and floods. This is why the Alps need our special protection.**



**Air pollution and traffic noise are already having a particularly severe impact on mountain areas. International transit routes in the Alps subject people and nature to excessive suffering. Climate change will have fatal consequences. Temperatures will rise twice as much in the mountains as elsewhere and will cause long-term changes to the sensitive Alpine ecosystem.**

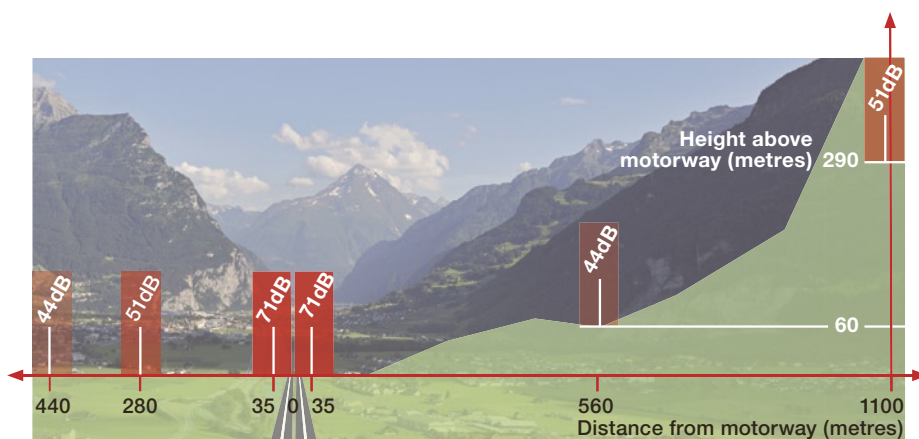
The Alps are home to 13.9 million people. They cover 8 states and encompass nearly 6,000 municipalities. The Central Alps are an important water reservoir for the whole of Europe. The Alps are to Europe what the Himalayas are to Asia. In the summer, for example, 60 percent of the water in the Rhine originates in the Alpine region. Mountains also play a key role in the global water cycle.

The Alps are one of Europe's most important natural areas. Many people visit them to recuperate from the stresses of city life. The Alps also act as a transit area for trains, trucks and cars. The international flow of goods across the Alps is concentrated on 14 crossing points. The volume of freight has tripled since 1970 and is still increasing, particularly on roads. However, road transport is much more harmful to the environment than rail. Air and noise pollution are significantly aggravated by the topography of the Alps. The situation is made worse by the fact that transit routes and settlements in mountain areas are concentrated in a very small space.

Environmental and transport policies need to include special rules for sensitive zones such as the Alps – an Alpine Crossing Exchange, restrictions on journeys, selective driving bans and improved safety standards. This is all the more urgent since mountain areas are being affected by global warming at twice the rate of non-Alpine regions.

**Noise pollution**

A valley is like an amphitheatre. Even high up on the valley sides, the noise of trucks, motorcycles and cars is just as loud as it is right next to the motorway. (db = decibel)







**Noise.** The way in which sound travels is determined by meteorological conditions and refraction. In narrow Alpine valleys, this means that noise moves obliquely upwards during the day. It echoes from the slopes, which act like an amphitheatre. On the valley sides, the noise level therefore is relatively high. On mountain summits, you can often hear noise generated by transport routes many kilometres away. So the noise level that can be found 280 metres from a road in a flat area can still be heard at a distance of 1 to 1.5 kilometres in an Alpine valley. Noise barriers only have a very limited effect in Alpine valleys. Moreover, trucks emit more noise when travelling uphill than on the flat. With trains, noise depends on the nature of the wheels, the rail head and the bogie construction. Trains also are noisier on mountain lines than they are on the flat.

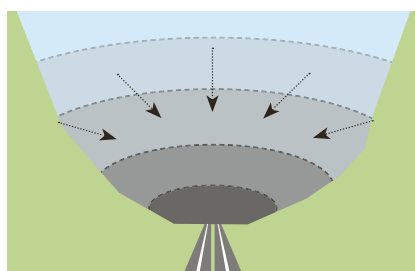
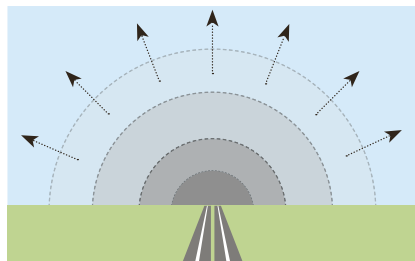
**Air Pollutants.** In valleys, air pollution cannot dissipate as effectively as in flat areas. The volume of air is severely limited by the valley sides, and pollutants collect in the valley bottom. This, however, is exactly where most people live. Moreover, the same number of vehicles cause much more air pollution in narrow Alpine valleys than they do in flat areas. Research has shown that vehicles emit twice as much nitrogen oxide on a five-percent incline as they

do on the flat. Particularly high levels of carcinogenic particulates can be found in Alpine valleys. On summer nights, meteorological conditions mean that vehicle exhausts are up to six times more polluting – bans on night traffic are therefore of central importance to mountain areas. Alpine valleys often experience temperature inversions, where warm air overlays cold air and acts like a lid, trapping the cold air in the valley bottom and resulting in increased pollution levels.

**Disappearing glaciers.** Glaciers are melting at hitherto unknown speeds. Their ice not only creates a unique landscape, but also fulfils an important function. Glaciers still hold about 20 percent of Switzerland's water reserves. Experts predict that the glaciers could lose another 70% of their surface area by 2050 and that 95% of their mass could disappear by 2100. This would mean the loss of a water reservoir that is of importance for the whole of Europe. If there is no water from the glaciers during dry summers, this could cause problems for electricity production and the cultivation and irrigation of agricultural land. This would particularly affect neighbouring, non-Alpine areas. Approximately 150 million people live within the catchment areas of major Alpine rivers.

**Air pollution**

In flat areas, air pollutants can dissipate freely to all sides (top graph). In valleys the situation is completely different. Pollutants accumulate at ground level.



The Alpine Crossing Exchange offers the most effective way of protecting the Alps from freight transit traffic. This is how it works: transalpine journeys are only permitted if you have a crossing permit. A limit to the number of journeys is set by the Alpine countries, and hauliers bid for freely tradable rights. The price for these rights is determined by demand.



**Permafrost.** Above 2,500 meters, most of the ground is permanently frozen. This permafrost is what holds many rocks and slopes in place. The average temperature in the Alps has increased by 1.5 to 1.6 degrees over the last 40 years, while global temperatures have increased by «only» 0.8 degrees during the same period. An increase in mudslides and rock falls bears witness to this trend, as does the fact that several cable-car operators have already had to inject concrete into rocks to stabilise their high-altitude installations. If the permafrost continues to melt, the risk of natural disasters will increase dramatically.

**Biodiversity.** Mountain ecosystems rank among the world's biodiversity hot spots and represent an enormous gene pool. 13,000 different plant species grow in the Alps, and about 35,000 animal species live between the Mediterranean and the highest Alpine summits. Because of the difficult growing conditions and short growing season, plants are very susceptible to air pollutants such as nitrogen oxides and particulates. If temperatures continue to rise as predicted, vegetation zones in the

northern hemisphere will move upwards by 600m. But most Alpine plants cannot migrate that fast, if at all. So 45 percent of Alpine plant species are threatened with extinction. Forests are also suffering from increasing environmental pollution. Unlike forests in flat areas, however, 20 percent of all Alpine forests provide vital protection against avalanches, mudslides and rock falls. Further damage to trees by air pollutants and global warming will result in an acute threat to many people and numerous transport routes.

**Accidents.** The topography of the Alps represents a special challenge for road traffic. Steep gradients, tight bends, many bridges and long tunnels make journeys particularly demanding. Moreover, roads and railways cannot simply be upgraded at will, because they often run parallel to each other, and space is very limited on valley floors. There is a high risk of serious, fire-related accidents involving trucks in tunnels. If such an accident were to involve a hazardous load, this could have disastrous consequences.

Further information:

[www.alpine-initiative.ch](http://www.alpine-initiative.ch)

[www.alpine-crossing-exchange.ch](http://www.alpine-crossing-exchange.ch)

The Swiss painter and poet Heinrich Danioth (1896 – 1953) characterised the Alps as follows: «Mountains are God's treasure house and the devil's maze, in equal parts». Humans have the crucial task of protecting the Alpine habitat, which is so sensitive to environmental pollution, and of preserving their beauty for future generations.

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