

# The list of the world's 100 largest ski areas

2019/2020 season



V.2

SkiWeltweit



# Imprint

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Title: Hemsedal, Hochzillertal overlooking the Zillertal Arena

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# Introduction

## A new evaluation method for ski resorts!

For the majority of winter sports enthusiasts, the size of a ski resort is the most important criterion when choosing their destination for a holiday in the snow. The kilometres of slopes have always served both ski areas and snow sports enthusiasts as a benchmark for the size and variety of different resorts. Unfortunately, this scale was not always applied correctly: On January 27, 2013, Christoph Schrahe published an article in the *Frankfurter Allgemeine Sonntagszeitung* entitled "Die Vermessung der Pisten" ("The Measurement of the Pistes"), which revealed that many ski resorts used exaggerated numbers to promote their ski areas. This triggered an international media echo and finally a rethinking process in the ski industry - at least when it came to determining the length and communication of piste kilometres.

In 2013, the International Cable Car Association FIANET as well as the National Cable Car Associations made recommendations on how to determine the lengths of runs.

Since then, however, only a few ski resorts throughout the Alps have adjusted incorrect data, with the exception of Austria. Moreover, the recommendations of the national cable car associations are not consistent. From the customer's point of view, the situation is therefore still unsatisfactory.

Why is it that only a few ski resorts have been able to follow the recommendations and that the consistent measurement method has not been able to establish itself? Only by understanding this it is possible to develop an approach for measuring the size of ski areas that has the chance of being widely accepted.

When the topic of piste lengths circulated in the media in 2013, operators justified too high values by referring to a wide variety of other characteristics of their ski areas: particularly wide pistes, the total area covered by the piste, a large number of secured off-piste routes and much more.

## Time for a new standard

The reason for this was the desire for a unit measuring the value of a ski area.

From the operators' point of view, the lengths of runs often did not reflect a real length but a perceived "value" of a ski area, which also included aspects other than the real kilometres of slopes. After all, the communicated value should also serve to achieve a respective price - the correlation between lengths of runs and ticket price is well known.

Nevertheless, misstated lengths of runs are misleading. But for many ski resorts a correct indication of this length is one-dimensional. Therefore a new approach is needed to determine the "perceived value" of a ski area, also on the part of the guest, in an interbranch standardised way!

With the evaluation of ski areas developed by Montenius Consult, this perceived value is converted into a measurable value, based on empirically proven methods. This finally provides skiers with a consistent, independently determined benchmark that not only allows them to compare objective data from different ski resorts but also to compare their prices, because the value determines the price.

At the same time, the Montenius ski area evaluation takes into account the legitimate interests of the operators to include as many aspects as possible that define the value of a ski area.

## Concept of evaluation

What does the guest pay for when buying a ski pass? He pays for the key services of a ski resort: the lifts, the pistes and the snow covering them. For food and beverage, rental, ski school or childcare, the customer pays extra - they are not included in the price of the ski pass and can therefore not be subject of a ski resort valuation, which is comparable to the price of a ski pass.

Which are the objectively measurable factors that determine the value of a ski resort? A look at other product categories may help to answer this question. The various aspects that determine the price of hotels, cars or flights, for example, can essentially be summed up in the categories quantity, quality and reliability.

### What determines the price – examples from other product categories

Hotel	Breadth (e.g. Wellness)	Classification Certification	Brand
Cars	Space offer Equipment	Materials Finish	Breakdown stats Warranties
Flights	Flight distance Leg space	Booking class Service	Punctuality Accident stats
	↓	↓	↓
	Quantity	Quality	Reliability

### State of research

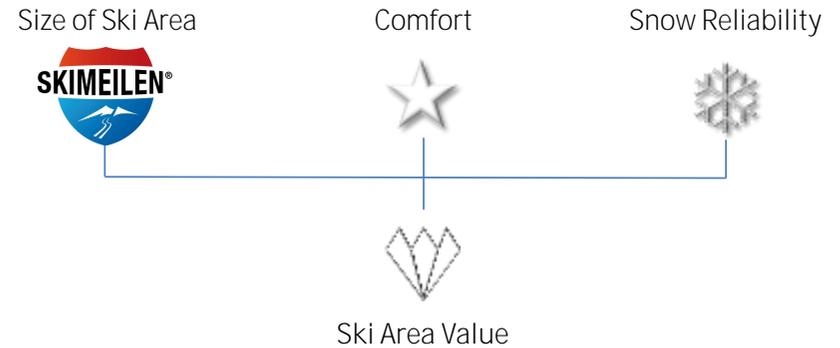
Many empirical studies have examined the evaluation of supply aspects in ski resorts. If their results are analysed in terms of factors related to ski resorts in the narrower sense (factors that have to be paid for with the ski pass), the following factors emerge as significant:

- Size of ski area (= Quantity)
- Comfort (= Quality) and
- Snow safety (= Reliability).

The Skimiles® were developed to measure the size of ski resorts. From now on they will also serve as a benchmark for *the list of the world's largest ski areas*. What is behind the Skimiles® is explained in detail on the following pages.

The combination of Skimiles® with the comfort and snow reliability of the ski resort results in the ski resort value, a standard with which the prices of ski passes can finally be compared and a price/performance ratio can be determined.

### Concept of the Montenius-Ski Area Valuation



### About the author

Christoph Schrahe worked for a travel agency and a provider of digital maps before moving into the tourism industry as a consultant in 1999 - as a result of a ski resort project he had developed in the Rothaargebirge. He created master plans for the development of winter sports offers for the Ministries of Economic Affairs of North Rhine-Westphalia, Thuringia and Lower Saxony. Together with the SLF in Davos he developed the simulation program SnowPlan.

The master plan for the Sauerland winter sports arena, which initiated projects to upgrade the winter sports infrastructure in the Sauerland region with an investment volume of around 140 million euros since 2000, was largely initiated by him.

Since 2008, Christoph Schrahe and his company Montenius Consult have been concentrating on consulting ski resorts and cable car companies, especially in the lower mountain regions of Germany and Bavaria, but he has also been active internationally with projects in Pakistan, Turkey and the Ukraine. He is a member of the supervisory board of Winterberg Schierke GmbH and a lecturer for ski resort planning at the FH Vorarlberg.

In addition, he is one of the best-known German authors in the field of winter sports. He has travelled to and described almost 500 ski resorts in 41 countries.

# 1. World's largest ski areas

## From length of runs to Skimiles® - the concept of rating the size

Advertisers love simple messages. The length of runs is almost perfect: a single, undisputedly meaningful number in a unit, which everyone uses continuously. The Skimiles®, on the other hand, include ten values, some in dimensions that are more difficult to comprehend. Sounds complicated. There are also ten disciplines in track and field. In the decathlon, the single performances are evaluated with points and the sum of the points decides who may call himself the greatest of all athletes. Those who can only run fast will lose at the end.

In order to determine which disciplines are particularly important for the size of a ski area, we did the obvious thing: asking skiers. The participants assessed the importance of the different factors regarding the perceived size of a ski area, distributing a total of 100 points.

They could assign them completely to one criterion or distribute them arbitrarily to different criteria. The most important criterion is the length of the runs (including ski routes) with 31.4 percent. It is followed by the skiable area with 14.6 percent, the elevation difference, the number of peaks and terrain pods with 11.1 percent, the area extent with 9.3 percent, the longest run with 7.1 percent, the extension with 7.9 percent and the length of the ski routes with 4.7 percent. A detailed explanation of these criteria can be found in the appendix, minor changes in the values compared to 2018/19 as a result of an extended sample of the underlying survey.

Before being able to determine the result of this decathlon with these values, the dimensions must be reduced to a common denominator, just like 70 metres in javelin throw and 2.00 metres in high jump. As with the decathlon scoring table, this can be achieved using the world record performances. This is for example 482 kilometres for the length of the runs (without cat tracks) and 116 square kilometres for the areal extent. In the decathlon, a maximum of 1,200 points can be achieved per discipline, for determining the size of the ski area 600 points are set (why is explained below).

The following table shows the result for the Skicircus Saalbach Hinterglemm Leogang with Fieberbrunn and Schmitten in Zell am See.

Criterion	Key figures Skicircus Saalbach	World-record	Maximum points for value...	achieved by Saalbach	Weight (according to survey)	Points (= achieved % x weight x 600 points)	
1	Pistes & Parks	257 km	482 km	400 km	72.9%	31.4%	137
2	„Skirouten“	34 km					
3	Catwalks	53 km	68 km	60 km	88.5%	4.7%	25
4	Skiable Area	1,207 ha	1,832 ha	1,800 ha	67.1%	14.6%	59
5	Boundary Area	60.5 km <sup>2</sup>	116 km <sup>2</sup>	100 km <sup>2</sup>	60.5%	9.3%	34
6	Extent	26.0 km	27.0 km	25 km	104.0%	7.9%	49
7	Vertical	1,203 m	2,345 m	2,200 m	60.7%	13.9%	51
8	Longest run	8.3 km	17.0 km	15.0 km	55.5%	7.1%	24
9	Summits	18	30	75	69.3%	11.1%	46
10	Pods	34	51				
Ski area size					69.6%	100.0%	425

The largest ski area in the world, the french Trois Vallées, scores 600 points according to this scheme. This corresponds with the length of 600 kilometres of runs that the three-valley ski area currently claims. The calculated score is therefore identical to the familiar value of the length of runs.

This makes sense, because it makes the calculated value more tangible. Calibrating with 600 points ensures that the results remain in familiar spheres. In order for this to apply to terminology as well, however, it should be left to the decathletes to measure themselves in points. Instead, the result of the size calculation is called Skimiles®. After all, miles already exist in various forms: as english, geographical, or nautical miles as well as for frequent flyers.

## The data basis for size assessment

In order to calculate the Skimiles®, the ten relevant values for a particular ski area must be recorded. This data acquisition is carried out regularly by Montenius Consult.

This also includes the digitalisation of runs in all major ski resorts around the world to determine the length of the runs. Therefore, the required data is already fully available - with one exception: the skiable area. This data is still being collected. Due to the complexity of the issue, this data acquisition involves a great amount of effort. Nevertheless, the number of ski areas whose skiable areas were estimated has been reduced from 42 to 27. A more detailed explanation can be found in the appendix. This number is to be further reduced by half for the coming season and the data collection is to be completed by the 2022/23 season. On the basis of the broadened database on skiable areas, the estimation method was further refined, so that the estimates can also be assumed to be more accurate.

For numerous ski resorts, however, the value of the skiable area is already available and the Skimiles® could be determined exactly. If there was no exact information available on the skiable area, this is indicated in the tables of the largest ski areas starting on the following page.

## With the Skimiles® the deck is reshuffled<sup>1</sup>

While there are hardly any changes in the rankings for some ski areas, others are climbing in the Skimiles ranking. For example, the Zillertal-Arena almost exactly achieves the rank it would have achieved with the 166 kilometres of pistes it once reported. Thanks to its large expanse and altitude difference, Sölden reaches the level it occupies with the currently communicated kilometres of pistes (which, however, are calculated on the basis of the area and do not have much in common with the actual length, as does Kronplatz which scores with a large skiable area). Engelberg, which offers a very large difference in altitude, also jumps in the Skimiles ranking to the position it would have taken with its incorrectly communicated 82 kilometres of pistes. Vail does well thanks to its vast expanse, while Kitzbühel loses some ranks due to its numerous cat tracks. Overall, ski areas with particularly large altitude differences benefit the most.

The impact of the Skimiles®						
Comparison of different approaches to size measurement						
Ski area	Length of runs <i>communicated</i> (current or maximum in the past)	Rank worldwide km communicated	Length of runs <i>measured</i>	Rank worldwide km measured		Rank worldwide Skimiles®
Hochzillertal-Hochfügen	91 km (181 km)	91. (20.)	84 km	95.	184 sm	57.
Engelberg	82 km	94.	38 km	296.	157 sm	83.
Les Trois Vallées	600 km	1.	553 km	1.	600 sm	1.
Garmisch Classic	40 km	263.	40 km	263.	124 sm	141.
Kitzbühel (main area)	195 km	17.	195 km	17.	271 sm	19.
Monterosaski	180 km	21.	80 km	102.	209 sm	43.
Espace San Bernardo	152 km	35.	152 km	35.	252 sm	25.
Sölden	143 km	36.	100 km	71.	218 sm	40.
Zillertal-Arena	132 km (166 km)	48. (25.)	129 km	48.	246 sm	28.
Corvatsch-Furtschellas	120 km	51.	43 km	243.	124 sm	138.
Kronplatz	116 km	55.	80 km	97.	175 sm	66.
Vail	234 km	14.	234 km	14.	319 sm	12.

<sup>1</sup>) This can be taken literally, because in cooperation with SkiMAGAZIN Christoph Schrahe has created the quartet card game "Die größten Skigebiet der Welt". You can order the card game at [www.sportcombishop.de/de/](http://www.sportcombishop.de/de/).

Top positions 1 to 24:

Top 100 – Skimiles®					
Positions 1-24					
Pos.	Ski area	Country	 SKIMEILEN®	Note	Length of runs (rank worldwide)
1	Trois Vallées	France	600 sm	Courchevel, Méribel, Les Menuires, Val Thorens, Orelle, St. Martin d. B.	553 km (1.)
2	Sella Ronda	Italy	517 sm	includes Alta Badia, Arabba, Gröden (without Seiser Alm), Canazei, Buffaure-Ciampac and Marmolada (without Fedaia)	353 km (3.)
3	Paradiski	France	461 sm	La Plagne and Les Arcs	408 km (2.)
4 (7)	Skicircus Saalbach	Austria	425 sm	Saalbach, Hinterglemm, Leogang, Fieberbrunn and Schmittenhöhe	345 km (4.)
	<i>Park City with Deer Valley</i>	<i>USA</i>	<i>418 sm</i>	<i>see page 13</i>	<i>381 km</i>
5	Ski Arlberg	Austria	387 sm	St. Anton, St. Christoph, Stuben, Zürs, Lech, Warth and Schröcken	288 km (6.)
6 (4)	Matterhorn Ski Paradise	Switzerland/Italy	378 sm	Zermatt, Breuil-Cervinia and Valtouranche	254 km (10.)
	<i>Big Sky with Yellowstone Club</i>	<i>USA</i>	<i>366 sm</i>	<i>see page 13</i>	<i>350 km</i>
7 (6)	Les Portes du Soleil	France/Switzerland	354 sm	Main area of Portes du Soleil between Morzine and Torgon	293 km (5.)
8	Whistler Blackcomb	Canada	344 sm		254 km (11.)
9 (10)	Voie Lactée / Via Lattea*	Italy/France	335 sm	<b>Sestrières, Montgenèvre, Sansicario, Sauze d'Oulx</b>	269 km (8.)
10 (15)	Park City	USA	324 sm	Park City and The Canyons, <u>without</u> Deer Valley	275 km (7.)
11	Grandes Rousses	France	323 sm	L'Alpe d'Huez, Auris-en-Oisans, Oz-en-Oisans and Vaujany	177 km (19.)
12	Vail	USA	319 sm		234 km (14.)
13 (9)	Espace Killy	France	319 sm	<b>Val d'Isère</b> and Lac de Tignes	241 km (13.)
14 (13)	Skiwelt Wilder Kaiser-Brixental	Austria	317 sm	without Kelchsau and Schwoich	266 km (9.)
15 (14)	Les 4 Vallées	Switzerland	314 sm	Main area between Bruson, Le Chable, Verbier and Veysonnaz/Thyon 2000	228 km (15.)
16	Les 2 Alpes	France	287 sm	incl. La Grave	153 km (33.)
17 (18)	Laax	Switzerland	275 sm	incl. Flims and Falera	165 km (25.)
17 (20)	Big Sky	USA	275 sm	incl. Moonlight Basin, <u>without</u> Yellowstone Club	245 km (12.)
19 (17)	Grand Massif*	France	271 sm	Flaine, Les Carroz, Samoëns, Morillon, Sixt	176 km (21.)
19	Kitzbühel (main area)	Austria	271 sm	Hahnenkamm, Pengelstein and Jochberg/Pass Thurn, Gaisberg	195 km (17.)
21 (22)	Silvretta Arena (Ischgl/Samnaun)	Austria/Switzerland	265 sm		171 km (24.)
22 (23)	Arosa Lenzerheide*	Switzerland	262 sm		173 km (23.)
23 (21)	Espace Diamant*	France	260 sm	Praz-sur-Arly, Crest Voland Co., Flumet, Hauteluce, Les Saisies, N.D. de Bellecombe	195 km (16.)
24	Snowmass	USA	252 sm		177 km (20.)

\*) estimated value taken into account for skiable area (4 ski areas of 26 compared to 8 in 2018/19)

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 24 to 50:

Top 100 – Skimiles®					
Positions 24-50					
Pos.	Ski area	Country		Note	Length of runs (rank worldwide)
24 (25)	Serfaus-Fiss-Ladis	Austria	252 sm		162 km (30.)
24 (26)	Espace San Bernardo	France/Italy	252 sm	La Thuile (Italy) and La Rosière (France)	152 km (34.)
27 (29)	Serre Chevalier	France	247 sm	Briançon, Le Monétier-les-Bains, La Salle-les-Alpes, Saint-Chaffrey	164 km (27.)
28	Zillertal-Arena	Austria	246 sm	Zell a. Ziller, Gerlos, Königsleiten, Hochkrimml	129 km (47.)
29 (27)	Les Sybelles*	France	243 sm	Le Corbier, La Toussiere, Saint Colomban des Villards, <b>Saint Jean d'Arves and Saint Sorlin d'Arves</b>	164 km (26.)
30	Skirama Dolomiti*	Italy	242 sm	Madonna di Campiglio, Pinzolo, Folgarida, Marilleva	129 km (46.)
31	Tres Valles*	Chile	240 sm	Valle Nevado, La Parva, El Colorado and Farellones	182 km (18.)
32	Beaver Creek	USA	240 sm		162 km (29.)
33 (41)	Mayrhofen	Austria	233 sm	now including Ahorn	126 km (49.)
34 (33)	Evasion Montblanc*	France	232 sm	Megève, St-Gervais-les-Bains, Saint-Nicolas de Verocé	163 km (28.)
35 (34)	Grandvalira*	Andorra	231 sm	Soldeu, El Tarter, Pas de la Casa, Grau Roig, Canillo, Encamp	175 km (22.)
36 (37)	Silvretta Montafon	Austria	225 sm	Schruns, St. Gallenkirch, Gortipohl, Gaschurn	123 km (51.)
37 (39)	Parsenn-Weissfluhjoch	Switzerland	223 sm	Davos, Klosters, Küblis	90 km (86.)
38 (36)	Grande Domaine*	France	221 sm	Valmorel, Saint-Françoise-Longchamp, Combelouvière	138 km (40.)
39 (38)	4 Berge Ski - Schladming	Austria	221 sm	Schladming, Rohrmoos, Pichl, Haus im Ennstal	139 km (39.)
40	Sölden	Austria	218 sm		100 km (70.)
41 (45)	Galibier-Thabor*	France	214 sm	Valloire, Valmeinier	143 km (36.)
42 (35)	Rosa Khutor/Alpica/Gazprom*	Russia	209 sm	Esto-Sadok, Krasnaya Polyana	137 km (41.)
43 (46)	Monterosaski*	Italy	209 sm	Champoluc, Gressoney, Alagna Valsesia	80 km (101.)
44 (43)	Breckenridge	USA	208 sm		172 km (23.)
45 (42)	Mt. Bachelor	USA	205 sm		135 km (43.)
45 (48)	Aletsch Arena	Switzerland	205 sm	Riederalp, Bettmeralp, Fiescheralp	92 km (81.)
47 (44)	Baqueira Beret	Spain	202 sm		159 km (31.)
47	Forêt Blanche*	France	202 sm	Vars, Risoul	140 km (37.)
49	Copper Mountain	USA	200 sm		140 km (38.)
50 (53)	Revelstoke Mountain Resort	Canada	199 sm		108 km (61.)

\*) estimated value taken into account for skiable area (10 of 24 ski areas)

Top positions 50 to 75:

Top 100 – Skimiles®					
Positions 51-75					
Pos.	Ski area	Country		Note	Length of runs (rank worldwide)
50	Alta-Snowbird	USA	196 sm		154 km (32.)
50 (51)	Steamboat	USA	196 sm		116 km (55.)
53 (54)	Jungfrauregion	Switzerland	195 sm	Main area Männlichen–Kleine Scheidegg-Lauberhorn (Grindelwald, Wengen)	99 km (72.)
53	Winter Park	USA	195 sm		133 km (44.)
55 (56)	Telluride	USA	191 sm		125 km (50.)
55 (57)	Sun Peaks	Canada	191 sm		146 km (35.)
57 (55)	Val Cenis*	France	188 sm		100 km (69.)
58	Mythenregion/Sattel/Hoch-Ybrig*	Switzerland	186 sm		97 km (75.)
59 (60)	Hochzillertal – Hochfügen	Austria	184 sm	Kaltenbach	84 km (94.)
60 (63)	Snow Space Salzburg	Austria	182 sm	Wagrain, Alpendorf, Flachau	107 km (62.) 
61 (59)	Keystone	USA	180 sm		132 km (45.)
62 (61)	La Clusaz-Manigod	France	180 sm		101 km (68.)
63 (62)	Hochkönig	Austria	180 sm	Maria Alm, Dienten, Mühlbach	96 km (77.) 
64 (65)	Adamelloski*	Italy	180 sm	Ponte di Legno, Passo Tonale	71 km (115.)
65 (68)	Kronplatz	Italy	175 sm		80 km (98.)
65 (73)	Panorama	Canada	175 sm		112 km (59.) 
67	Obersaxen–Surcuolm–Lumnezia*	Switzerland	170 sm		104 km (66.)
68	Adelboden-Lenk*	Switzerland	170 sm		98 km (74.)
69 (75)	Saas Fee	Switzerland	170 sm		51 km (195.)
70 (74)	Espace Lumière*	France	168 sm	Pra-Loup, La Foux d'Allos	101 km (67.)
71 (72)	Powder Mountain	USA	168 sm		136 km (42.)
72 (71)	Morzine-Les Gets	France	166 sm		122 km (52.)
73 (76)	Sierra Nevada	Spain	166 sm		109 km (60.)
74 (64)	Mürren	Switzerland	165 sm		49 km (213.)
75 (66)	Grimontz-Zinal*	Switzerland	165 sm		84 km (93.)

\*) estimated value taken into account for skiable area (6 ski areas of 25 compared to 12 in 2018/19)

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 76 to 100:

Top 100 – Skimiles®						
Positions 76-100						
Pos.	Ski area	Country		Note		Length of runs (rank worldwide)
76 (70)	Ski Gastein	Austria	163 sm	Skischaukel Schloßalm-Angertal-Stubnerkogel		90 km (87.)
77 (80)	Formigal	Spain	162 sm			118 km (53.)
78 (77)	Alp 2500*	Spain	161 sm	La Molina, Masella		116 km (56.)
79 (86)	Heavenly	USA	160 sm			98 km (73.)
80 (78)	Crans Montana	Switzerland	159 sm			81 km (97.)
81	Mammoth	USA	159 sm			128 km (48.)
81 (83)	Tourmalet*	France	159 sm	Barèges, La Mongie		73 km (112.)
81 (85)	Jackson Hole	USA	159 sm			94 km (79.)
84 (83)	Killington*	USA	157 sm			116 km (57.)
85 (88)	St.Moritz–Corviglia/Piz Nair	Switzerland	155 sm			73 km (111.)
86 (90)	Flumserberge	Switzerland	155 sm			70 km (126.)
87 (79)	Obertoggenburg	Switzerland	155 sm	Wildhaus, Unterwasser, Alt St. Johann		75 km (108.)
88 (87)	Silver Star	Canada	154 sm			113 km (58.)
89 (94)	Hintertuxer Gletscher	Austria	153 sm			53 km (181.)
90 (89)	Åre	Sweden	153 sm			92 km (82.)
91 (84)	Engelberg-Titlis*	Switzerland	153 sm			38 km (295.)
92 (91)	Sunshine Village	Canada	152 sm	Banff		91 km (84.)
93	Nassfeld	Austria	150 sm			79 km (102.)
94 (92)	Big White	Canada	149 sm			104 km (65.)
95	Trevalli*	Italy	148 sm			56 km (165.)
96	Lake Louise	Canada	147 sm			82 km (95.)
97	Mondole Ski	Italy	147 sm			69 km (128.)
98 (100)	Stubai Gletscher	Austria	147 sm			54 km (177.)
99	Wildkogel-Arena	Austria	146 sm			67 km (134.)
100 (98)	Fernie Alpine Resort	Canada	145 sm			96 km (76.)

\*) estimated value taken into account for skiable area (7 ski areas of 25 compared to 12 in 2018/19)

## Length of runs is not the only thing - those who are not among the biggest despite their length

A total of 14 ski areas that are not among the top 100 in terms of length of runs have moved among the 100 largest ski areas in terms of Skimiles® thanks to other factors. Engelberg jumped from rank 295 to rank 90, Müren from 213 to 71 and Saas Fee from 195 to 69. The reason for this was the exceptionally big difference in altitude as well as outstanding values for the longest run. Together, these categories contribute 21 percent to the Skimiles® value.

On the other hand there were 16 ski areas which, despite being ranked in the top 100 in terms of length of runs, are not among the 100 largest ski areas in the world according to the Skimiles®:

▪ Trysil, Norway	117 km (54.)	137 sm (115.)
▪ Deer Valley, USA	106 km (63.)	143 sm (101.)
▪ Perisher, Australia*	99 km (71.)	137 sm (116.)
▪ Northstar California, USA*	92 km (80.)	126 sm (138.)
▪ Sugarloaf, USA*	92 km (83.)	141 sm (105.)
▪ Tremblant, Canada	89 km (90.)	127 sm (130.)
▪ Schweitzer, USA*	87 km (91.)	120 sm (151.)
▪ Sugarbush, USA*	87 km (92.)	129 sm (126.)
▪ Mt. Hood Meadows, USA*	81 km (96.)	128 sm (133.)
▪ Whitefish Mtn. Resort, USA*	80 km (99.)	122 sm (148.)
▪ Sunday River, USA*	80 km (100.)	129 sm (139.)
▪ Solitude-Brighton, USA*	93 km (79.)	136 sm (119.)
▪ Snowbasin, USA*	89 km (88.)	134 sm (125.)
▪ Squaw Valley, USA*	89 km (89.)	135 sm (115.)
▪ Yellowstone Club, USA*	105 km (64.)	142 sm (104.)
▪ Red Resort, Canada*	90 km (85.)	138 sm (112.)

While in the case of Trysil it is mainly the numerous cat tracks (41 km) through the holiday homes that lead to fewer Skimiles®, in the typically more compact North American ski areas it is the small extensions and altitude differences that cause downgrades. In the Australian Perisher it was particularly the low altitude difference of 390 m - no other ski area accommodates so many kilometres of pistes with so little relief energy.

## The seal *Verified Length of Runs*

The seal 'Verified Length of Runs' has the idea to restore transparency and comparability for customers with a standardised measuring method: Skiers who see the seal on the website, in the brochures or on the panoramic maps of a ski area can be sure that everything is included and nothing is missing. Thus the seal not only serves the guests but also a fair competition.

The Skicircus Saalbach Hinterglemm Leogang was the first ski area in the Alps to use the seal in the 2015/16 season.

Besides the Skicircus, Kitzbühel also uses the seal. The Bergbahnen Kitzbühel see themselves as active supporters of the idea to implement a seal as the next step towards more honesty in communication with customers, according to their CEO Dr. Josef Burger. "We hope that many more cable car companies will follow our example," said Burger at the award ceremony.

Another 13 ski areas in Austria, Germany, Greece and the USA were certified for the winter 2016/17. For the 2019/20 season the first Canadian ski resort joined the network: Panorama Mountain Resort.

The number of ski areas whose data do not quite correspond to reality is still in the majority. Especially in Switzerland there are many ski areas that exaggerate, but also in France exaggerated data are widespread. Austria, on the other hand, has the highest proportion of ski areas that declare what they owe their customers and what should be taken for granted: correct figures.

More information can be found at [www.pistenlaengen.com](http://www.pistenlaengen.com).



## What actually is a ski area?

The basis for comparing the size of different ski areas is, of course, not only the designation of suitable criteria for size measurement, but also an exact, uniformly applied definition of a ski area.

In this report, a ski area is always defined as an area linked by lifts and/or ski runs. This means that ski bus connections included in the lift ticket do not transform two ski areas into one, whereas a connecting cable car does, even if it is not possible to switch between the two areas on a piste (as is the case, for example, in the Silvretta Montafon ski area in Austria).

Especially in the largest ski resorts, which often extend over several valleys, it happens that different areas are separated by roads and these roads cannot be crossed on a ski bridge or through a ski tunnel. Ski or board must be taken off and carried across. As long as the distance to be covered on foot does not exceed 400 metres<sup>1</sup>, the area is considered to be a linked area. If this distance is also covered by a bus, so much the better, but 500 meters of distance lead to a split even though the bus is there. This is the case, for example, in Flachauwinkel, from whose opposite side of the valley there is access to the Zauchensee and Kleinarl ski areas, or in Megève.

This special treatment of buses may seem random. However, it should be borne in mind that if buses are included as transport facilities which link spatially separated ski areas to form contiguous ski resorts (provided that their use is free with the ski pass), entire regions would suddenly become contiguous ski areas: the Zillertal, Davos-Klosters, the Engadin, the Saanenland. A corresponding approach would be far from practical - even if skiers in some ski areas do use short, closely timed ski bus connections to switch between different areas during the day, such as in the Tuxertal (Eggalm Glacier) or between Kühtai and Hochoetz.

This differentiation is of great importance for the ranking of ski areas in the top 100: although Portes du Soleil is marketed as the largest ski area in the world with 650 kilometres of slopes, it actually consists of two large connected and three smaller ski areas.

<sup>1</sup> A distance of 400 metres is used internationally as the limit of the "walking distance to the lifts", for example when planning accommodation, parking spaces etc.

## Hidden giants in North America

A special case is formed by ski areas that are physically connected to each other but do not offer common ski passes and position themselves as separate ski areas on the market. This applies to Deer Valley and Park City in Utah and Big Sky and Yellowstone Club in Montana. While Park City has the option of buying two lift tickets (expensive but possible), the other case requires a club member (e.g. Bill Gates) to invite you to the private ski resort Yellowstone Club (possible but unlikely). Park City and Deer Valley combine for 418 Skimiles®, which puts them in 5th place worldwide. Big Sky, including the Yellowstone Club, achieves 366 Skimiles®, making it number 7 worldwide.

## Die Skimeilen® - ein neues Instrument für die Kommunikation

With the Skimiles® there is a new tool to communicate the size of a ski area. The advantage: In addition to the pure length of runs in kilometres, Skimiles® also takes other relevant aspects of a ski area into account: the skiable area, the difference in altitude, the extension, etc.

In addition to the seal Verified Length of Runs, Montenius Consult also awards a seal that certifies the Skimiles® of a ski area.

Example of the Skimiles®-Seal



The Skimiles® value is linked to the familiar value of kilometres of pistes and the SkIMAGAZIN is indicating the Skimiles® for all the ski areas described. In the course of 2020 there will be further activities to increase the awareness of the new unit. The most important contribution to this could be made by the ski resorts themselves - by stating Skimiles® instead of kilometers of pistes.

## 2. The most powerful lift networks

### Introduction and method

Vertical Transport Capacity is a somewhat awkward term one might not have come across yet. However, there is a good reason why this figure is being looked at first in this report. The Vertical Transport Capacity in metres (VTM) is the most suitable figure for comparing the performance of a ski area's lift system.

The VTM of a single lift is calculated by multiplying the transport capacity (in persons per hour) with the vertical metres covered. The sum total of all the lifts in one resort is the total VTM per hour.

So why is this figure so important? The answer is straightforward: winter sports enthusiasts, be they skiers or boarders, want to spend as much time on the slopes, and not wait in the queue. They are here for the number of times they tackle the slopes and want to cover as many metres as possible. Long slopes equal many vertical metres and the sooner one is back up on the mountain again, the better. The higher the VTM, the better the chance to achieve just that.

If one assumes that an average skier wants to cover 3000 vertical metres during one day, he has to use a lift providing 500 vertical metres six times. If this lift has an hourly capacity of 2000 persons and if one lap (ascent and descent) takes 20 min, this lift will allow 667 guests to meet this target within two hours (667 persons x 3000 vertical metres = 2 Mio. VTM/h = 2000 pers/hr. x 500 vertical metres x 2 hrs.). If the lift has a capacity of 1000 people per hour, only 333 persons can meet their target of 3000 altitude metres with this mean of transport.

This means that the larger the VTM, the more persons with a certain target of vertical metres per day can be accommodated. In other words, a larger number of persons can be catered for. In the Dolomiti Superski resort, for example, this demand reaches 4000 vertical metres per day; in smaller ski resorts it can be as low as 2000 vertical metres.

The VTM is also suitable when compared to the bed capacities within the accommodations of the resort, indicating potential crowding at the resort during high season and resulting in waiting times at the lifts.

The method to calculate the VTM is easy and was already explained in the introduction: The total of vertical metres by capacity of all lifts within the skiing resort.

To make the comparison easier, this figure is expressed in a specific timeframe, an hour. Establishing the total VTM of a resort per season would be too complicated as daily opening times (incl. night skiing) and opening days per season would have to be included.

Newly opened lifts for the 2019/20 season have been included as far as information was available.



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## News for the 2019/20 season

Changes resulted from the construction of many new, partly high-capacity lifts for the 2019/20 season. However, these were only partly lifts that led to expanding ski areas; most of the new lifts are just replacing existing lifts as in previous years.

An exception was the first section of the zellamseeXpress in Viehofen, which creates a connection between the ski areas of Saalbach and Schmitzen - even though this has so far only been open in one direction, as you have to take a ski bus for the return journey from Viehofen to Saalbach. Due to the connection the Skicircus Saalbach (now with Zell am See) climbed from sixth to fourth place.

Probably the world's largest cable car project for winter 2019/20 was the K-Connection from Maiskogel near Kaprun to the Kitzsteinhorn. Although the cable car itself is purely a feeder line and its transport capacity is therefore not included in the total sum for the new interconnected ski area, the area with its facilities near the village and on the glacier now makes it into the top 100.

The Mayrhofen-Lanersbach ski area climbs five positions, not because of a new lift, but because the Ahorn is now considered part of this ski area and not as a separate resort. A decision that was not an easy one, as one has to take a long cable car down from the Penken (no downhill run) and then has to walk about 400 meters to the bottom station of the Ahornbahn.

This was taken as an opportunity to indicate those ski areas in the following lists where such or similar restrictions on connections exist.

Overall, the transport capacity of the top 15 was increased much more strongly (+3.3%) than in the previous year (+1.2%), mainly due to the Saalbach connection.

The most powerful new cable car was built in Kitzbühel. The new Fleckalmbahn reaches 2.55 million VTM per hour in one section. The new Planaibahn has 4.08 million VTM in two sections, the Männlichenbahn in Grindelwald reaches 2.31 million VTM. All the lifts are ten-seater gondolas, one from Leitner, one from Doppelmayr and one from Garaventa.

Les deux Alpes is the only established ski area that has four new lifts for the 2019/20 season. Ski resorts which went into operation for the first time in winter 2019/20 installed more lifts: Idre Himmelfäll in Sweden installed eight and Xiaohaituo in China, the venue for the Alpine competitions at the Winter Olympics in Beijing in 2022, nine of them - but it has not been clarified whether these lifts will be available to the public.

New additions to the top 100 in the 2019/20 season are Chamonix Brévent - Flégère and Gudauri. With the exception of Shiga Kogen, there were no significant shutdowns of lifts in the top 100 over the summer of 2019.

The changes are indicated in the tables on the following pages as follows:

	Winner – better ranking than last season
	Looser – worse ranking than last season
	Ranking like last season
	Newcomer – in the Top-areas for the first time

## Top 100 – the most powerful lift networks

The most powerful lift system of all ski areas worldwide have the French Three Valleys (Trois Vallées). In second position is Sella Ronda with just 66 percent of the vertical transport capacity of the leader in the Vanoise mountains. Closely followed by Paradiski, also located in the Vanoise, in 3rd place.

Just behind in 4th place is the newly connected ski area, which stretches from Fieberbrunn in Tyrol via Saalbach to Zell am See. The main area of Portes du Soleil follows at some distance in 5th place, closely followed by the third mega ski area in the Vanoise, Espace Killy. The largest Swiss ski area follows in ninth place.

Austrian ski areas are represented 26 times in the top 100 rankings as well as France, Switzerland follows with 13 and Italy with nine ski areas. Cross border ski areas are always counted for both countries. Only 32 non-alpine resorts made it to the top 100: 15 US-ski areas, one Canadian, five ski areas in the Pyrenees (two in Spain and in France and one in Andorra), three Japanese, two Russian and one each in Chile, Sweden, Argentina, Slovakia, Georgia and another one in Spain.

Of the 16 North-American ski areas amongst the Top 100, only five have made it to the Top 50 and only two are amongst the Top 25.

Top positions 1 to 25:

Top 100 – Vertical Transport Capacity				
Positions 1-25 (last year's position in brackets)				
Pos.	Ski area	Country	VTM/hr.	Note
1	Trois Vallées	France	107.117.371	1
2	Sella Ronda*	Italy	70.823.903	1, 2
3	Paradiski (La Plagne/Les Arcs)*	France	70.730.066	1
4 (6)	Skicircus Saalbach /Zell am See**	Austria	68.248.953	
5 (4)	Les Portes du Soleil	France/Switzerland	53.316.734	1, 3
6 (5)	<b>Espace Killy (Val d'Isère/Tignes)</b>	France	51.026.475	
7	Skiwelt Wilder Kaiser/Brixental	Austria	49.772.245	
8	Ski Arlberg*	Austria	46.283.285	4
9	Matterhorn Ski Paradise	Switzerland/Italy	40.294.441	5
10	Silvretta Arena (Ischgl/Samnaun)	Austria/Switzerland	39.518.370	
11	Park City mit Deer Valley	USA	36.206.932	6
12 (13)	Les 4 Vallées	Switzerland	34.676.027	1, 7
13 (12)	Le Grand Massif	France	34.045.354	
14	Kitzbühel*	Austria	32.520.284	8
15 (16)	Via Lattea	Italy/France	31.484.297	
16 (18)	Zillertal Arena	Austria	31.281.996	9
17 (15)	4 Berge Ski – Schladming	Austria	30.863.835	
18 (17)	Whistler/Blackcomb	Canada	30.783.262	
19	Skirama Dolomiti*	Italy	30.708.043	1
20 (25)	Mayrhofen-Lanersbach*	Austria	30.034.450	1, 10
21	Sölden	Austria	28.503.961	
22 (23)	Serre Chevalier	France	28.085.543	
23 (20)	Grandes Rousses	France	27.621.872	11
24 (22)	Snow Space Salzburg	Austria	27.525.069	12
25 (24)	Hochzillertal-Hochfügen	Austria	26.963.978	

\*) partly connections with cable cars without ski runs \*\*) connection without gaps only in one direction

Notes:

1) Lifts that serve just for access to a ski resort and do not serve any runs (piste or “Skiroute”) are not included in the totals for VTM/hr.

2) The Sella Ronda ski area includes lifts and slopes in the Grödner valley (not including Seiser Alm), all lifts in the Hochabteital, Arraba, Marmolada (excluding Fedaiia) as well as Canazei (excluding base lift Avisio, Alba Ciampac).

3) The VTM includes the main area of Portes Du Soleil between Morzine (France) and Torgon (Switzerland) and the lifts of Avoriaz, Châtel, Champéry, Champoussin and Morgins as well as La Chapelle d'Abondance. In Morzine, the distance to the Morzine/Les Gets area is outside the accepted walking distance of 400 m, thus creating a separate resort.

4) Ski Arlberg is the combination of the resorts of St. Anton, St. Christoph, Stuben, Zürs, Lech and Warth.

5) Zermatt, Cervinia and Valtourenche: lifts which are only operating during the summer, are not included.

6) The ski areas are physically connected, but do not offer a combined ski pass. During the Ski Utah Interconnect Tours you can ski both.

7) The total includes the lifts in between Bruson, Le Chable, Verbier and Veysonnaz/Thyon 2000.

8) The “Skigrossraum” of Kitzbühel includes the areas between Hahnenkamm, Pengelstein and Jochberg/Pass Thun. Not included (as they are not directly linked) are Kitzbüheler Horn and Bichlalm.

9) Due to the opening of the ski run down to the valley in the 2015/16 season, the former access lifts are now also included in the total sum of the Zillertal Arena.

10) Ski area of Penken, Rastkogel, Eggalm, now with Ahorn

11) The Grandes Rousses include the lifts of L'Alpe d'Huez, Auris-en-Oisans, Oz-en-Oisans and Vaujany.

12) Previously known under the name Flachau-Wagrain-Alpendorf.

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 26 to 50:

Top 100 – Vertical Transport Capacity				
Positions 26-50 (last year's position in brackets)				
Pos.	Ski area	Country	VTM/hr.	Note
26	Kronplatz	Italy	26.587.368	
27 (28)	Grandvalira	Andorra	25.043.656	13
28 (27)	Serfaus-Fiss-Ladis	Austria	24.365.030	
29	Rosa Khutor*	Russia	24.124.802	
30	Arosa Lenzerheide*	Switzerland	23.808.474	
	<i>Park City</i>	USA	<i>23.806.991</i>	
31	Les 2 Alpes	France	23.666.837	1
32	Vail	USA	23.105.045	
33	Megève (Arbois-Rochebrunne)	France	23.697.742	14
34	Les Sybelles	France	21.976.172	
35	Silvretta Montafon*	Austria	21.877.257	
36	Espaces Diamantes	France	20.635.761	
37	Espace San Bernardo	Italy/France	20.194.561	15
38	Morzine-Les Gets	France	19.981.547	16
39 (41)	Hochkönig	Austria	19.886.879	17
40 (39)	Laax	Switzerland	19.709.810	
41 (43)	Galibier Thabor	France	19.472.535	18
42 (40)	Baqueira/Beret	Spain	18.460.167	
43 (42)	Grand Domaine	France	18.415.885	19
44	Ski Gastein	Austria	17.104.317	20
45	Nassfeld	Austria	16.982.352	
	<i>Big Sky/Yellowstone Club</i>	USA	<i>16.310.510</i>	21
46 (47)	La Clusaz	France	15.798.083	
47 (48)	Mammoth Mountain	USA	15.600.836	
48 (49)	Obergurgl-Hochgurgl*	Austria	15.558.535	
49 (50)	Hintertuxer Gletscher	Austria	15.494.683	
50 (51)	Beaver Creek	USA	15.101.486	

\*) partly connections with cable cars without ski runs

Notes:

1) Lifts that serve just for access to a ski resort and do not serve any slope are not included in the totals for VTM/hr.

13) Grandvalira is the interconnected ski area of the resorts of Pas de la Casa, Grau Roig, Soldeu, El Tarter and Canillo.

14) Including Saint Gervais und St Nicolas de Vérocé.

15) Espace San Bernardo is the linked ski area of La Thuile (Italy) and La Rosière (France).

16) This resort is part of the Portes du Soleil ski region but not linked with the main area between Morzine and Torgon (see note 3). It is therefore categorized as a resort of its own, including Mont Chéry.

17) Includes the lifts of Mühlbach-Dienten-Hinterthal-Aberg, Natrun, the Faschinglifte and Sonnleitenlift. The lifts in Hinterreit and Hintermoos and the lifts of Hochkeil are not included.

18) Galibier Thabor is the linked ski area of the resorts of Valloire and Valmeinier.

19) The Grand Domaine includes the ski resorts of Valmorel and Saint Francois Longchamp.

20) Ski Gastein Includes „Skischaukel“ Schloßalm-Angertal-Stubnerkogel. The resorts of Sportgastein and Graukogel are not included.

21) These ski areas are physically linked, but only members and their guests have access to the Yellowstone Club.

Top positions 51 to 75:

Top 100 – Vertical Transport Capacity				
Positions 51-75 (last year's position in brackets)				
Pos.	Ski area	Country	VTM/hr.	Note
51 (52)	Adamello ski	Italy	15.034.396	22
52 (53)	Forêt Blanche	France	14.755.339	23
53 (54)	Squaw Valley	USA	14.741.467	
54 (55)	Monterosa Ski	Italy	14.411.089	24
55 (56)	Breckenridge	USA	14.342.503	
56 (57)	Naeba-Kagura*	Japan	14.170.884	1, 25
57 (58)	Val Cenis	France	13.997.035	
58 (59)	Sierra Nevada	Spain	13.781.740	
59 (69)	Jungfrauregion	Switzerland	13.547.624	1, 26
60	Stubai Gletscher	Austria	13.326.503	
61	Killington	USA	13.175.762	
62	Steamboat	USA	13.038.872	
63	Obertauern	Austria	12.892.021	
64 (65)	Keystone	USA	12.578.959	
65 (64)	L'Espace Lumière	France	12.436.280	27
	<i>Deer Valley</i>	<i>USA</i>	<i>12.583.614</i>	
66	Mellau-Damüls	Austria	12.531.688	
67	Kitzsteinhorn-Maiskogel*	Austria	12.483.313	
68	Tres Valles	Chile	12.409.930	28
69 (71)	Alta-Snowbird	USA	12.280.408	
70 (72)	Snowmass	USA	12.213.254	
71	Winter Park	USA	11.881.574	
72 (73)	Crans Montana	Switzerland	11.822.500	
73 (67)	Shiga Kogen	Japan	11.685.182	29
74	Jasná	Slovakia	11.661.553	
75 (87)	Aletsch Arena	Switzerland	11.564.750	1, 30

\*) partly connections with cable cars without ski runs

Notes:

1) Lifts that serve just for access to a ski resort and do not serve any slope are not included in the totals for VTM/hr.

22) Ponte di Legno, Temu and Passo Tonale with Presena glacier.

23) Forêt Blanche includes the stations Vars und Risoul.

24) Monterosa Ski includes the resorts of Alagna Valsesia, Tschaval, Gressoney-la-Trinite, Frachey and Champoluc.

25) In the Nineties these areas had 54 lifts with 16.9 Mio. VTM/hr., following a decrease of visitation a lot of lifts ceased operation.

26) Includes the ski area of Männlichen–Kleine Scheidegg-Lauberhorn. Schilthorn and First are regarded as separate ski areas.

27) Includes the stations Pra Loup and La Foux d'Allos.

28) Includes the resorts of Valle Nevado, La Parva, El Colorado and Farellones.

29) In the Nineties these areas had 55 lifts with 14.5 Mio. VTM/hr., following a decrease of visitation a lot of lifts ceased operation.

30) Bettmeralp, Riederalp and Fiesch/Kühboden

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 76 to 100:

Top 100 – Vertical Transport Capacity				
Positions 76-100 (last year's position in brackets)				
Pos.	Ski area	Country	VTM/hr.	Note
76	Skijuwel Alpachtal-Wildschönau*	Austria	11.428.755	
77 (86)	Copper Mountain	USA	11.362.763	
78	Adelboden-Lenk	Switzerland	11.341.940	1, 31
79	Davos Parsenn-Weissfluhjoch	Switzerland	11.259.680	
80	Alp 2500	Spain	11.253.020	32
81 (77)	Le Grand Bornand	France	11.261.735	
82 (81)	Sheregesh	Russia	11.165.096	
83 (82)	Dorfgastein-Großarl	Austria	11.150.309	
84 (83)	Niseko United	Japan	11.081.800	
85 (85)	Les Sept Laux	France	10.919.434	
86 (90)	Big Sky	USA	10.724.813	33
87	Chamonix Brévent – Flégère*	France	10.694.660	
88	Civetta	Italy	10.535.697	
89	St.Moritz Corviglia-Piz Nair	Switzerland	10.497.280	
90 (84)	Gran Catedral (Bariloche)	Argentina	10.449.584	
91 (92)	Heavenly	USA	10.421.808	1
92 (91)	Åre	Sweden	10.267.660	34
93	Les Contamines Montjoie	France	10.202.684	
94 (95)	Flachauwinkel-Zauchensee	Austria	10.033.342	
95	Gudauri	Georgia	9.969.600	
96	Bad Kleinkirchheim/St. Oswald	Austria	9.968.638	
97	Saint Lary Soulan	France	9.968.271	
98	Roccaraso-Rivisondoli	Italy	9.943.602	1
99 (94)	Villars-Gryon-Meilleret*	Switzerland	9.942.485	
100	Tourmalet	France	9.790.136	

\*) partly connections with cable cars without ski runs

Notes:

31) Includes the main area between Adelboden and Lenk without Betelberg, but with Tschentalp and Chuenisbärgli.

32) Linked ski areas La Molina and Masella

33) Includes the lifts of the former independent stations Spanish Peaks and Moonlight Basin.

34) Without Duved-Tegelfjäll

# 3. The most comfortable ski areas

## Introduction

Providing comfort costs money - this applies to comfort when going uphill (by lift) as well as comfort when skiing downhill on the piste. A ten-seater gondola with heated seats costs much more than a button lift of the same length. On the way from the top to the bottom, the space on the slopes and the quality of the snow determine whether the guest is feeling comfortable or not.

## The concept of measuring the comfort

The following figure shows how the Montenius comfort evaluation scheme works. Lift comfort, the demand of rides, the waiting times and skiing comfort together result in the ski area comfort rating.



## Up the hill comfortably - the lift riding comfort

The following theses on lift comfort served as the basis for the development of a evaluation methode:

- the faster a lift, the better the comfort
- the more complete the weather protection, the more comfortable it is to use
- Sitting during the ride is more comfortable than standing
- it is more comfortable to get into a standing vehicle than to get into a slow or even fast vehicle
- difficulties in use (correct timing, coordination of movements, balancing uneven surfaces, etc.) reduce comfort
- the way of ski transport influences the comfort of the ride, it is most unfavourable if the skis or boards have to be held in the hand, holding devices are better, it is best to be able to keep the skis at the feet
- on the other hand a high degree of freedom while the vehicle is in motion is positive
- level-walk-in, conveyor belt access and lifting tables increase ease of entry
- a longer distance between the vehicles relaxes the boarding situation and thus increases comfort
- heated seats additionally increase comfort
- spacious gondolas in which you are able to stand upright are more comfortable than less spacious gondolas
- padded seats are more comfortable than unpadded ones
- Wi-Fi additionally increases the comfort of a ride.

For the operationalization, six main characteristics were initially selected and their potential values were located on a ten-point scale. After that, 30 common types of lifts were assigned a corresponding scale value for each of these main characteristics. For the speed feature for example, the fastest lifts (aerial tramways with 12 m/s) have a maximum value of 10, magic carpets a value of 1.

The following figure illustrates the six main features and their scaling.

### Scheme to determine an underlying value for Lift Riding Comfort

Feature		Punkte		Punkte		Punkte
Speed	Fast	10	average	5	slow	1
Weather protection	full	10	partly	7	none	0-3
Posture	sitting	10	ajar	5	standing	0
Boarding	idle	10	moving slowly	5	moving fast	2
Difficulty	easy	10	advanced	5	difficult	0
Ski transport	on feet	10	at cabin	5	in hands	0

To derive a base value for each type of lift, a weighting of the features is required, which was determined as follows:

- Speed 10%
- Weather protection 20%
- Posture 20%
- Boarding 20%
- Difficulty 15%
- Ski transport 15%.

On the basis of this weighting, these results are used as base values for some of the 30 types of lifts taken into account:

- Pulsed gondola with seats 8.8 points
- Gondola with seats 8.2 points
- Detachable chairlift with covers 7.2 points
- Fixed grip chairlift 4.9 points
- Button lift 3.6 points
- T-bar lift 3.2 points.

By using such base values, a number of factors do not need to be determined in detail for each lift, as they are already included in the coverage of the lift type.

A table in the appendix shows the respective ratings for all types of lifts. Whether the difference in the rating would have to be bigger, for example to better reflect the cost ratio of the different types of lifts, could be clarified in the context of the proposed study. Some cost-driving factors will be considered as bonus factors in this methodology:

- Access conveyor belt +0.400 points
- Heated seats +0.400 points
- Chair distance >5 sec, per extra second +0.125 points
- Level-walk-in for gondolas +0.600 points
- Wi-Fi +0.300 points
- Lifting table at chair boarding point +0.200 points
- Child protection +0.200 points.

The cabin size of gondola lifts and the seating comfort of chair lifts are taken into account as a negative factor in relation to the age of the lifts, since exact information on cabin and chair types is less available than the years of construction:

- Built before 1980 -1.500 points
- Built 1980-1989 -1.000 points
- Built 1990-1999 -0.500 points
- Built 2000-2009 -0.250 points
- Built since 2010 no deduction.

Once a comfort value has been determined on this basis for each individual lift in a ski area, the overall evaluation follows. For this purpose, the different lifts have to be weighted. This weighting is based on the vertical transport capacity (VTM = transport capacity in persons per hour x altitude difference of the lift), as the particularly powerful lifts of a ski area also carry a particularly large number of guests who can enjoy the comfort of these high-performance lifts.

The following table illustrates the determination of the lift comfort value using the Oberjoch ski area as an example. The database of Montenius, which includes a total of 18,000 lifts, makes it possible to carry out this evaluation.

### Determination of Lift Riding Comfort for Oberjoch ski area

Lift (Year of construction)	Type	Under lying value	Bonus Malus	VTM	Weight	Value weight- ed
Grenzwies (2015)	6 CLD-B	7.15	+1.54	756,000	25.6%	2.22
Idealhang	T-bar lift	3.15	+0.00	82,908	2.8%	0.09
Iseler (2001)	6 CLD-B	7.15	+0.25	957,600	32.4%	2.40
Wiedhag (2015)	6 CLD-B	7.15	+1.54	893,200	30.2%	2.62
Zubringer (2015)	8 CLD-B	7.15	+1.86	263,200	8.9%	0.80
Oberjoch ski area total				2,952,908	100.0%	<b>8.13</b>

### Addition for the 2019/20 season: Demand of rides

Another aspect of comfort when using lifts is the number of lift rides required to reach the personal need for vertical meters. This personal need varies greatly depending on the ability of the skier. Over all target groups, including beginners and experts, it averages around 4000 vertical meters per ski day.

In a ski area where the longest lift covers 200 vertical metres, you have to make 20 runs, i.e. stop 20 times at the valley station, loosen the buckles of your ski boots, join a queue if necessary, pass the turnstile and so on. This takes time, specially in queues, even five minutes per ride add up to more than one and a half hours per day. If a ski resort has a lift covering 1000 metres of altitude, four rides are sufficient to cover the personal needs.

For this reason, the weighted vertical distance of the lift fleet has now also been included in the comfort rating. The weighting is based on the transport capacity of each individual lift in relation to the total transport capacity of the ski area. The weighted vertical difference of the lifts in larger ski areas is usually around 450-500 meters, but can also be 650 meters and more. So on average, eight to nine rides are required to ski 4000 vertical meters.

### Addition for the 2019/20 season: Waiting time

How much time is lost at the bottom stations of the lifts depends on the actual waiting times, which can cost not only time but can also be nerve-wracking and reduce comfort without a doubt. For this reason, an additional indicator has now been included in the evaluation of the comfort of a ski area, which allows at least an estimation of the expected waiting times.

This is the ratio of transport capacity to skier visits per season. Of course, the significance of this quotient differs depending on the duration of the season and the usual proportion of lifts actually open. Actually, one would have to relate the actual transport capacity achieved per season and not the transport capacity achieved per hour to the number of visits, or even better, the actual number of visitors on the ten busiest days to the capacity available at that time. In addition, the skiers' profile in the area in question should also be taken into account: in ski areas with more difficult pistes, guests ski more vertical meters than in those with predominantly blue runs. However, the results do not differ significantly from those of the simplified analysis even though the effort involved is considerably higher (and data availability is poor).

### Down the hill comfortably – the skiing comfort

The term "comfortable piste capacity" is used in ski resort planning and in skier flow analyses. This number indicates how many snow sports enthusiasts can be on the slopes at the same time without the feeling of overcrowding. The absolute number of skiers per hectare depends on the inclination, width, but also on the part of the world for which such observations are made - Koreans and Japanese are less sensitive to a lack of space. All empirical studies carried out on this topic (e.g. by the University of Innsbruck) ultimately come to the conclusion that the fewer other skiers there are, the more comfortable a ski run is perceived.

Downhill comfort could therefore be operationalised in a manageable way by relating the number of snow sports enthusiasts in a ski area to the area available to them for skiing. Although data on the number of simultaneous guests on peak days is far from being available for all ski resorts, the transport capacity of the lifts provides a suitable substitute. The guests of a ski resort can only ski downwards as much as they are transported upwards. A lift with a capacity of 2,400 people per hour simply allows twice the number of guests to ski a certain number of pistes as a lift with a capacity of 1,200 people. If both operate the same piste, it is twice as full. The available skiable

area per 1.0 million VTM is weighted at 70 percent. The relevant benchmark is 120 hectares per 1.0 million VTM/h.

In addition to the available space, the condition of the surface under the skis determines the comfort of the ski-run. Therefore, a further criterion for the evaluation of skiing comfort is the proportion of the groomed area in relation to the total piste area. In many alpine ski resorts, this is 100 percent, but in some North American ski resorts it is less than 40 percent. The share of the groomed area is weighted at 30 percent.

Based on this, the skiing comfort is calculated as follows:

$$70\% \times \left( \left( \frac{\text{Skiable area in ha}}{1,0 \text{ Mio. VTM/h}} \right) / 100 \text{ ha} \right) + \frac{\text{Groomed surface in ha}^*}{\text{Skiable area in ha}^{**}} \times 30\%$$

*\*) The area not groomed daily is only weighted at 50%, \*\*) Hike-to-terrain and terrain accessible by snow cat for which a fee is charged are not taken into account.*

More detailed information on the methodology for measuring skiing comfort can be found at the following link: <http://www.skigeietsbewertung.de/skiing-comfort.html>.

#### Note on the quality of grooming

Of course, the condition of a piste also plays an important role for skiing comfort. Various companies award ski resorts for the quality of their piste preparation.

The quality of the snow cover on the pistes depends to a large extent on the amount of work involved in piste grooming and the know-how of the operators, but ultimately also on the prevailing snow and weather conditions. In principle, these natural effects would have to be excluded from the result, as in ski jumping, which would be extremely difficult from a methodological point of view.

In addition, a daily and area-wide survey of the piste condition would be a prerequisite for a valid statement as to whether the quality of the piste preparation in ski area A is better than in ski area B. The effort involved would be unreasonably high.

## Overall rating - ski area comfort

Combining lift and skiing comfort as well as the demand of rides and waiting times into one value for ski area comfort presents a number of methodological challenges. Firstly, because the range of values for skiing comfort is much bigger, and secondly, because of the question of what importance should be assigned to these aspects.

In North America, the focus of ski resort operators is more on creating the largest possible number of pistes than in Europe, where the competition is more based on the quality of the lift system. These cultural differences will not be fully reflected by any weighting.

The following weighting was applied to evaluate the comfort for the 2019/20 season:

- |                       |     |
|-----------------------|-----|
| ▪ Lift riding comfort | 35% |
| ▪ Demand of rides     | 15% |
| ▪ Waiting time        | 5%  |
| ▪ Skiing comfort      | 45% |

The general weightings for lift and skiing comfort are currently the subject of a survey at <http://www.skigeietsbewertung.de/your-rating.html>.

## Top 50 – the most comfortable of the world’s largest ski areas

The most comfortable ski area in the world is the Kronplatz in the Dolomites. Although it is only ranked in the middle of the top 100 in terms of skiing comfort, the very long and very comfortable lifts put the area in first place.

This is followed by Canadian ski areas in the next five ranks. In total, the country has seven resorts in the top 50. The USA has 6 rankings, Switzerland 17, Austria 15, Italy five, France two - the result of the extensive lack of particularly comfortable chair lifts and the tendency towards very close-meshed networks of lifts – and Spain one. Oberjoch, Germany's most comfortable ski area, scored 6.26 points, which would be enough for a Top 25 ranking here if it belonged to the club of the 100 largest areas.

Since the skiable area had to be estimated for eight of the 50 listed ski areas, there may still be considerable shifts in the ranks when the measurements are completed.

Top positions 1 to 25:

Top 50 – Ski area comfort (only ski areas which are among the 100 largest according to the Skimiles® are considered)								
Positions 1-25 (the respective positions within the 100 largest ski areas by Skimiles® are indicated)								
Pos.	Ski area	Country	Lift riding comfort Index	Vertical per lift	VTM per skier visit	Area / 1 Mio. VTM	Skiing comfort	Ski area comfort
1	Kronplatz	Italy	8.50 (1.)	781 m	20.3	19.92 ha	4.48 (54.)	7.20
2	Revelstoke Mountain Resort	Canada	6.73 (27.)	652 m	32.9	58.41 ha	5.85 (14.)	7.15
3	Panorama	Canada	5.78 (69.)	447 m	21.2	86.76 ha	8.08 (1.)	7.12
4	Lake Louise	Canada	5.98 (53.)	471 m	14.0	82.91 ha	7.90 (3.)	7.01
5	Silver Star	Canada	6.08 (50.)	422 m	12.3	91.30 ha	7.90 (2.)	6.90
6	Sun Peaks	Canada	5.51 (81.)	453 m	15.5	92.86 ha	7.88 (4.)	6.83
7	Skischaukel Schloßalm-Angertal-Stubnerkogel	Austria	7.67 (3.)	885 m	22.6	14.84 ha	3.39 (97.)	6.70
8	Männlichen–Kleine Scheidegg-Lauberhorn	Switzerland	7.08 (16.)	686 m	20.3	28.62 ha	4.79 (40.)	6.62
9	Saas Fee	Switzerland	6.25 (45.)	636 m	17.4	36.72 ha	5.59 (18.)	6.52
10	Laax	Switzerland	6.82 (24.)	618 m	22.0	32.18 ha	5.03 (35.)	6.51
11	Wildkogel Arena	Austria	7.51 (5.)	659 m	26.8	20.07 ha	3.96 (78.)	6.47
12	Parsenn–Weissfluhjoch	Switzerland	6.58 (32.)	556 m	18.3	36.52 ha	5.56 (19.)	6.45
13	<i>Mythenregion/Sattel/Hoch-Ybrig*</i>	<i>Switzerland</i>	<i>5.23 (96.)</i>	<i>373 m</i>	<i>37.8</i>	<i>57.45 ha</i>	<i>6.61 (6.)</i>	<i>6.42</i>
14	Matterhorn Ski Paradise	Switzerland/Italy	6.95 (21.)	713 m	18.4	22.89 ha	4.34 (59.)	6.39
15	Snowmass	USA	5.74 (71.)	504 m	15.3	72.69 ha	6.42 (7.)	6.36
16	<i>Obersaxen–Surcuolm–Lumnezia*</i>	<i>Switzerland</i>	<i>5.95 (54.)</i>	<i>467 m</i>	<i>24.1</i>	<i>45.16 ha</i>	<i>5.97 (12.)</i>	<i>6.33</i>
17	Grandes Rousses	France	5.85 (63.)	474 m	17.3	45.35 ha	6.29 (8.)	6.32
18	Aletsch Arena	Switzerland	6.98 (19.)	538 m	17.8	28.10 ha	5.00 (36.)	6.29
19	Mt. Bachelor	USA	5.60 (77.)	485 m	19.4	81.19 ha	6.22 (9.)	6.27
20	Skicircus Saalbach-Hinterglemm-Leogang-Fieberbrunn mit Zell am See	Austria	7.69 (2.)	603 m	19.3	21.03 ha	3.92 (80.)	6.23
21	Hochzillertal - Hochfügen	Austria	7.34 (11.)	691 m	26.3	11.44 ha	3.43 (96.)	6.23
22	Zillertal Arena	Austria	7.41 (8.)	650 m	20.8	14.98 ha	3.78 (85.)	6.22
23	Formigal	Spain	5.39 (91.)	339 m	18.7	60.89 ha	6.87 (5.)	6.13
24	Telluride	USA	5.93 (55.)	406 m	15.5	63.65 ha	6.10 (11.)	6.07
25	<i>Trevalli*</i>	<i>Italy</i>	<i>6.14 (48.)</i>	<i>425 m</i>	<i>25.5</i>	<i>32.40 ha</i>	<i>5.36 (22.)</i>	<i>6.05</i>

\*) skiable area estimated (3 ski areas in total)

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 26 to 50:

Top 50 – Ski area comfort (only ski areas which are among the 100 largest according to the Skimiles® are considered)								
Positions 26-50 (the respective positions within the 100 largest ski areas by Skimiles® are indicated)								
Pos.	Ski area	Country	Lift riding comfort Index	Vertical per lift	VTM per skier visit	Area / 1 Mio. VTM	Skiing comfort	Ski area comfort
26	Nassfeld	Austria	6.55 (35.)	653 m	22.5	19.58 ha	3.97 (76.)	6.03
27	Sunshine Village	Canada	6.47 (39.)	399 m	16.0	52.53 ha	5.59 (18.)	6.02
28	Obertoggenburg	Switzerland	6.49 (37.)	552 m	20.0	29.12 ha	4.60 (48.)	6.02
29	Monterosaski*	Italy	6.56 (34.)	516 m	24.6	21.27 ha	4.45 (55.)	5.98
30	Silvretta Arena	Austria/Switzerland	7.40 (9.)	621 m	19.7	17.41 ha	3.45 (95.)	5.97
31	Mayrhofen-Lanersbach	Austria	7.53 (4.)	581 m	19.4	15.95 ha	3.56 (92.)	5.97
32	Sella Ronda/Marmolada	Italy	6.95 (20.)	415 m	18.1	26.02 ha	4.91 (37.)	5.96
33	Arosa Lenzerheide*	Switzerland	6.44 (40.)	501 m	18.0	27.77 ha	4.83 (40.)	5.94
34	Crans-Montana	Switzerland	6.41 (41.)	529 m	18.9	23.62 ha	4.66 (45.)	5.94
35	Sölden	Austria	7.16 (15.)	584 m	16.8	17.42 ha	3.88 (81.)	5.93
36	Snow Space Salzburg	Austria	7.43 (6.)	561 m	13.1	17.66 ha	3.96 (77.)	5.93
37	4 Berge Ski - Schladming	Austria	7.38 (10.)	574 m	16.3	17.31 ha	3.77 (86.)	5.93
38	Engelberg-Titlis*	Switzerland	7.19 (14.)	510 m	24.2	15.72 ha	3.83 (83.)	5.90
39	Adelboden-Lenk*	Switzerland	6.68 (28.)	411 m	13.7	30.49 ha	5.19 (30.)	5.89
40	Powder Mountain	USA	5.42 (89.)	327 m	23.3	67.12 ha	6.16 (10.)	5.89
41	Serfaus-Fiss-Ladis	Austria	7.42 (7.)	518 m	13.9	22.70 ha	4.03 (74.)	5.88
42	Beaver Creek	USA	5.83 (65.)	490 m	16.5	53.12 ha	5.26 (27.)	5.87
43	Les Trois Vallées	France	6.52 (36.)	543 m	18.1	20.88 ha	4.54 (51.)	5.87
44	Skiwelt Wilder Kaiser-Brixental	Austria	6.74 (26.)	559 m	22.0	20.39 ha	3.94 (79.)	5.87
45	Hahnenkamm-Ehrenbachhöhe-Jochberg-Pass Thurn	Austria	7.24 (13.)	521 m	25.1	17.78 ha	3.58 (91.)	5.85
46	Grimentz-Zinal*	Switzerland	5.52 (80.)	499 m	19.4	36.82 ha	5.28 (24.)	5.85
47	Whistler Blackcomb	Canada	6.35 (43.)	662 m	12.8	37.14 ha	4.05 (73.)	5.84
48	Hochkönig	Austria	7.28 (12.)	495 m	22.6	18.52 ha	3.73 (87.)	5.82
49	St. Moritz Corviglia Piz Nair	Switzerland	6.81 (25.)	414 m	18.7	23.85 ha	4.67 (43.)	5.81
50	Big Sky	USA	5.84 (63.)	394 m	17.9	63.28 ha	5.52 (20.)	5.80

\*) skiable area estimated (7 ski areas in total)

## 4. The most popular ski areas

### Introduction

The installation of lifts and slopes over widely-stretched areas and large vertical drops ultimately serves only one purpose: to gather as many visitors for a ski resort as possible. Whether a ski resort is successful in doing so, is expressed in the number of skier visits. This figure is seen as the key indicator to measure success in the ski business. The number of visits does not only depend on the attractiveness and size of a ski area. There are ski resorts that have more visits than others that are ten times larger. An extreme example of this are the indoor ski slopes, which generate more visits than many medium-sized alpine ski area on a minimal surface. The proximity to metropolitan areas and the relative competitive positioning are factors that may cause visits widely above or below averages for ski areas of the same size. The number of hot beds also is a significant factor to draw visitation. The length of the ski season also plays a role. Especially in Korea, Canada and the United States, numerous ski areas generate additional visits by offering nightskiing – sometimes on a large scale and seven days a week.

### Method

Only a few ski resorts publish the number of their visits, this applies in particular to those in Austria and now also in North America. Therefore it is quite difficult to determine the top 100 in terms of visits. Whenever possible, official figures from the annual reports of the cable car companies were used. Some figures could be taken from the press. An important source was the list of the 100 largest French ski resorts, which is published annually by the magazine *Montagnes Leaders*, and the "International Report on Snow & Mountain Tourism" by Laurant Vanat, which contains information on how the total demand in various countries has developed. In order to achieve the most complete compilation possible, however, estimates had to be used. These estimates could partly - but not always - be validated by data on valleys, ticket associations or federal states. Estimates based on data for the 2018/19 season are shown in *italics*. Where older data were used, the figures are marked *red*.

A good 90 percent of the following data relates to the 2018/19 season. Thus, the rankings reflect the regional differences in this season. Colorado and Utah had a very good

year. This was due in part to the low-cost season passes Epic Pass and Ikon Pass, which offered skiers many days of skiing thanks to excellent snow conditions. Switzerland experienced rising numbers for the second year in a row. In France, the development was heterogeneous with an overall stagnating market, with some ski resorts reporting growth and others losing visitors. Ski resorts in the Pyrenees were unable to repeat the previous winter's good performance, but the Sierra Nevada in southern Spain had a record year. The large holding companies also had varying degrees of success. Increases in the ski areas of the Vail Resorts were contrasted by slight declines at Skistar, the winter in Scandinavia was poor in snow and in Austria, where Skistar operates a resort, the figures were also down on the previous year. The US East Coast benefited from very good snow conditions.

### Top 100 – the most visited ski areas

By far the most visited ski area in the world are the Trois Vallées in France. Of the world's 400 million skier visits this one area accounts for over 1.5 percent. In places two to five follow Paradiski, the Sella Ronda, the Skicircus Saalbach, which was extended by Zell am See for the 2019/20 season, and the Esapce Killy. The top 5 ski areas thus account for about 5 percent of global business, while they represent just 0.1 percent of **the world's total of roughly over 5,000 ski areas.**

Austria is home to 22 of the top 100 ski areas (previous year: 25), while France has 20 (22). The USA has 17 ski areas (16) in the top 100. Switzerland is represented with ten ski areas (three of which are cross-border, eight the previous year). Italy has nine listings, Canada has four ski areas in the top 100, with only one in the top 50.

The most frequented non-alpine ski areas are ranked 8th (Whistler Blackcomb), 15th (Vail), 18th (Grandvalira), and 22nd (Mammoth, Breckenridge, Bukovel).

23 ski resorts outside the Alps and North America make it into the top 100: Japan is represented with four, Sweden and Spain with three resorts each, Norway, Poland and Russia with two resorts. Andorra, China, Australia, Bulgaria, Korea, Ukraine and Slovakia each have their top ski resort in the Top 100.

In total, the most popular 100 ski resorts worldwide account for around 130.3 million visits (+2.3 percent compared to 127.4 million last year). This means that around two percent of the ski resorts cover one third of the total market. In total, the 100 most popular ski areas worldwide account for around 126.3 million visits (+2.2 percent compared to the previous year's 123.6 million). This means that around two percent of the ski areas account for a good 30 percent of the total market.

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 1 to 25:

Top 100 – Skier visits				
Positions 1-25				
Pos.	Ski area	Country	Skier visits	Note
1	Trois Vallées	France	5.870.673	Season 2018/19, Source: Montagnes Leaders
2	Paradiski	France	4.787.320	Season 2018/19, Source: Montagnes Leaders
3	Sella Ronda	Italy	ca. 3.909.182	Estimation for 2018/19, based on data on skier visits in Alta Badia, Gröden, Val di Fassa, Arabba and Marmolada as well as on data for South Tyrol and Trentino
4 (7)	Skicircus Saalbach-Hinterglemm mit Zell am See	Austria	3.528.022	Calculated value for the connection realised for the 2019/20 season, based on data for the 2018/19 season, source: Cable car companies (5% deducted for pedestrians at Schmittenhöhe)
5 (4)	Espace Killy	France	2.946.057	Season 2018/19, Source: Montagnes Leaders
6 (5)	Les Portes du Soleil	France/Switzerland	ca. 2.856.338	Source: Montagnes Leaders (Avoriaz 1,097,568 and Châtel, La Chapelle-d'Abondance estimated), LV (Champéry), Morgins based on Annual Report 2016/17 (200.000), Torgon estimated (60,000)
7 (6)	Skirama Dolomiti	Italy	2.855.405	Season 2018/19, Source: Annual Reports
8	Ski Arlberg	Austria	ca. 2.400.000	Estimation for season 2017/18
8	Whistler Blackcomb	Canada	ca. 2.400.000	Estimation for season 2017/18
10	Skiwelt	Austria	ca. 2.260.000	Estimation for 2016/17 based on previous years and development Austria
11	Matterhorn Ski Paradise	Switzerland/Italy	2.195.500	Season 2018/19 for Zermatt, incl. summer skiing, Source data Cervinia (706,500 for 2017/18): University of Bergamo
12	Snow Space Salzburg	Austria	2.100.000	Season 2018/19, Source: Management
13	Les 4 Vallées	Switzerland	2.046.919	Season 2018/19, Source: Laurent Vanat and Annual Reports (for Telethyon, 2017/18)
14 (12)	Silvretta Skiarena	Austria/Switzerland	2.010.000	Season 2018/19, Source: Press release, „the threshold of 2.0 million was reached on 29 April 2019“
15 (20)	Vail	USA	ca. 1.900.000	Estimation based on total number of visits in ski areas of the Vail Resorts (14.998 Mio., Source: Annual Report, probably incl. 220.000 visits in June and July in Hotham and Falls Creek)
16 (14)	Schladming/Vier Berge	Austria	ca. 1.900.000	Estimation based on total number of Ski amadé of around 7.8 Mio. in 18/19 (Source: Press release)
17 (15)	Le Grand Massif	France	1.833.667	Season 2018/19, Source: Montagnes Leaders
18 (16)	Grandvalira	Andorra	1.800.000	Season 2018/19, Source: lugaresdenieve.com
19 (17)	Serfaus-Fiss-Ladis	Austria	ca. 1.750.000	Estimation for 2016/17 based on season 2013/14 and development Austria
20 (19)	Sölden	Austria	ca. 1.700.000	Estimation for season 2017/18 based on season 2010/11 and development Austria
21 (18)	Via Lattea	Italy/France	1.696.488	Season 2018/19, Source: Montagnes Leaders (Montgenevre) and University of Bergamo (others)
22 (37)	Mammoth Mountain	USA	ca. 1.600.000	Source: Ski Inc. 2020
22 (25)	Breckenridge	USA	ca. 1.600.000	Season 2018/19, Source: see Vail
22 (21)	Bukovel	Ukraine	1.600.000	Season 2015/16, Source: Press release citing numbers
25	Grandes Rousses	France	1.596.431	Season 2018/19, Source: Montagnes Leaders

Top positions 26 to 50:

Top 100 – Skier visits				
Positions 26-50				
Pos.	Ski area	Country	Skier visits	Note
26 (23)	Mayrhofen-Lanersbach	Austria	ca. 1.550.000	Estimation based on season 2010/11 and development Austria
26 (29)	Park City	USA	ca. 1.550.000	Season 2018/19, estimation based on total number of visits in ski areas of the Vail Resorts (see Vail) and number of visits in Utah in 2018/19 (5.125 Mio.)
28 (27)	Zillertal Arena	Austria	ca. 1.500.000	Estimation for 2017/18 based on season 2012/13 and development Austria
29 (28)	Kronplatz	Italy	ca. 1.337.220	Source: LV/Prof. Andrea Macchiavelli, University of Bergamo basis 2017/18 and decline Dolomiti Superski 2018/19 (-3.1%)
30 (34)	Evasion Montblanc (Megève)	France	1.346.298	Season 2018/19, Source: Montagnes Leaders (deducted share of Les Contamines 420,000, estimation based on previous years)
31 (36)	Arosa Lenzerheide	Switzerland	1.323.325	Season 2018/19, Source: Annual Report
32 (31)	Kitzbühel (Hauptgebiet)	Austria	ca. 1.297.278	Estimation based on Kitzski total (1.5 Mio. in 2017/18, Source: Cable car companies) and development Austria
33 (35)	Serre Chevalier	France	1.264.822	Season 2018/19, Source: Montagnes Leaders
34 (40)	Les Sybelles	France	1.205.659	Season 2018/19, Source: Montagnes Leaders
35 (41)	Espace Diamant	France	1.204.231	Season 2018/19, Source: Montagnes Leaders
36 (37)	Rosa Khutor/Alpica/Gazprom	Russia	ca. 1.200.000	Season 2018/19, estimation based on completed connection
36 (66)	Jasná	Slovakia	ca. 1.200.000	Season 2018/19, estimation based on visits TMR: 2.706 Mio. (Source: Annual Report)
36 (46)	Winter Park	USA	ca. 1.200.000	Season 2018/19, estimation based on total visits in Colorado (13.8 Mio. in 2018/19)
39 (33)	Les 2 Alpes/La Grave	France	1.186.717	Season 2018/19, Source: Montagnes Leaders
40 (30)	Morzine-Les Gets	France	1.168.651	Season 2018/19, Source: Montagnes Leaders
41 (55)	Alta-Snowbird	USA	ca. 1.150.000	Season 2018/19, estimation based on skier days Utah in 2018/19 (5.125 Mio.)
42	Silvretta Montafon	Austria	ca. 1.150.000	Estimation
43	Trysil	Norway	1.121.000	Season 2018/19, Source: Annual Report Skistar
44 (54)	Copper Mountain	USA	ca. 1.100.000	Season 2018/19, estimation based on total visits in Colorado (13.8 Mio. in 2018/19)
45 (22)	Naeba-Kagura	Japan	1.063.850	Season 2018/19, Source: <a href="https://www.town.yuzawa.lg.jp/kanko/kankou/kankou_toukei.html">https://www.town.yuzawa.lg.jp/kanko/kankou/kankou_toukei.html</a>
46 (58)	Steamboat	USA	ca. 1.050.000	Season 2018/19, estimation based on total visits in Colorado (13.8 Mio. in 2018/19)
47 (45)	Galibier Thabor	France	1.110.994	Season 2018/19, Source: Montagnes Leaders
48 (50)	La Forêt Blanche	France	1.090.503	Season 2018/19, Source: Montagnes Leaders
49 (47)	Keystone	USA	ca. 1.050.000	Season 2018/19, estimation based on Vail Resorts total (see Vail)
50	La Clusaz-Manigod	France	1.034.869	Season 2018/19, Source: Montagnes Leaders

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 51 to 75:

Top 100 – Skier visits				
Positions 51-75				
Pos.	Ski area	Country	Skier visits	Note
51 (60)	Sierra Nevada	Spain	1.029.036	Season 2018/19, Source: Annual Report (5% deducted for pedestrians)
52 (49)	Hochzillertal-Hochfügen	Austria	ca. 1.025.000	Estimation
53 (52)	Åre	Sweden	ca. 1.022.400	Annual Report 2018/19, estimation based on 1,278,000 in Åre/Duved in total
54 (53)	Hintertuxer Gletscher	Austria	ca. 1.000.000	Estimation
54	Heavenly	USA	ca. 1.000.000	Season 2018/19, estimation based on Vail Resorts total (see Vail)
56 (65)	Kitzsteinhorn-Maiskogel	Austria	ca. 975.070	Season 2017/18, Source: Annual Report (5% deducted for pedestrians), calculated value for the connection realised in season 2019/20
57 (37)	Stubai Gletscher	Austria	975.000	Season 2018/19, Source: ski area
58 (62)	Grande Domaine	France	932.687	Season 2018/19, Source: Montagnes Leaders
59 (55)	Bansko	Bulgaria	ca. 950.000	Estimation
60 (64)	Beaver Creek	USA	ca. 915.000	Season 2018/19, estimation based on Vail Resorts total (see Vail)
61 (59)	Lindvallen/Högfjället	Sweden	899.000	Season 2018/19, based on 1,669,000 in Sälen in total (Source: Annual Report Skistar)
62 (68)	Laax	Switzerland	896.582	Season 2018/19, Source: Annual Report (around 20,000 visits deducted for pedestrians)
63 (44)	Hochkönig	Austria	ca. 880.916	Season 2018/19, estimation based on Ski amadé total (7.8 Mio. in 18/19, Source: Press release)
64 (61)	Baqueira/Beret	Spain	876.008	Season 2018/19, Source: lugaresdenieve.com
65 (67)	Perisher	Australien	845.000	Season 2017, Source: Annual Report Vail Resorts
66 (72)	Adelboden-Lenk	Switzerland	ca. 800.000	Season 2018/19, estimation based on 1,187,374 visits in this region
67 (69)	Adamello ski	Italy	818.437	Season 2017/18, Source: University of Bergamo
68 (32)	Shiga Kogen	Japan	ca. 809.034	2018, Source: (www.pref.nagano.lg.jp/kankoki/sangyo/kanko/toukei/documents/h30-31skikekka.pdf)
69 (70)	Squaw Valley	USA	ca. 809.000	Season 2017/18, estimation based on visits Squaw/Alpine in total
70 (71)	Sheregesh	Russia	800.000	Season 2017/18, Source: Laurent Vanat
71	Snowmass	USA	ca. 799.000	Season 2018/19, estimation based on Aspen Skiing Company total 2018/19 (1.55Mio.)
72 (77)	Tremblant	Canada	ca. 790.000	Estimation
73 (80)	Espace San Bernardo	Italy/France	777.622	Season 2018/19, Source: Montagnes Leaders /University of Bergamo
74 (73)	Ski Center Latemar	Italy	ca. 772.000	Season 2018/19, Estimation
75 (63)	Alp 2500	Spain	770.874	Season 2018/19, Source: lugaresdenieve.com

Top positions 76 to 100:

Top 100 – Skier visits				
Positions 76-100				
Pos.	Ski area	Country	Skier visits	Note
76 (75)	Tandådalen/Hundfjället	Sweden	770.000	Season 2018/19, based on 1,669,000 in Sälen in total (Source: Annual Report Skistar)
77 (51)	Ski Gastein	Austria	ca. 757.500	Season 2018/19, estimation based on Ski amadé total of 7.8 Mio. (Source: Press release)
78 (76)	Nassfeld	Austria	ca. 754.000	Estimation
79 (81)	Killington	USA	ca. 750.000	Season 2018/19, estimation based on total visits in Vermont (4.178 Mio. in 2018/19)
80 (78)	Northstar California Resort	USA	ca. 750.000	Season 2018/19, estimation based on Vail Resorts total (see Vail)
81 (96)	Solitude-Brighton	USA	ca. 750.000	Season 2018/19, estimation based on skier days Utah in 2018/19 (5.125 Mio.)
82 (79)	Daemyung Vivaldi Park	Korea	715.885	Season 2016/17 (lower figures can be expected for 2018/19)
83 (94)	Jackson Hole	USA	715.500	Season 2018/19, Source: Press release
84 (82)	Val Cenis	France	703.729	Season 2018/19, Source: Montagnes Leaders
85 (83)	Obergurgl-Hochgurgl	Austria	703.000	Source: management (without year specification)
86 (84)	Niseko United	Japan	ca. 700.000	Estimation
87 (85)	Le Grand Bornand	France	678.612	Season 2018/19, Source: Montagnes Leaders
88 (87)	Skijuwel Alpachtal-Wildschönau	Austria	ca. 676.000	Estimation
89	Jungfrauregion (Kerngebiet)	Switzerland	Ca. 666-000	Season 2018/19, Estimation based on total visits incl. First and Mürren (1,029,777, Source: Annual Report)
90	Gala Yuzawa/Ishiuchi Maruyama	Japan	657.440	Season 2018/19, Source: <a href="https://www.town.yuzawa.lg.jp/kanko/kankou/kankou_toukei.html">https://www.town.yuzawa.lg.jp/kanko/kankou/kankou_toukei.html</a> and Press Release Ishiuchi ( <a href="http://ishiuchi.or.jp/wordpress/wp-content/uploads/2018/11/ISHIUCHI_PressRelease_.pdf">http://ishiuchi.or.jp/wordpress/wp-content/uploads/2018/11/ISHIUCHI_PressRelease_.pdf</a> )
91 (86)	Seiser Alm	Italy	ca. 656.000	Estimation
92	Aletsch Arena	Switzerland	651.370	Season 2018/19, Source: Annual Report
93 (88)	Skischaukel Dorfgastein-Großarl	Austria	ca. 664.000	Season 2018/19, Estimation based on Ski amadé total of 7.8 Mio. (Source: Press release)
94 (89)	Hemsedal	Norway	661.000	Season 2018/19, Source: Annual Report Skistar
95 (90)	Blue Mountain	Canada	ca. 650.000	Estimation
96	Szczyrk	Poland	ca. 650.000	Season 2018/19, Estimation based on visits TMR: 2.706 Mio. (Source: Annual Report)
97	Genting Secret Gardens/Wanlong	China	ca. 650.000	Season 2018/19, Source: Estimation based on Chongli District: 7 Ski areas with 1.07 Mio. visits in 2018/19
98	Kotelnica	Poland	635.997	Season 2018/19, Source: management
99	Crans Montana	Switzerland	626.667	Season 2018, Source: Annual Report
100	Big White	Canada	ca. 625.000	Estimation
100	Mellau-Damüls	Austria	ca. 625.000	Estimation

## 5. Snow Reliability

### „No snow, no show“

This sentence has the status of a principal in the industry. But from the visitors' point of view, what does snow reliability actually mean? It is a fact: In modern ski areas, natural snow conditions hardly play a role for providing snow-covered pistes thanks to technical snow-making. For this reason, analyses of snowfall and the number of days of snow cover are not as relevant anymore.

As a skier, you want the ski area to function properly and all its areas to be accessible on a sufficient, well-maintained white surface. Sufficient natural snow on slopes that are not covered by technical snowmaking, powder in open terrain and snow-covered trees are of course a desirable bonus, but in case of doubt skiing only on technical snow is always better than not skiing at all - especially for the holiday guest. Some people book months in advance when there is no way of predicting what nature will deliver at the time of the trip.

### The concept to evaluate the snow reliability

There are a number of factors that influence whether and to what extent pistes are available in a ski area:

- Quantity and frequency of natural snowfalls
- Proportion of runs with technical snowmaking
- snowmaking performance (depending on hourly water flow per hectare, number and performance of snowmaking machines, air and water temperature, total available water volume etc.)
- Proportion of glaciated terrain
- Snow requirements of the terrain (rocky or meadowy ground)
- Character of phases of thawing depending on exposure and local climate
- Quality and intensity of snow management (use of snowmaking windows, piste maintenance, snow depots, snow fences etc.).

However, the evaluation of snow reliability is not based on these factors, which combined produce the product snow on the slopes. Why? On the one hand, it would be virtually impossible to systematically assess the extremely complex interaction of these

factors. On the other hand, it would be a unreasonable effort to collect the large amount of data for all relevant ski areas.

Therefore the snow safety should be evaluated primarily on the basis of the result, i.e. on the basis of what the guest experiences. What does the guest perceive? On the panorama display at the bottom station, the guest can see how many pistes are open, whether there is snow next to the pistes and whether it is possible to ski in the open terrain at the top of the mountain. He does not see whether the snow on the pistes has been produced by a machine, fallen from the sky or whether there is a glacier underneath.

Therefore, we first evaluate the snow reliability on the basis of these three central factors:

- Factor 1: Availability of open pistes  
What proportion of its terrain does a ski area usually provide at what times? Have there been days without skiing on important dates? On how many days could snow sports be practised in total? For the guest, it doesn't matter whether a ski resort achieves these results thanks to snowfalls or thanks to expensive technology, the guest simply wants to be able to practice his sport without any problems. In addition to the snow, the weather also plays a role, because especially in the high mountains, days of rest rarely result from a lack of snow, but often from storms or avalanches.
- Factor 2: Number of snow cover days in the village  
If you spend several days in a winter sports resort as a guest, you also expect to find a winter atmosphere. At least most guests appreciate it when there is snow in the village.
- Factor 3: Quantity of snow in the terrain (expressed by the annual sum of fresh snow)  
Since many snow sports enthusiasts are also looking for an off-piste powder experience, the natural amount of snowfall should also be included in the evaluation. Which weight you attach to it depends strongly on individual preferences and ability. For beginners, fresh snow is a problem even on the piste, for passionate freeriders there can't be enough of it.

The following variables are included in the evaluation of these three factors:

#### Availability of open pistes in the last 5 winters

- Availability in the core season: It is assumed that the season runs from December 20th to April 10th (average Easter Sunday), which means 112 days. The respective proportion of the open pistes (from zero to 100 percent) is determined for each day of the period, which adds up to 112 values that are divided by 112 afterwards. The result is the average of open pistes over the entire period in percent. The availability of open pistes can be expressed by the proportion of open piste kilometres (e.g. 30 of 40 kilometres = 75 per cent), the area (250 of 500 hectares = 50 per cent) or the open lifts (7 of 10 = 70 per cent).
- Availability during the Christmas holidays: The proportion of open pistes between December 25th and January 6th is determined in the same way. The percentage of open pistes and the percentage of days with ski operation in this period (e.g. 10 of 13 days = 77 percent) are each weighted at 50 percent. This takes into account the fact that it is particularly important at Christmas to be able to ski at all.
- Total duration of the season: Ski resorts with high snow reliability are characterised by a long season. A season duration of 180 days means 100 per cent, which means that a maximum of 200 per cent can be achieved in year-round operation. The availability of at least one run is crucial.

#### Number of snow cover days in the village

- For this purpose, official data from the weather services on the average number of days with snow depth >0 cm (in the last five winters) can be used. In the case of large ski resorts, which include villages at different altitudes (in the French Trois Vallées this ranges between 600 and 2300 metres above sea level), the altitude at which the bed capacities are concentrated is the relevant factor.
- In addition, the average maximum snow depth in the village could be used. Thus, places that make the dream of snow to the edge of the roof come true would be appreciated accordingly. There are a number of winter sports resorts in which there is snow all the time but there is never a thick layer of snow.

#### Quantity of snow in the terrain

- For this purpose, official data from weather services and ski resorts on the average annual sum of fresh snow are used. Certain distortions caused by different measurement methods have to be accepted. While European weather services measure the amount of fresh snow only once a day, elsewhere this is done hourly. The more frequently one measures, the higher the sum of fresh snow.

- Of course it would be desirable to include other variables in this context: the number of days with at least 10, 20 or 30 cm of fresh snow, the quality of the snow (expressed by the air content of the snow layer), the maximum snow depths reached or the number of days with snow layers of more than two or three metres. However, as these data are not available on a broad basis and their collection would involve an unreasonable effort, they will not be available for the moment.

In addition to the three central factors, two bonus factors are to be included in the evaluation: the proportion of glaciated terrain in the overall terrain and the performance of the snowmaking system.

#### Technical snowmaking

The efficiency of technical snowmaking is already indirectly taken into account via the availability of open pistes, because the more snowmaking is used, the higher the proportion of open pistes. Nevertheless, a high-performance snowmaking system is supposed to score points beyond this effect in the evaluation of snow reliability. The reason for this is: technical snowmaking gives snow sports enthusiasts the luxury of skiing even in regions with insufficient natural snow reliability, regions which may be less far away and therefore enable us to make day trips. For this luxury the ski resort operators have to make an enormous financial effort. For the guests it is a valuable asset.



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In this respect, expensive snowmaking can play a role in determining the value of a ski area. The capacity can be expressed by the pumping capacity (in cubic metres of water per hour) per hectare covered with artificial snow. This can be used to calculate how long it takes, for example, to produce 40 centimeters of snow in these areas. The faster, the better.

In order to assess the actual efficiency of the snowmaking system, the hours required for basic snowmaking should be related to the local climate. If, as in Finnish Lapland, you have reliable night-time lows of minus 10°C from November onwards, you can take a little more time for snow-making confidently. In German low mountain ranges, it is a blessing to have 40 or 50 hours of sufficiently cold temperatures before Christmas. However, efficiency is already taken into account by the availability of open pistes. That's why this bonus criterion is purely about the absolute power of snowmaking.

#### Glaciated terrain

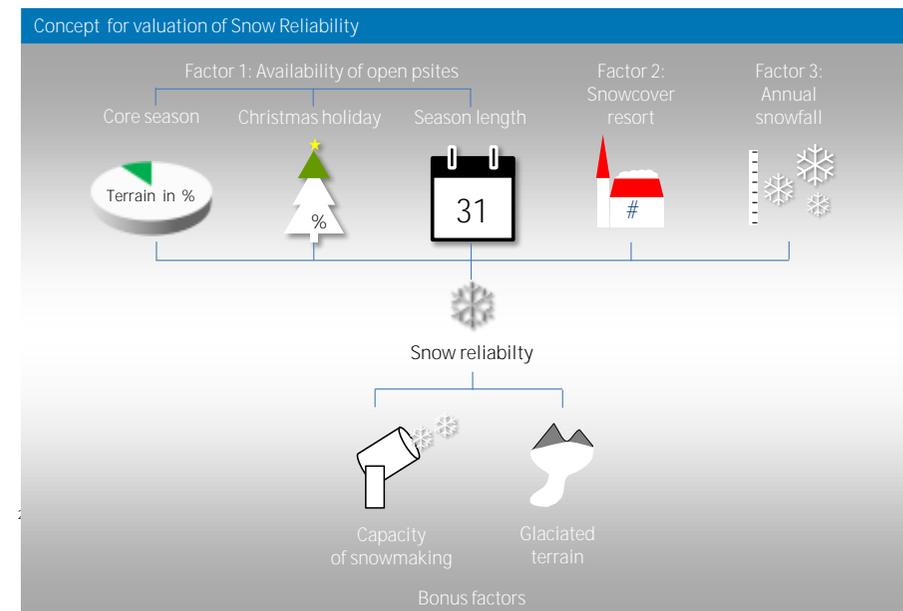
The situation with glacier ski areas is similar to that with snow-making. They offer the opportunity to ski or snowboard in autumn and well into spring - also a luxury. However, the operation of a glacier ski area involves an enormous amount of effort: Lift towers have to be moved, crevasses closed, avalanches triggered, wind fences set up and areas threatened by ice shrinkage covered in spring. Therefore, the existence of skiable terrain on a glacier also justifies extra points for snow reliability.

The overall concept for evaluating snow reliability is shown in the figure on the right.

The method described above also requires a great amount of data that is currently only available from a few ski areas. The 2018/19 season was used for data collection, which was continued in 2019/20 in an extended manner.

#### Survey on the evaluation of snow reliability

In addition to data availability, their weighting also has an impact. For this reason, an online survey is currently being conducted at <http://www.skigebietsbewertung.de/your-rating.html> to assess the factors of snow reliability described above. With your participation you can contribute to establish and improve the evaluation of snow reliability!



For the evaluation on the page after next, the individual factors were weighted as follows:

- Availability
  - Availability of pistes as a percentage of the total length of the pistes: 40% (this includes 70% for the whole season and 30% for the peak season)
  - Days of skiing: 15% (this is achieved with 180 days)
- Days with snow in the village: 20% (this is achieved with 150 days of snow)
- Amount of snowfall on the mountain: 25% (this is achieved with 1,200 cm of fresh snow per season)
- Capacity snowmaking 10% (this is achieved with a capacity of 45 m<sup>3</sup> of water per hour and per hectare of piste area)
- Share of glaciated terrain in the total piste area: 15% (this is achieved when 50% of the piste area is on glaciers).

## Snow conditions in the 2018/19 season

The course of the 2018/19 season varied greatly from region to region and showed how important longer observation periods are for valid statements. Despite climate change, records were set in 2018/19 in very different parts of the world:

- June 2nd 2019: last day of skiing in Mont Saint Sauveur – the latest of all times in Québec
- 645 cm: Snow depth on the Zugspitze on May 30th 2019. There had never been so much snow there so late - but it didn't help the Schneesferner, because the extremely hot summer caused the snow cover to disappear by mid-August.
- 151 days: Valley run Engelberg open (Nov. 23rd - Apr. 22nd) – longer than ever before.
- 136 days: Duration of the skiing season in the Australian Perisher, the longest ever - but the following summer bush fires threatened the resort.

Overall, the 2018/19 season can be characterised as follows:

- In the Northern Alps there was a lot of snow at the beginning of January and an extremely snowy spring followed. Numerous ski resorts extended their season, and opened on weekends in May or even June, sometimes for the first time in their history. In Italy many ski resorts opened earlier than planned.
- In the USA snow conditions were good in general, Utah's ski resorts achieved record numbers of snow (more than 18 meters snowfall) and visitors, also in California (1,824 cm snowfall in Mammoth Mountain) and in the Northeast the winter was better than usual.
- Australia also recorded a historically good winter (445 cm of snow fell in Thredbo), overall the season was good or very good.
- In New Zealand, however, the season was rather mixed, with only 95 cm of snow falling on Coronet Peak near Queenstown. Only snowmaking could save operations here. At Mount Hutt, on the other hand, 349 cm of snow fell, Whakapapa on the North Island was able to offer skiing until the summer.
- In South America hardly any snow fell, in Valle Nevado, the highest ski resort of the continent, it was only 154 cm, in Nevados de Chillán it was less than half the usual amount with 347 cm.
- In Scandinavia the snowfall was rather below average (Åre: 360 cm, Trysil: 213 cm), the snow fell later than usual, Hemsedal started the season four weeks late.

## Results of the data acquisition in the 2018/19 winter

In the winter of 2018/19, data on the availability of pistes was collected for around 140 selected ski areas worldwide. The selection criteria for this sample were size and a wide geographical distribution. The data was collected directly on the websites of ski resorts on the one hand and via snow reports on winter sports websites on the other. Since it was found that the data on the portals were more often not accurate, the websites of the ski resorts themselves were accessed more frequently during the winter. The results presented below are therefore subject to possible incorrect information in the respective sources.

During the Christmas holidays in the period from December 25, 2018 to January 6, 2019, only four ski resorts were able to offer all their pistes on all days: Livigno, Ober- tauern, Hochzillertal-Hochfügen and Wolf Creek (Colorado). Serfaus-Fiss-Ladis, 4 Berge Ski Schladming and Hochkönig achieved 98 percent availability of pistes. The Feldberg in the Black Forest (8%) and the Wurmberg in the Harz (19%) achieved the lowest piste availability. In Australia and New Zealand, the holidays at the beginning of July are similar to our Christmas season. Coronet Peak and Mount Buller (Australia) were only able to offer seven percent of their pistes in the two weeks of peak season.

Over the entire season from December 20, 2018 to April 10, 2019, only Livigno reached 100 percent, Vail and Obertauern 99 percent, Breckenridge and Serfaus-Fiss-Ladis 98 percent. An interesting fact is that glacier ski resorts that are actually considered snow-proof only reached 54 (Mölltaler Glacier) to 91 percent (Kitzsteinhorn). Here, frequent storm and bad weather days had an effect - snow is not enough. In the northern hemisphere, the lowest availability over the entire season was 40 percent (Wurmberg), in the southern hemisphere Valle Nevado, Mount Buller, Tiffindell, Whakapapa and Las Lenas (31%) stayed below the 40 percent mark. There, the best winters were recorded at Cerro Castor in southern Chile (72%), Mount Hutte (71%) and Perisher (69%).

## Top 25 – the most reliable of the world's 50 largest ski areas

With its huge glacier skiing area that reaches up to a height of 3,899 metres, skiing all year round and a rather intensive snowmaking below the glacier, Zermatt with its Matterhorn Ski Paradise is at the top of the list of the skiing areas with the most reliable snow conditions. In the coming years, the database will be expanded in order to allow evaluations of ski areas beyond the 50 or 100 largest ones. The Hintertuxer Glacier, the world's most reliable ski area in terms of snow, is not among the 50 largest.

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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To positions 1 to 25:

Top 25 – Snow reliability (only the 50 largest ski areas in the world were considered for this ranking)										
Position 1-25										
Pos.	Ski area	Country	Glaciated terrain	Capacity snowmaking	Piste availability season**		Days of skiing	Snowfall mountain***	Snow days village****	Weighted snow reliability
					12/20-04/10	12/25-01/06				
1	Matterhorn Ski Paradise	Switzerland/Italy	168 ha	16.4 m <sup>3</sup> /ha/h	75%	58%	350	2,000 cm	147.7	13.25
2	Espace Killy	France	74 ha	16.9 m <sup>3</sup> /ha/h	96%	95%	227	1,256 cm	140	11.04
3	Sölden	Austria	82 ha	10.1 m <sup>3</sup> /ha/h	93%	90%	214	1,146 cm	127.6	10.35
4	Silvretta Arena	Austria/Switzerland	0 ha	21.7 m <sup>3</sup> /ha/h	87%	85%	159	1,304 cm	155.9	10.06
5	Ski Arlberg	Austria	1 ha	12.1 m <sup>3</sup> /ha/h	85%	78%	149	1,450 cm	154.9	9.92
6	Zillertal Arena	Austria	0 ha	19.2 m <sup>3</sup> /ha/h	92%	89%	143	1,179 cm	161	9.86
7	Les deux Alpes-La Grave	France	119 ha	5.6 m <sup>3</sup> /ha/h	90%	85%	213	1,043 cm	88.0	9.64
8	Arosa Lenzerheide	Switzerland	0 ha	11.4 m <sup>3</sup> /ha/h	85%	86%	144	1,223 cm	166.8	9.64
9	Monterosaski	Italy	1 ha	24.1 m <sup>3</sup> /ha/h	80%	75%	148	1,216 cm	162	9.62
10	Whistler Blackcomb	Canada	33 ha	3.7 m <sup>3</sup> /ha/h	94%	92%	224	891 cm	136.4	9.54
11	Skicircus Saalbach	Austria	0 ha	8.6 m <sup>3</sup> /ha/h	90%	87%	142	1,325 cm	138.4	9.54
12	Breckenridge	USA	0 ha	0.0 m <sup>3</sup> /ha/h	98%	86%	202	899 cm	150	9.33
13	Serfaus-Fiss-Ladis	Austria	0 ha	19.1 m <sup>3</sup> /ha/h	98%	98%	138	1,026 cm	126.8	9.32
14	KitzSki (Kernbereich)	Austria	0 ha	16.6 m <sup>3</sup> /ha/h	88%	82%	198	1,154 cm	102.8	9.24
15	Vail	USA	0 ha	6.8 m <sup>3</sup> /ha/h	99%	90%	158	899 cm	150	9.19
16	Silvretta Montafon	Austria	0 ha	19.0 m <sup>3</sup> /ha/h	87%	70%	144	1,193 cm	132.2	9.15
17	4 Berge Ski - Schladming	Austria	0 ha	17.0 m <sup>3</sup> /ha/h	97%	98%	151	950 cm	118.6	9.09
18	Parsenn-Weissfluhjoch	Switzerland	0 ha	4.9 m <sup>3</sup> /ha/h	87%	70%	146	1,057 cm	168.5	9.05
19	Mayrhofen-Lanersbach	Austria	0 ha	22.1 m <sup>3</sup> /ha/h	96%	97%	142	1,025 cm	102.2	9.02
20	Big Sky	USA	0 ha	5.8 m <sup>3</sup> /ha/h	90%	85%	144	1,015 cm	150	8.98
21	Snowmass	USA	0 ha	1.5 m <sup>3</sup> /ha/h	96%	85%	151	668 cm	185.8	8.87
22	Grand Massif	France	0 ha	17.9 m <sup>3</sup> /ha/h	83%	79%	131	1,164 cm	125	8.85
23	Laax	Switzerland	21 ha	11.1 m <sup>3</sup> /ha/h	72%	57%	142	1,353 cm	124.6	8.77
24	Espace San Bernardo	France/Italy	0 ha	11.2 m <sup>3</sup> /ha/h	89%	74%	133	1,087 cm	127	8.70
25	Revelstoke Mountain Resort	Canada	0 ha	0.7 m <sup>3</sup> /ha/h	94%	92%	135	999 cm	129.8	8.69

\*) values in red were estimated based on the number of snow makers \*\*) values set in red were estimated on the basis of results from nearby locations \*\*\*) total amount per year, values in italics are estimated, usually on the basis of information from weather stations nearby \*\*\*\*) values in italics are estimated, the reference periods of the other values are different, in general the period 1970-2000 (Austria), 1981-2010 (Switzerland) and 2010-2019 (France).

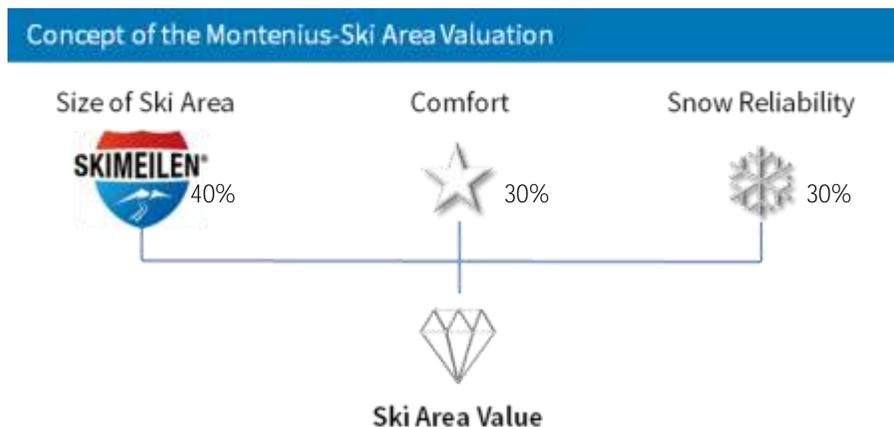
## 6. Ski area value

### Three factors determine the value

The concept of the overall evaluation has already been briefly discussed above. In order to obtain the overall value of a ski area from the three factors of ski area size, comfort and snow reliability, it is first necessary to weight these factors. This is done as follows:

- Ski area size: 40%
- Ski area comfort: 30%
- Snow reliability: 30%

The three factors must also be adjusted to each other in their units of measurement. Therefore, the size of a ski area in Skimiles is first divided by the number of Skimiles of the largest ski area and then multiplied by ten. For the Trois Vallées, this results in a value of 10.0. The comfort value is given on a scale of ten anyway and can therefore be adopted without adjustment. The snow reliability is also divided by the best value (in this case 14.15 for the Hintertux glacier) and multiplied by ten.



The weighted result for the Trois Vallées is 7.46 points. On the scale of the ski area value, this value is set equal to 10.0, the corresponding conversion (division by 0.75) is carried out for all areas in the same way.

### Value for money

If one compares the determined ski area value with the price of the lift tickets, a price/performance ratio can be determined. Since even small ski areas can be comfortable and snow reliable, the largest ski areas are not automatically ahead, as in all price comparisons, which are made in various media only on the basis of piste kilometres.

Nevertheless, the world's largest ski area is still at the top of the list in the Monténus ski area evaluation in terms of price/performance - at least if only the top 50 ski areas are taken into consideration, as happened here, and only by a small margin: the Skicircus Saalbach achieves 99.8 percent of the price/performance value.

In the table on the following page the top 25 ski areas are listed in the overall value. The following ski areas do not make it into the Top 25 in terms of overall value, but they do make it in terms of value for money:

▪ Galibier-Thabor	1.54	Pos. 3
▪ Monterosaski	1.48	Pos. 5
▪ Espace Diamant	1.48	Pos. 6
▪ Espace San Bernardo	1.48	Pos. 8
▪ Fôret Blanche	1.44	Pos. 11
▪ Voie Lactée / Via Lattea	1.42	Pos. 12
▪ Les Sybelles	1.38	Pos. 15
▪ Grande Domaine	1.35	Pos. 18
▪ Mayrhofen-Lanersbach	1.26	Pos. 25.

It is noticeable that these are almost exclusively French ski areas. The reason for this is the lower price level in general. For example, the day pass for the Espace Diamant is only 41.80 euros.

The American ski resorts gather on the last positions due to their very expensive lift tickets. With 219 US dollars for the day pass (adult/peak season) Vail is the most expensive ski resort in the world. The fact that the season pass in Vail is relatively inexpensive and that Vail only earns a little more than 30% of the highest price per visit (in the Alps it is 60%) does not change anything.

Introduction	Skimiles®	Transport Capacity	Comfort	Skier Visits	Snow Reliability	Value	Appendix
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Top positions 1 to 25:

Top 25 – Ski area value (only the 50 largest ski areas in the world were considered for this ranking)									
Positions 1-25									
Pos.	Ski area	Country		Ski area comfort	Snow reliability	Overall value	Price Day Pass Adults Peak Season 19/20	Value/10 Euros	Pos. value for money
1	Les Trois Vallées	France	600 sm	5.87	7.90	10.0	63.00 €	1.59	1.
2	Matterhorn Ski Paradise	Switzerland	378 sm	6.39	13.25	9.7	ca. 86.00 €	1.12	33.
3	Sella Ronda/Marmolada	Italy	517 sm	5.96	7.90	9.2	62.00 €	1.48	7.
4	Skicircus Saalbach	Austria	425 sm	6.23	9.54	9.0	56.50 €	1.58	2.
5	Paradiski	France	461 sm	5.39	7.87	8.5	61.00 €	1.39	14.
6	Ski Arlberg	Austria	387 sm	5.48	9.92	8.4	56.50 €	1.49	4.
7	Espace Killy	France	319 sm	5.51	11.04	8.2	61.00 €	1.34	21.
8	Whistler Blackcomb	Canada	344 sm	5.84	9.54	8.1	ca. 130.00 €	0.62	41.
9	Grandes Rousses	France	323 sm	6.32	8.18	7.7	54.50 €	1.41	13.
10	Vail	USA	319 sm	5.66	9.19	7.7	199.00 €	0.39	47.
11	Silvretta Arena	Austria/Switzerland	265 sm	5.97	10.06	7.6	56.00 €	1.36	17.
12	Les deux Alpes-La Grave	France	287 sm	5.75	9.64	7.6	52.50 €	1.44	10.
13	Laax	Switzerland	275 sm	6.51	8.77	7.5	ca. 83.00 €	0.91	39.
14	Zillertal Arena	Austria	246 sm	6.22	9.86	7.5	55.50 €	1.35	19.
15	Arosa Lenzerheide	Switzerland	262 sm	5.94	9.64	7.4	ca. 79.00 €	0.94	38.
16	KitzSki (Kernbereich)	Austria	271 sm	5.85	9.24	7.4	58.00 €	1.27	24.
17	Les 4 Vallées	Switzerland	314 sm	5.52	8.36	7.4	ca. 72.00 €	1.02	37.
18	Les Portes du Soleil	France/ Switzerland	354 sm	4.94	7.88	7.3	57.00 €	1.29	23.
19	Skiwelt Wilder Kaiser	Austria	317 sm	5.87	7.61	7.3	53.50 €	1.37	16.
20	Big Sky	USA	275 sm	5.80	8.98	7.3	ca. 153.00 €	0.48	44.
21	Snowmass	USA	252 sm	6.36	8.87	7.3	ca. 167.00 €	0.44	45.
22	Sölden	Austria	218 sm	5.93	10.35	7.3	56.00 €	1.30	22.
23	Serfaus-Fiss-Ladis	Austria	252 sm	5.88	9.32	7.2	54.00 €	1.34	20.
24	Grand Massif	France	271 sm	5.61	8.85	7.2	48.50 €	1.48	9.
25	Parsenn-Weissfluhjoch	Switzerland	223 sm	6.45	9.05	7.1	ca. 68.00 €	1.05	36.

# 7. Appendix

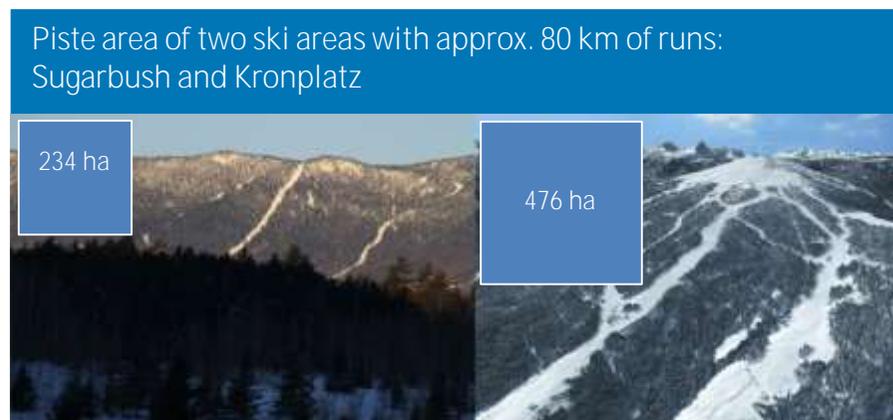
## Potential criteria for measuring the size of ski areas

When comparing the size of ski areas, the first question is how to measure this size? There are several variables to choose from:

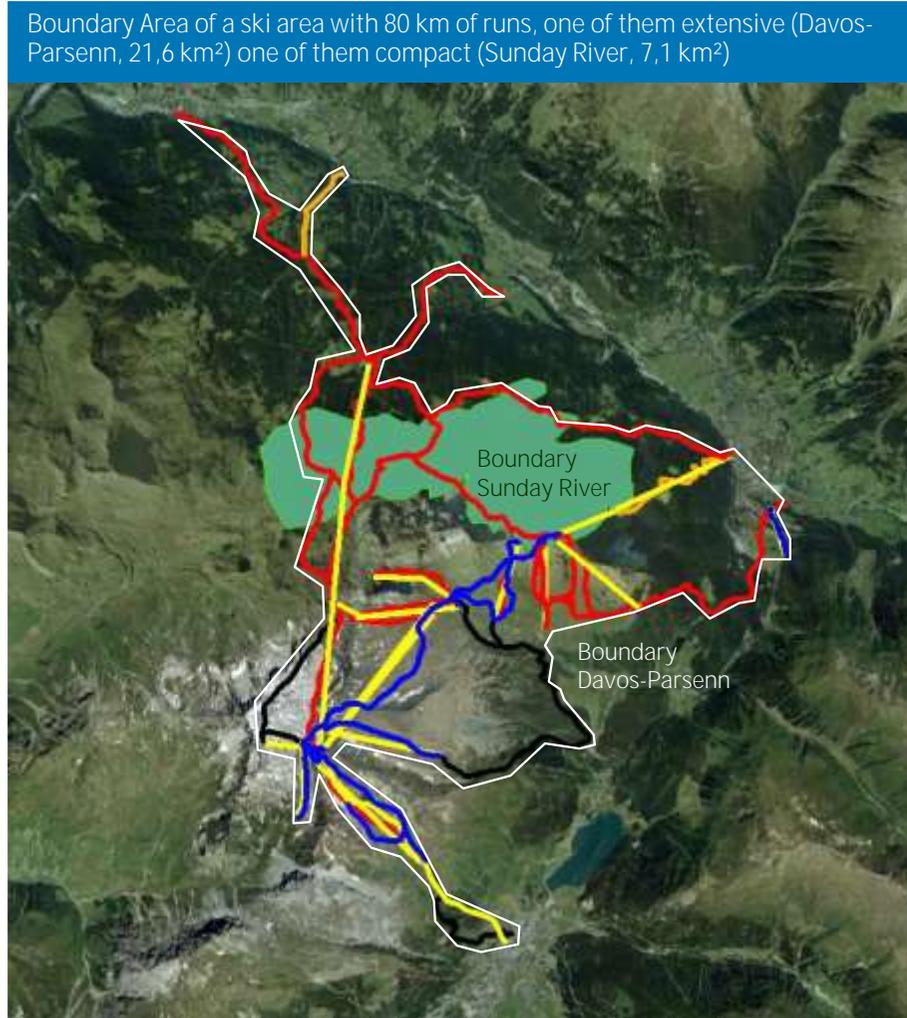
- Length of runs: The total length of ski runs (incl. slopes, ski trails and ski routes) in kilometres is the standard in Europe so far - with all its problems described above.
  - Conclusion: The length of runs should be a central factor in determining the size of a ski area and is therefore taken into account.
- Number of runs: While in Central Europe the number of runs is of minor importance, it is advertised in other parts of the world, especially in the eastern part of North America. This value is effectively promoted by the splitting of runs into upper, middle and lower sections.
  - Conclusion: The number of runs should not be taken into account for size measurement, not only because of inconsistent counting methods. It is also not a reliable indicator of the diversity of the terrain, as in some ski areas many parallel runs of identical character increase the number.
- Skiable area: In North America, the skiable area is the indicator for the size of a ski area. It usually includes both groomed pistes and ungroomed areas off-piste that have been opened for skiing. In North America, areas of rocks, trees and buildings are often included - or those that are not accessible by lift.
  - Conclusion: The skiable area should be taken into account when measuring the size, as it includes the width of pistes. The following figures illustrate that width makes a difference.

A detailed description of the concept for determining the skiable area, which combines the different philosophies in Europe and North America, can be found from page 42 onwards.
- Number of lifts: A key indicator worldwide, especially in East Asia and Scandinavia. However, it is losing importance due to the ongoing restructuring of the lift system in many areas.

→ Conclusion: The number of lifts is not appropriate to measure the actual size. In Scandinavia it is not uncommon that three parallel surface lifts lead to a piste where there is just one chair lift elsewhere. Some lifts open up only 100 metres of piste, some other a full 20 kilometres of pistes.



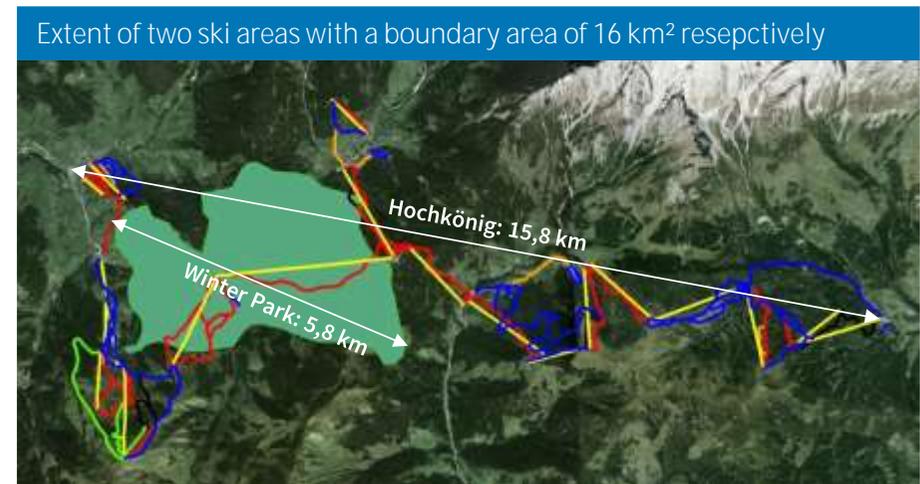
- Areal extent of a ski area: When you talk about the "size" of a country, you usually don't mean the length of the highway or fiber optic network there, but its area. Consequently, Russia is the "largest" country in the world. In this respect, when considering the size of ski areas, it is also necessary to consider their area. This includes the area that cannot be left without crossing a piste or a lift. Some North American ski resorts do not indicate the skiable area, but the total area of the resort.
  - Conclusion: The areal extent is relevant when determining the size of a ski area and should be taken into account. For example, a large ski area with a relatively thin network of pistes can appear larger than one with a longer length of runs in a smaller area. The figure on the following page illustrates this using the example of the Davos Parsenn and Sunday River ski resorts, both measuring around 80 kilometres of pistes - with a very different areal extent.



Source base layer: Google Earth – the areal extent of the Sunday River ski area is shown as a green area, the Davos-Parsenn area is framed in white.

- Extension: Even ski areas that have an identical length of runs, areal extent and skiable area can be significantly different. The extension is the largest linear distance between two points in the ski area. So far, the extension has only been communicated sporadically.

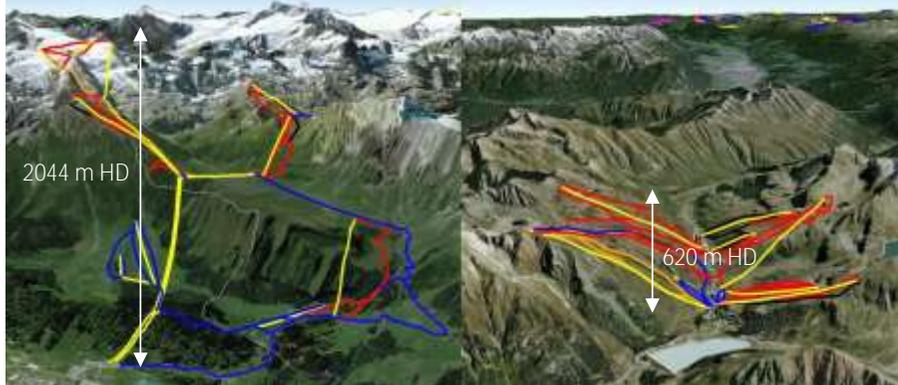
→ Conclusion: The larger the extension, the higher the probability of changes in the landscape, so it should be considered as a complementary factor in size measurement.



Source base layer: Google Earth – the extension of the ski resort Winter Park is shown as a green area, the aerial view shows the ski area Hochkönig.

- Elevation difference: Ski areas not only expand in terms of width but also in terms of elevation. The maximum difference in elevation plays an important role in the communication of American ski resorts, but hardly in Europe, even though European ski resorts have much greater differences in elevation. And the greater this difference, the more "alpine" a ski area can be.
  - Conclusion: If size is defined as for human beings measuring the difference between a person's head and his toes, then ski areas that have a particularly long way from the highest to the lowest point can also be described as particularly large. One reason for this is that you can experience this difference in elevation by passing through different climate zones (from the glacier to the forest belt) and experiencing large differences in temperature. Therefore, the entire elevation difference between the lowest and the highest part of the piste should be included in the size measurement (the uninterrupted difference in elevation is taken into account via the longest run).

Vertical drop of two ski areas with approx. 38 km of runs respectively



Source base layer: Google Earth – the left picture shows the Titlis with its 2,044 meters of elevation difference, the right picture shows the Kühtai with its 620 meters of elevation difference.

- Topography: Even ski areas that have the same total length of runs, the same skiable area, the same extension and the same difference in elevation can still differ significantly from each other in their topography. It is possible to fit 30 kilometres of pistes on a mountain side with 400 metres of elevation difference, completely exposed in one direction, but they can also extend over several mountain sides exposed in various directions. In the latter case, a change of perspective makes such an area appear much larger, despite identical statistics. The two ski resorts Holimont and Winterberg each have about 24 km of runs, about 130 hectares and about 200 metres of elevation difference. But all the pistes of Holimont are located on a long north slope, while in Winterberg seven peaks and 15 mountain sides are accessible.
- Conclusion: With the criterion topography, the structure of the terrain, which is not measured by any other indicator, can also be included in the evaluation of the size, expressed in the number of different peaks and accessible mountain sides. Therefore the topography should be taken into account.

Topography of two ski areas with 24 km of runs on a 200 m vertical : Winterberg (7 summits, 15 pods) and Holimont (2 summits, 3 pods)



Source figures: Ski resorts, on the left the Skiliftkarussell Winterberg in the Sauerland, on the right Holimont in the US state of New York

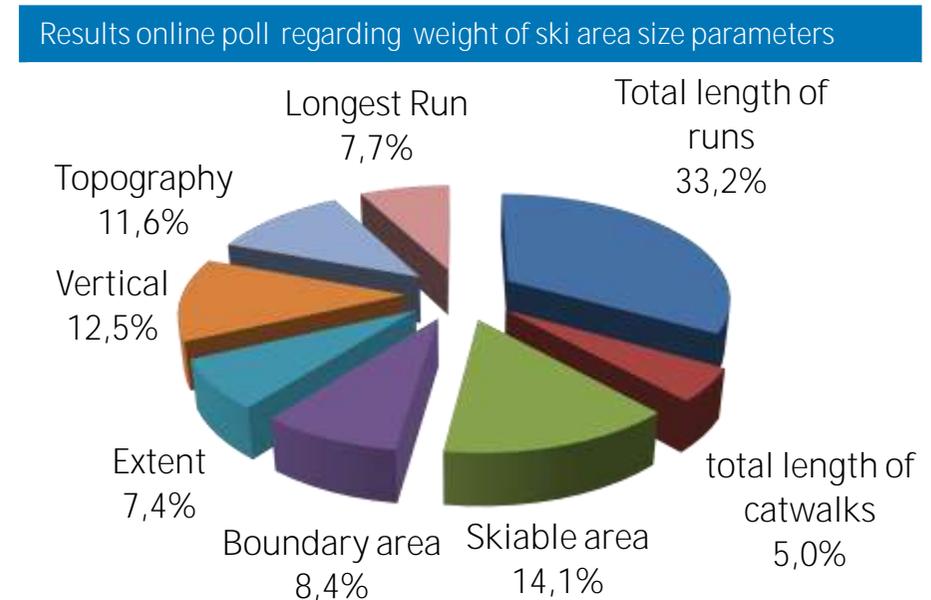
- Transport capacity of the lift system: The hourly transport capacity in persons per hour is often communicated, but rarely in advertising. Almost exclusively in North America, the vertical transport capacity of the lifts is communicated from time to time.
  - Conclusion: For the guest, transport capacity only plays a role in relation to the number of skiers because it influences waiting times. However, it has no relevance for the size.
- Skier visits: This indicator is used to measure the success of a ski area and its market share.
  - Conclusion: For the guest, the number of skier visits in a ski area is irrelevant as a criterion for its size. Even if the number of visits in relation to other key figures may allow qualitative statements to be made.
- Longest run: The longest runs of a ski area are something like the little brother of the total length of runs. Attributes like "the longest run in Europe" can compensate for a certain amount of total run length in terms of image. Runs over ten, twelve kilometres of uninterrupted length are a great source of fascination and some of these runs bear names that skiers have heard before: Parsenn, Sarenne or the Hochjoch-Totale are just a few of them.
  - Conclusion: The longest run should find its way into the evaluation of the size of a ski area, as it can be a flagship for a ski area.

The following criteria remain for measuring the size of a ski area:

- Total length of runs (ski runs or organised ski area, i.e. length of runs, ski routes, special areas and cat tracks in kilometres)
- Skiable area (marked and secured area within the ski area boundaries in hectares)
- Areal extent of the ski area (area enclosed by lifts and pistes in square kilometres)
- Extension of the ski area (largest linear distance between two points within the ski area in kilometres)
- Elevation difference (Difference between the highest and lowest point in the piste network in metres)
- Topography (Number of peaks and mountain sides in the ski area)
- longest run not interrupted by ascents in kilometers.

But how can these very different features be combined into a single value for the size of a ski area? The first question to be answered is how much weight the listed criteria have for the perceived size of a ski area. This perception should be represented as accurately as possible by the size value.

An online survey was therefore conducted as the basis for such a weighting. The results are shown in the following diagram.



As part of the online survey, the criteria were first explained (also using the graphs shown here) and finally the following question was asked: "Please assess how important the criteria shown are to you with regard to the actual perceived size of a ski area. You can award a total of 100 points. These can be placed completely on one criterion or distributed as desired to the different criteria."

The criterion total length of runs was subdivided into length of runs, special areas and ski routes on the one hand and length of cat tracks on the other hand. This was done to reflect the fact that cat tracks can be used to produce "length" much easier, a length, however, which in its significance for the perceived size of a ski area is much less weighted than that of the pistes and ski routes.

## Aspects of area calculation

While the transport capacity of a ski area can be easily measured on the basis of lift data, the determination of the area is more complicated. Without a doubt, pistes that are groomed every night are particularly comfortable. But what about pistes that are only groomed episodically? Or ski routes that only get to see a snow groomer from time to time or never at all? How is the open terrain to be evaluated, where skiers also make turns and take pressure from the organized ski area while putting their lives at risk?

If you want to compare areas of ski resorts in the Alps and in North America, the different philosophy of defining skiable terrain makes things more difficult. In North America, you can use the entire terrain within the ski area boundaries (total areal extent), because it is entirely protected from avalanches (or areas are only opened if this is the case). In the Alps this only applies to pistes and ski routes. Nevertheless, there is no restriction between Montblanc and Dachstein to ski in the so-called open ski terrain or next to it, as this is only done at one's own risk - which is why relatively few skiers do so.

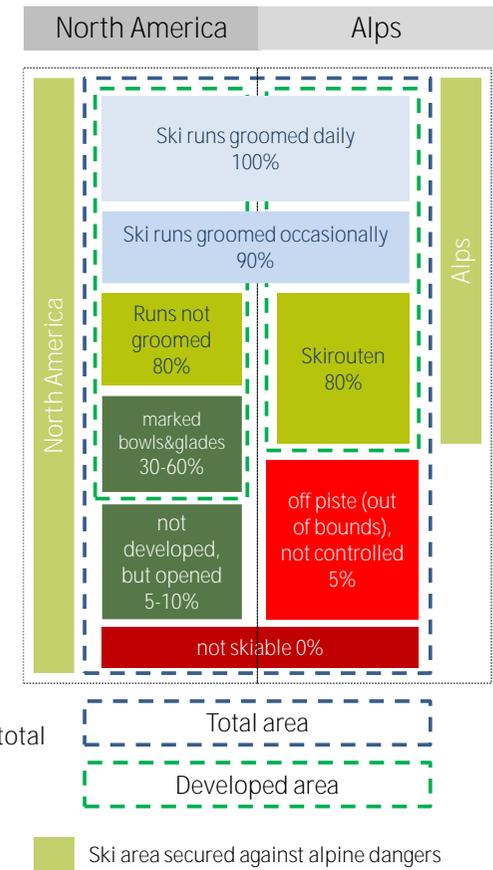
By weighting the various area categories differently, however, you can make them comparable. Of course, the daily groomed piste is considered 100 percent. With decreasing grooming intensity the weight decreases, even if the fun for some people in the ungroomed terrain between the trees rather increases. For the majority of skiers, however, such areas are not relevant and therefore provide only limited relief for the classic pistes. The figure shows the area categories and weights used to determine the relevant skiable area.

Zero hectares of episodically groomed pistes means that all pistes are groomed daily - which is the standard in the Alps.

The ski routes widespread in Switzerland and Austria are treated in the same way as the ungroomed pistes of North American ski resorts. The latter are mostly difficult pistes that are offered as moguls. For the ski routes, the width will be 20 metres and for the ungroomed slopes, the actual area will be taken into account.

Categories d) and e) do not exist in European ski resorts. Here they belong to the unsecured, open ski terrain. Since this terrain is skied on anyway, it is taken into account with a weight of five percent. In North America, the off-piste areas within the ski area boundaries are also secured. Some of these are developed areas (category d), as the off-piste areas are marked in treeless terrain or those in forests are cleared of vegetation (so-called glades). The undeveloped terrain (category e) is left in its natural state but protected from avalanches. Access to this terrain is partly controlled by gates.

The weighted skiable area is only included in the evaluation of the Skiing comfort. In the calculation of the Skimiles® the categories belonging to the developed area are taken into account (at 100 per cent each), since the total areal extent of the ski area already includes the undeveloped and open terrain and therefore this are already taken into account when calculating the Skimiles®.



## Evaluation of lift types (basic values)

	Underlying value	Speed	Weather protection	20%	Posture	20%	Boarding	20%	Difficulty	15%	Transport of skis	15%
STB	7,5	1,00	10	2,0	5	1,0	10	2,0	10	1,5	0	0,0
ASC	7,0	0,50	10	2,0	5	1,0	10	2,0	10	1,5	0	0,0
ZRB	7,4	0,50	10	2,0	8	1,6	9	1,8	10	1,5	0	0,0
SEB	7,4	0,50	10	2,0	8	1,6	9	1,8	10	1,5	0	0,0
Snowcat	7,8	0,50	10	2,0	8	1,6	7	1,4	10	1,5	5	0,8
Bus	7,9	1,00	10	2,0	8	1,6	9	1,8	10	1,5	0	0,0
Wieli	6,4	0,40	0	0,0	10	2,0	10	2,0	10	1,5	3	0,5
ZPB	6,5	1,00	10	2,0	0	0,0	10	2,0	10	1,5	0	0,0
EPB	6,5	1,00	10	2,0	0	0,0	10	2,0	10	1,5	0	0,0
Funitel	6,7	0,80	10	2,0	5	1,0	7	1,4	10	1,5	0	0,0
GUB	8,8	0,50	10	2,0	10	2,0	10	2,0	10	1,5	5	0,8
DUB	8,2	0,50	10	2,0	10	2,0	7	1,4	10	1,5	5	0,8
3S	7,5	0,60	10	2,0	10	2,0	7	1,4	10	1,5	0	0,0
Elevator	5,7	0,20	10	2,0	0	0,0	10	2,0	10	1,5	0	0,0
EUB	8,2	0,50	10	2,0	10	2,0	7	1,4	10	1,5	5	0,8
ZUB	8,2	0,50	10	2,0	10	2,0	7	1,4	10	1,5	5	0,8
CLD-B	7,2	0,50	7	1,4	10	2,0	5	1,0	5	0,8	10	1,5
CLF-B	6,3	0,25	7	1,4	10	2,0	2	0,4	5	0,8	10	1,5
CLD	5,8	0,50	0	0,0	10	2,0	5	1,0	5	0,8	10	1,5
CGD	7,5	0,50	9	1,7	10	2,0	5	1,0	8	1,1	8	1,1
CLF	4,9	0,25	0	0,0	10	2,0	2	0,4	5	0,8	10	1,5
T-bar	3,2	0,35	3	0,6	0	0,0	2	0,4	2	0,3	10	1,5
T-bar (short bar)	3,0	0,35	3	0,6	0	0,0	2	0,4	1	0,2	10	1,5
T-bar/button	3,4	0,30	3	0,6	0	0,0	3	0,5	3	0,5	10	1,5
Magic Carpet	4,4	0,15	3	0,6	0	0,0	5	1,0	8	1,1	10	1,5
Button lift	3,6	0,30	3	0,6	0	0,0	3	0,6	4	0,6	10	1,5
Nutcracker	2,8	0,35	3	0,6	0	0,0	0	0,0	2	0,3	10	1,5
Va-et-Vient	3,4	0,50	3	0,6	0	0,0	4	0,8	0	0,0	10	1,5
Télécorde	2,6	0,15	3	0,6	0	0,0	1	0,2	1	0,2	10	1,5
Rope tow	2,60	0,15	3	0,6	0	0,0	1	0,2	1	0,2	10	1,5

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### Panorama Mountain Resort uses Montenius Ski Area Evaluation

The Panorama ski resort in the Canadian province of British Columbia is the first to use the results of the Montenius ski area evaluation for its own communication. The 2018/19 list of the world's 100 largest ski areas identified Panorama as the area with the highest level of skiing comfort worldwide. Together with the marketing management of Panorama, the award for "most space per skier" was created - because this is what the result of the skiing comfort in essence means and it is a claim that gives the guest a concrete idea.

Similar awards can also be created for other features (lift riding comfort, snow reliability) and other regional dimensions (Europe, Switzerland, Tyrol, Pyrenees). If you are interested, we will be pleased to submit an offer.

