

## Transcript

Interview on 27 June 2025, Future Forum Alps Liechtenstein with Carmen de Jong

**Ms De Jong, do you enjoy skiing?**

Well, I don't ski anymore. I had a pretty bad accident, but my family skis or used to ski.

**So you're not fundamentally opposed to winter sports, but actually more of a fan?**

I wouldn't say that. My opinion has changed a lot. And I also know other scientists who were professional skiers and combined that with their scientific work, but who no longer ski either.

**You criticise winter sports and winter tourism for using too much water.**

You have to differentiate here, because you can also talk about winter tourism such as winter hiking or snowshoeing or whatever, or tours. But when it comes to ski resorts, it's unfortunately the case that hardly any ski resort can function without snowmaking. And I think that most skiers and tourists are not aware that this white mass consists of water and that it is very, very complicated to get this water onto the ski slopes. And that it is not a simple matter of water coming out of a snow cannon or a snow lance, but that there is an immense, really immense and very complex infrastructure behind it, which is also being expanded and changed all the time. It's not like a building that you construct once and then it's there; it's a very dynamic and complex process that is invisible to the average tourist because it's hidden underground or covered up.

**You mention storage basins, for example, which are visible, but there are also underground water pipes.**

Yes, skiing used to be simple; it was just a cable car, and that was manageable, also in economic terms. Nowadays, it has become much more complex because you have to get the skiers down the slopes on artificial snow, which means you need snow pipes. The artificial snow is processed every night in the large ski resorts using diesel vehicles, and of course, because more and more snow is being made, not only because the area covered by snow has expanded, but also because of climate change, because snow has to be replenished so often, the snow stays on the ground for less time, so naturally you need more water, and the water is no longer available locally, which is why more and more reservoirs are being built. Just as an example, Saalbach-Hinterglemm now has 14 reservoirs, and even that is often not enough. In St. Moritz, for example, the reservoirs are located very high up, as in Corviglia, like most of them, and the catchment areas are simply too small to fill these reservoirs. This means that a large part of the water has to be pumped up from the valley, and I emphasised this very strongly today.

The whole problem is that not only is water being pumped hundreds or thousands of metres up from the valley, but now there is not even enough water in some cases and groundwater is being pumped. And so, in my opinion, having worked in this area for a very long time, we have now reached a very dangerous tipping point, where we are getting to the heart of the matter, to the safe groundwater, which many municipalities also use for drinking water.

**Then there is the counterargument from some ski resorts, which say, yes, but the water stays in the cycle. We're just using it. And another argument that goes even**

**further is that it doesn't harm the vegetation at all. On the contrary. So these are the claims that are being made. What is your scientific opinion on this?**

That annoys me because it's unscientific. But in any case, it's true that it doesn't stay 100 percent in the cycle because much more water evaporates than if it were to remain in the natural system. The water has to evaporate when it snows. That's part of the process. Then, of course, the water also evaporates in the large water reservoirs, which heat up. And yes, then of course there are also losses along the way and often defective water pipes and so on. The SLF also published a study on this a few years ago. They also conclude that on average about 35 percent of the water is lost. But this can also be as much as 60 percent. This means that these alpine valleys or the slopes below them are literally drying out. And I have already worked on very specific examples where certain species have become extinct (...) and we are then working together to investigate this. It's like detective work because you first have to find out why it dried up in that particular place. Oh yes, a water pipe was laid here that tapped into this stream or that spring. And this spring actually flows towards this alluvial fan where this plant species is found. So you need extremely good alpine knowledge to understand what is being built or whether it is even an artificial structure and when it was built.

**Would winter tourism as we know it today in the Alpine region be possible without artificial snow?**

Certainly not anymore, because we know from scientific studies that winter is now almost two months shorter than it was in the 1970s. And there is also this concept that winter must be longer and longer, that the winter season must be longer. That means starting in November and continuing until April. But we know very well that the current winter no longer looks like this, that we often lose the months of November and December, that we have thaws in the middle of winter and that winters are often becoming shorter. This means that ski resorts, in order to maintain their current model, say that there is no alternative to snowmaking. Of course, we need to consider whether we are getting caught up in a vicious circle by continuing down this path and pursuing these arguments. And whether we should fundamentally rethink the whole thing and say, yes, we know that climate change is now hitting hard. Winters are already much, much shorter. We simply have to accept that and do something completely different, develop something completely different.

**Let's come back to that later. You are also very involved with the Winter Olympics and, of course, you criticise them because they are very resource-intensive, including the Winter Games in China in 2022, which are being promoted as green and sustainable. That is one of the most striking examples. What are the biggest environmental offences that the Winter Olympics have ever committed?**

Yes, I've been researching the Winter Games since 2010 in Vancouver, and at first I thought that these were just isolated cases and that they would spark individual environmental campaigns and then perhaps spread more towards Asia. But now that I've researched it systematically, I can say that the main problem is snowmaking and water. Back in 2010, the artificial snow melted because it was too warm. So they transported bales of straw by helicopter, brought the snow down from the mountains by truck, and then transported it all back by helicopter and spread it on the slopes. So there were helicopter games, at least in the lower areas. And the other extreme example is, of course, Sochi in 2014, where temperatures reached around 19 degrees in the second week and then lots of salt was transported in. I don't think most people know that an entire plane was chartered from Zurich

with 14 tonnes of coarse-grained salt because it wasn't available in Russia. This was then spread on the ski slopes so that the short snow cover would freeze again and provide some grip. These are extreme isolated cases when it comes to the long term. Of course, there's the question of the Winter Olympics in Asia, which took place without any snow at all, such as Beijing 2022, where water had to be transported from over 30 kilometres away and agricultural irrigation had to be partially suspended, so really big decisions had to be made. What runs like a red thread through the entire Games, right up to Cortina d'Ampezzo, which I visited last year, is that they are encroaching on the core zones of nature reserves. I wasn't aware of that, but it's very serious. With all the Games and the promises that are made that compensation will be paid or that something will be rebuilt, that doesn't happen, of course. And then there are species that are really endangered, such as the brown bear at the Sochi Games or the snow leopard in China. Or, for example, a very serious example is also in Pyongyang, in 2018, where a primeval forest, a completely unique primeval forest, was cut down with trees that were between 500 and 1000 years old. Of course, you can't replant them, and they won't grow back naturally. Yes, well, the problem nowadays is, of course, increasingly the water problem, and that's particularly the case in Cortina d'Ampezzo, where springs in the villages are being tapped and groundwater is being pumped. So you can't just sit back and say, well, the Games were held there in 1956. That's why it's no longer a problem to do it now. The conditions are completely different. And apart from the many water problems, how do I manage it, how do I avoid conflicts? And in some areas there isn't enough to serve the bobsleigh track and ski slopes and everything else at the same time. Apart from these aspects, there are the aspects relating to nature reserves.

### **In Cortina too?**

Yes. There are many places where cross-country skiing is practised, including nature reserves along the river, where they have now installed a snow tap. And the national park is very fragmented in that area, but they just go right across it into the park. All the permits have been granted. And that's my criticism in general, not just for the Olympics, but also for normal ski developments. Nowadays, we have so little usable space for storage reservoirs or new slopes for " " that what has been painstakingly developed and designated as nature reserves is now being thrown out and simply cut into. At the Olympic Games, the pressure is of course much higher, and because it is an absolute geographical law that high-altitude areas are often the most vulnerable, with the most protected species, alpine ski slopes are built there because they are the steepest and longest. It's different in every case. It wasn't done just for prestige. In Pyeongchang, there were existing ski resorts that could have been used. South Korea in the parks. Yes, yes. And they could have been used, but they weren't because, for reasons of prestige, they wanted a ski slope that was a few hundred metres longer. Even though the FIS and IOC regulations already specify that an Olympic ski slope does not have to be longer than 650 metres. And also to create these superlatives. In China, they built a really long slope, really steep, so steep that most people can't use it these days, so they could say ours is even steeper and even longer. And the same goes for bobsleigh. And then nothing is too good for them. And it doesn't even go to the public. I was the first, and probably the only one, to mention this on television everywhere, because I looked at the maps, analysed all the boundaries and also read older articles which said, for example, that Chinese biologists had specifically warned against placing the ski slope in the core area, in the core zone of Shonyang Park. And when I looked at the construction phase, I saw that it was still there, but that no one was pointing it out. And the problem is that all these environmental and sustainability reports that come out before and after such Olympic Games

don't mention any of this. The park isn't even mentioned in the reports. The core zone doesn't appear at all, the name doesn't appear at all. It's simply ignored, and then there's no problem and no one thinks about it. You don't want to wake sleeping dogs, after all. Yes, but Cortina is really no better. And besides, there are also huge danger zones. In Cortina, there is a landslide that moves two metres per year. It is extremely dangerous. And the lift pillars are on movable bases. That's how fast they move. An accident cannot be ruled out. The spectator stands are also on height-adjustable pillars. But something could go wrong very quickly during prolonged heavy rainfall. We've seen that everywhere in recent weeks. It's simple: a lot of risk is taken for a few days during the Olympic Games. And with winter sports, it's just for a few weeks or a few months.

**You also mentioned Cortina d'Ampezzo a lot. The Winter Olympics in Milan and Cortina will take place in 2026. And you also briefly mentioned that the higher you go, the more sensitive nature is. That naturally leads us to the glaciers at the very top. As we know, the snow line is also moving higher and higher due to the increasingly hot climate. Glacier ski areas now see this as an opportunity and want to expand their offerings. That means new slopes and lifts on previously undeveloped glacier areas. There are several cases like this. How sensible do you think such ideas are?**

I can't understand that at all. And it's really frightening, because several ski resorts in France and Austria have now closed because it's no longer feasible. It's not just that these glaciers need to be covered with artificial snow. And especially the area in front of the glacier, because the glaciers are receding so quickly that a kind of artificial ramp has to be covered with snow in front of it so that there is a connection to the lift. But the glaciers themselves are also becoming increasingly dangerous with all the crevasses. I had a hearing in the German parliament in Berlin two years ago and I mentioned the closure of these several large glacier areas. Actually, in the sense that it should be taken as a warning signal for other ski resorts. Because where are we going to go if glacier ski resorts are already closing as a direct result of climate change and because it was simply technically almost impossible to continue. I don't understand how, on the other hand, people want to develop new areas. Above all, the right scientists and experts are never consulted. There are ski resorts around Sölden where the glaciers are receding by several metres a year. And you can see that the return from the glacier to the lift has to be moved every few years. Rock is then blasted away and new tracks are laid in the glacier. In some cases, a lake develops, which is also extremely dangerous because it can cause even more of the glacier to melt. And then some of the return routes no longer work. So you have to build a new artificial ramp in front of the glacier, a kilometre long, and cover it with snow so that the skiers or professionals can come back at all. So the technical effort involved is enormous. And if you look at the glacier retreat with a cool head, I'm no glaciologist, but you can see how rapidly the glaciers are receding. In the last two years, they have lost more than 10 percent of their total volume since measurements began. We really need to develop a tourism strategy and sports that are in harmony with climate change and don't require such an artificial environment. Plus processes that always go against the season, against gravity, against the season, against geography, against everything. It should be with it, not against it. Yes, that's exactly one question that comes to mind. Suitable alternatives for mountain regions and valleys whose economies currently depend on winter tourism. Yes, perhaps the impact is being exaggerated a little. Most of the money doesn't stay in the tourist resorts in the valleys, but flows elsewhere. Many employees are only employed for very short periods of time; it's not something sustainable that runs throughout the year. These are very short-term profits, most of which then have to be

reinvested. Economically, this has not been properly worked out. How much of the profit has to be reinvested? Most ski resorts, even large ones, are already struggling because the costs are so high. Erosion must also be combated, slopes must be repaired and improved, and then other facilities and new facilities must be built. Instead of this, it would of course make sense to develop tourism that is in harmony with the valleys. Every Alpine valley has its own characteristics. It is, of course, very easy to copy this McDonald's model from right to left, but it is something else to look at what the valley has to offer and how I can further develop small niches. There is a good example with the Dobratsch, which is not a glacier area, but there was a question of developing artificial snowmaking, which was about 15 years ago, and the local population opposed it and developed a campaign or association called "Save the Dobratsch", and the concept is much cheaper than the original idea and involves less risk, because ski resorts take enormous risks. I also discussed this in Cortina d'Ampezzo for the normal ski resorts outside the Olympic Games, what happens when there is an overlap of different crises. In volcanic eruptions, no planes, no tourists can come in, or no petrol or any bottlenecks or too expensive. You can have an overlap and then all these expensive investments are for nothing. Whereas if you compare that with four-season tourism, you have about 40 or 50 times less investment and also much less risk, and you're even more flexible. You can then operate at any time of the year. Of course, you don't get the same crowds of tourists. Probably less profit overall, too. Yes, but you could also distribute the tourists a little better in the Alps. There is far too much focus on hotspots, and there are beautiful valleys that now look very sad because they used to have beautiful tourism, but no longer do. You could also renovate and simply take a more diverse approach, not just focusing on tourism, but also on conferences, and with these hot summers, people might want to enjoy more conferences in the mountains in future, where it's a bit cooler, and also different concepts that combine education with hobbies. You could have alpine gardens and geotrails, something for every age group and something for everyone, and above all, you could focus more on people's own motor skills, rather than putting them on lifts and saying that the lift will do everything and then they come down with gravity, but instead encourage them to discover the mountains at a different pace. because what's the point if children only know the names of the slopes and no longer know any peaks or rivers and have no contact with nature? There is so much to do, the landscape is different every day, it's a bit like being at the sea, there is so much you could do, and in Switzerland there are projects on alternatives to winter tourism, how they have worked and what was particularly positive about them, and there is a common thread running through them all, where nature is still intact, where the local food is wonderful and can be enjoyed, and so on. These attractions are combined with culture, of course, but what we are doing now is ruining entire landscapes for the next few hundred years. It won't recover that quickly, even if we stopped today. Many of these winter sports areas are incompatible with summer tourism, which is also something to consider. The sooner we stop this gigantic expansion and development, the better. Then at least we would still have a few side valleys or a few corners left.

**But what will those who have already invested so heavily and built up a huge infrastructure on the mountain do? They probably have large debts to repay and therefore need to generate a lot of profit. What will they do?**

Of course, I'm no economist, and it also depends on the size of the area and whether they are structured differently, but I would say that the sooner they stop, the better, because I'm seeing it now in the low mountain ranges, ski resorts that are bankrupt and are now trying to invest again and are draining the finances of the local authorities, so that there is no longer

enough money for kindergartens or other developments, so that people are already suffering, but somewhere they know that it's actually no longer viable. So sometimes it's better to turn around sooner rather than later, and people can also settle into a new situation very quickly. We saw that with Covid, where everyone said beforehand that it wouldn't work, and sometimes positive things come out of it. But the real problem is whether it's really a decision made by the " " ski resorts, and a decision that is relevant to the survival and needs of the local population, because that's what it's all about. There are now increasing water conflicts. Drinking water is being tapped. Groundwater is being tapped. There are landslides and floods that have been artificially created on ski slopes because they were so poorly managed and compacted. The question is also who is more valuable and whether you can compare something in percentage terms or whether you can compare something in terms of area or numbers. (...) you simply have to apply a different measure of value and show a different respect for the living conditions of the local population, who are really trying to maintain them, because there is also the danger that more and more immigrants and people will arrive who are not so familiar with the area, who can be led by the nose [sic!] or manipulated because they do not know the local conditions so well. So my work is very closely linked to local stakeholders. Last year, I was in Cortina d'Ampezzo with about 25 stakeholders, ranging from lawyers and architects to ski instructors and so on, and I can learn much more from these people than from a hydrological model or a climate model, because a colleague of mine makes a climate model and publishes it and says that a certain ski resort can continue to exist for a long time and can cut back if it has enough water, but in reality this ski resort has already been written off and will close in two years, and there is such a divide between reality and what is actually happening and what is then theoretically calculated and modelled. So I think we need to completely change our approach and start with the needs of nature and the local population and, above all, take into account the experience of the local population, because there is also a huge discrepancy between the feedback I am getting now, even worldwide, from New Mexico, New Zealand, everywhere, and the feedback I'm getting now from the local population about the problems and how they see them, and they know because it's on their doorstep, and the statements from the ski resort operators, who are perhaps just administrators, i.e. they do administrative work, or engineers who have no knowledge or understanding of the natural environment, who then define a mountain valley as a bathtub, when building dams or on mountain slopes, they simply see them as ski slopes, but they don't understand the diversity behind them. They are only seen as objects, i.e. they have a certain gradient and are a certain length, but they are not seen as an enormously important part of the Alps.

### **We have to come to a conclusion. What future do you see for traditional ski tourism?**

Very little. As far as alpine ski tourism is concerned, it will continue for a few more years and then come to an end very quickly, because we are seeing temperatures rising due to climate change, even more than the models predict, and I think that will come to an end very quickly for various reasons, especially with regard to the issue of water and water availability.

### **What time frame are we talking about?**

Yes, of course, it doesn't depend so much on the altitude, but on the snowmaking, whether it's a snow hole and gets heavily snowed on or not, but even now there is no longer any guarantee of snow, because that would mean that the natural snow is sufficient. And even with snowmaking, high- e areas such as Corviglia and others are already affected by a lack of snow or by situations where snowmaking does not work. So I think that's well before 2050.

It will be ten years earlier for areas that are currently less well covered by snow and lie at lower altitudes.