

Qualitative Results User Study

The following are the participants' answers on the question to elaborate their answer on the usefulness of the maps, and on the open question. The answers have been sorted based on the participant's opinion on the usefulness.

Please elaborate your answer on the usefulness of the map for assessing avalanche risk

Strongly disagree

- 1. a map is just one of the many tools necessary to help assessing the avalanche risk
- 2. in the mountains I would never rely only on 'open street map' (and I would never go on a skitour without a physical map)
- 3. In Austria Switzerland and France I will never start a skitour without checking the avalanche bulletins of WSL/SLF (www.wsl.ch or www.slf.ch) and their maps: <https://whiterisk.ch/en/tour/map-settings> > Topomap Austria
- 4. I will check several weather forecasts
- 5. I will talk to as many 'locals' as possible, as circumstances change from year to year and from day to day
So 'this map' but in general not any map can provide "enough information to assess the snow avalanche risk"
- The map shows terrain cover and slope angle, which are most useful in context of the snow condition for assessing avalanche risk. Without the context of snow condition and history, this map is not very useful with the exception of choosing very conservative lines to minimize avalanche risk across all possible snow conditions (like point D).
- What is the current snow condition? What is the avalanche bulletin of today? What is the typical problem at hand at this moment?

Disagree

- Colours and markings are difficult to interpret. A normal Swiss map gives better interpretation of avalanche risk because of better interpretation of the terrain.
- The map provides information on slope angle, although the color uses is (for me) confusing with "scree". Slope angle is an important factor in avalanche risk assessment, but never enough (imo).
- assessing the avalanche risk just with a map is impossible, you have to judge the actual situation at the spot. This map gives useful information, although I have to get used to the lay out and would prefer for this moment a Swiss tour ski map for the overall view.
- I get that the relevant information is there (slope angle, tree cover, terrain trap features, but the map is more difficult to read than using Caltopo with the slope angle feature
- It is helpful to have differentiation between terrain types and distinction given to terrain over a 30 degree slope angle. However, this information alone is not enough to

assess avalanche risk - weather and snowpack conditions are also vital information for assessing avalanche risk, especially

for routes that traverse more difficult terrain. Information about historic avalanche locations would also be extremely helpful.

- Slopes above 35-45 degrees are much riskier than 30 degree slopes and there is only one color.

It could be helpful to indicate which aspects are riskier somewhere on the map

The terrain cover provides little relevance to avalanche risk - again you could replace with something like known history of avalanches or aspect

Neutral

- Slope indication and terrain is usefull information. Conditions in the field are (of course) not possible to assess based on only the map. Avalanche bulletin and local judgement is needed.
- Weather and/or snow conditions are more important to asses avalanche risks
- when it's steep, you have always avalanche risk, expect when it's to steep or there is no snow. You cannot always see it on the map
- Numbers are hard to read. Overlay shade of slope angle on different terrain covers is hard to distinguish.
- the map gives approximate slope angle, forest cover, and terrain features like ridges which are useful for assessing avalanche risk but are far from complete without up to date avalanche forecasts for the specific terrain feature
- My avalanche knowledge is too limited to properly assess avalanches (i only went tour skiing with a qualified instructor). I only know the basic "avalanche risk at slopes >30 degrees". This is depicted very clearly.

Agree

- The altitude lines are giving, so you ca clearly see if a face is steep or not. You can aslo clearly see in which direction the faces are facing. And you know the altitude of the mountain peaks.
- the difference between scree / bare rock / 30degree is difficult to see. I'd prefer some sort of overlay which i can turn on and which colors redder for more dangerous terrain in terms of avelanche. For a paper map, distinguish better what the difference in color for the contour lines mean compared to the difference in color for the background.
- The colour used for the >30 degrees slope is at some place hard to distinguish from the basic map colours. I would add a sample of distance between contour-lines for a 30 degrees slope into the map legend. Or a kind of scale for contourline distances between 20 and 40 degrees.
- Showing slopes over 30 degrees is helpful. It's still tough to figure out runout areas and terrain traps, but slightly easier than on other maps.

Strongly agree

Please elaborate your answer on the usefulness of the map for planning ski tours

Strongly disagree

Disagree

Neutral

- It is a nice start, and gives suggestion for potential routes, but the 'key' (on the right) is rather basic
- I don't feel comfortable with the map because it is difficult to interpret
- The color of the slope angle is very similar to scree, it's hard to see which slopes are actually >30. I like the suggested routes but it would be useful if descent options were shown (like on backcountryskimaps.com) Seeing shelters is very useful, although I think we don't have as extensive a system here in the US
- I'd just prefer caltopo. It is better than nothing for sure. The "difficult passage" marking is definitely really useful.
- For general planning it would be OK. For detailed planning including the current avalanche bulletin information it is too general. I prefer to use the slope angles with various colors for 30 - 35 - 40 and 45 degrees.

Agree

- Slope indication is very useful, including the indication of the terrain. Downhill indication is a nice feature.
- The map is sufficiently detailed. The only information I am missing are crevasse zones on the glaciers. And, as said early, the color used for slope angles > 30 deg is not so distinctive from "scree". I used the map digitally on screen, and I needed to zoom in to see the details well enough.
- It gives a good overview
- it's with (snow) colours and 1/25 and there are some known routes on the map
- The only thing I'm missing are the facts of how high the Hütte are situated. Maybe also good to know if they have a winter room, so in case you want to stay the night in the winter. You know in front if it would be possible or not. And is it open with drinks and restaurant, or do you need to bring your own > selbstversorgungshütte.
- especially avalanche risk is important and this helps to assess the slope, although it could be clearer where the dangerous parts are.
- Appreciate areas marked on tours with difficult passage!
- The map gives very helpful information about the terrain and touring routes. Some aspects of the map are confusing, for instance, I'm not sure exactly what is meant by "Downhill Area" (is this meant to mean a valley with mountains on both sides? the name does not mean that to me). I would also want more information on the routes given - what is the total distance and altitude gain for each route? Starting elevation and highest elevation? Having distance markers along the route as is often done for hiking trails would be an additional help.

- the map shows the tour routes and locations of huts and lifts
- I think the map is very clear! One thing that would be really nice: Since there is only a limited number of routes depicted on the map, write down each route including the length and a short description of the route (what makes it easy/difficult, highlights). There is still plenty of white space available.

Strongly agree

- A scale of 1:25.000 is a must for planning. The grid works fine. Please add to the legend the distance between the contour lines (20m). Since the not that much heights on the contour lines, it took me a little time to find out.
- The map has many major features that might be useful to a skier, has common routes, particular hazards are marked, and it is easily readable.
- Seeing popular routes is helpful, as well as seeing huts, parking areas, and lifts for logistics. I haven't seen that before. The 30 deg slopes are similar to what is provided in CA maps, which is helpful, I do think it's a little easier to interpret on the CA maps. This would be my go-to map if it existed for where I tour (US west coast).

Please elaborate your answer on the usefulness of the map for navigation during a ski tour

Strongly disagree

Disagree

- When using 'during' the tour it should be uploaded in the pictures library in my smartphone, which makes it quite laborious to use; plotting the chosen route on the map in the White-RisK-App is much more straightforward and gives the opportunity to use GPS.
- I'd like to have a map with more detail.
- Probably too large scale for navigation. Or make the numbers (e.g. elevation contours) bigger so they are easier to read.
- It isn't detailed enough. More detailed slope angle like in caltopo would be better

Neutral

- The contour lines are not very clear
- Not sure since I usually use an app that is 3D and I can pinch and zoom and rotate
- It would only be useful if I could link it to my GPS location somehow (e.g. available in alltrails). It is hard to navigate based solely on geographical features

Agree

- used to old maps, the different colors give more clearer information of situation.
- There is a lot of information for orientation.
- See above. For navigation I would largely have the same requirements as for planning. This map would work for me, although the details are quite small (especially the font for altitude and hut names). Most people over 50yr will have difficulties reading such small details...
- there are a lot of marking points such as lift, hut etc and 1/25
- because of the given skitours you can orientate quite easily in the terrain. Maybe it's good to explain what is an easy, medium and hard skitour? Approx. how many hours and how many altitude meters. Because an easy tour for a trained person is not an easy tour for a beginner.
- The map is useful for navigation during the tour, by listing obvious cues like lifts, peaks, elevation, and surface cover. The map however is crowded and busy. Making a more simplified map with just the tour(s) you're concerned with for that day could be more easily readable for navigation during the tour.
- Some minor critiques - The direction arrows are rather minimal on the loop route 2. Also the coloring of the contour lines makes them difficult to see against some backgrounds, particularly green on green. I rely on contour lines to read the landscape, so it's difficult if I can't see them! - a map and compass can be used to navigate - Main features are depicted clearly.
- Could be... maybe a bit of changes in the colors to make it more clear

Strongly agree

- Again contour lines + estimated distance is key to navigate, next to the direction.

Please elaborate your answer on the usefulness of the map for reflecting on a ski tour

Strongly disagree

Disagree

- I would reflect on my ski tour with gps tracks and photos.

Neutral

- If you mean 'planning' (i.s.o. 'reflecting on') any suggestion for potential skitours is useful of course
- What do you mean with reflecting?
- I think it is much better than what mostly is given to the people. But how good is difficult for me to say on my desk.
- Not sure, to be honest I'm not sure I've frequently used a map to reflect, although maybe I should start doing that - I don't usually do this - ?

Agree

- Probably yes, especially if one can plot the gps track on it
- As it gives a good overview
- all the marks are there, lift ect and 1/25
- Yes, but only if you know what you do in the terrain
- Yes it is, Though, you need to know the weather conditions and the snow conditions as well to consider skitour and it's area - Good overview!
- Not sure what additional comments I can provide for 'reflecting' vs. planning and navigation.
- you can review your route by looking at this map and learn more about the area once you have seen it in person
- with the details from the field you can fill the gaps pretty easily I would say.

Strongly agree

- The map has many major features that might be useful to a skier, has common routes, particular hazards are marked, and it is easily readable. These are the same reasons it is useful for planning a tour

Would you change anything in this map?

- Pff, not looked in very much detail. I like the swiss maps more
- Depending on the size of the print: Might be very detailed for a map for skiing
- Glacier crevasses (after zooming in, I saw they are on the map, but hardly visible)
- No
- give the hutte also a hight, what is the hight of Ramsau am Dachstein. Are the lift open?

There is enough space on the left side to make the lettres/names bigger (otherwise I need classes

- a legenda, clarifying how colours (also of altitide lines) are used
- Yes, see the other answer. I would also write on the map, that the giving tours are just a help for on your way, but it's not a navigater and you have to know what you are doing in the terrain and be up to date from the avalanche risks and have knowledge about glaciers and skitouring.
- For navigation I'd want information about small settlements/houses/barracks too. I think I'm missing them, but maybe they are not there.
- Descent options and rated by difficulty Zones to avoid
- Having a few colors for different ranges of slope angle is useful for avalanche risk, but also very useful for scoping skiing lines.

Crevasse hazard areas on glacier could be nice

Summer trails can be nice to have on the map incase blazes show through, or if snow levels are low.

- Maybe adding lines for descent options would be useful.
- One thing I found to be missing was names of roads, which would help navigate to the starting point. Perhaps lifts could also be labeled? - add elevation profiles for the ski tours

Would you change anything in this map?

- clear landscape information due to different colors - Slope indication can be more granular.
- As an example: Bare mountain with green lines is not logical. I would change colours. Yellow is for easy, but also for difficult passage.
- 1. The color of the zones with slope angle > 30
2. Smallest font is too small for me
- Letters of the names can be bigger. Indicate contour lines more clearly - it's a clear map. How big is it?
- more bright colouring and using shadows for both sides of a ridge; better visible altitude lines
- Yes, the things I wrote down before.
- It is a bit dark.
- Larger fonts, colors with better contrast
- Color shading is inconsistent. Is it the background, or the contour color that matters for surface cover? Slope angle is not a surface cover, so it's confusing to have both impacting the color of the map. Additionally, slope angle here is a cutoff at 30, having a few colors for different ranges of slope angle is useful for avalanche risk, but also very useful for scoping skiing lines
- Adding a legend item explaining that green is the start of the lifts could be easy and nice, it took me a while to figure that out. Maybe more frequent labelling of the contour lines. I found the colors a bit confusing at first but it makes sense now I understand it and I can't think of a better way to do it. Would it be possible to flag high avalanche areas based on where lots of previous avalanches have been seen/reported? That would be extremely useful to someone not familiar with the area. Also, noting the size of parking areas could be helpful (i.e. is there room for just a couple cars or is it a resort size parking lot). Perhaps this is less relevant in Europe, but in the US you often park at small pull-outs for tours and that is a hard part of the planning.
- Bigger numbers on elevation contours, different shading/color scheme for terrain and slope angle overlays.
- Have greater contrast between contour lines and background, maybe change the green on green to something else.
- Add distance and elevation markers to the routes and perhaps make the direction of travel more clear, particularly to indicate whether a route is an out-and-back vs. a loop vs. a through tour.
I would also be more clear about what is meant by "Downhill Area" or just wouldn't include it, since that information should be evident from the contour lines.
Another thing I noticed is that some of the labels, like Niederer Turlspitz, have a whitish shadow which makes them much more legible than all the other elements that do not have this!
- add elevation profiles for the ski tours
- As stated earlier: Short descriptions of the route. What I would still like to know:
- Is the route difficult because it is physically demanding or because it is technically difficult?

- Is the technical difficulty uphill or downhill?
- What equipment is required? Crampons? Ropes?
- More detailed slope angle shading; known avalanche paths
- Change to colors to make it more clear. add the various slope angle categories

Are there any elements that are unclear in this map?

- downhill areas appears after you have planned your tour? - in general its clear take care !
- No
- It takes long to get a clear view of the terrain.
- Not really, it seems quite a nice map. Also the complexity of the terrain, e.g. around the Simonyhuetten, is well displayed.
- The colors that represent the terrain are very nice, but too dominant over the text and contour lines.
- no, not anything else that I wrote down before.
- I don't think I found this easier to read or better for planning than the other maps I mentioned. As mentioned I found the slope angle hard to read.
- the context for green/grey ends of tours/lifts is not explained clearly in the Key. Are tours uphill, or downhill? Are both shown? Or are all routes 2-way? "Downhill area" was unclear to me, is this recommended downhill-skiing areas?
- Overall very well done! This is a great start for a more usable ski touring map - these comments are all coming from a geographer & someone who enjoys planning trips in the outdoors, so I stare at a lot of maps.
- start and finish for lifts
- Check website skitourenguru.ch for inspiration. If you do not know it: a good combination of routes with current avalanche information and historic avalanche data. All tracks are changing color with the current snow situation.