

CHANGES IN AVALANCHE FATALITIES BY ACTIVITY AND ASSOCIATED CHALLENGES IN WINTER OUTDOOR RECREATION IN JAPAN

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ABSTRACT: In Japan, 214 fatal avalanches have occurred over the past 35 years (1991–2025), resulting in 316 deaths. Of these, 84% (267) of the fatalities belonged to the winter outdoor recreation category. The activities included mountaineering, backcountry skiing or snowboarding, snowshoe hiking, snowmobiling, mountain stream fishing, and skiing at ski resorts. The fatalities included people enjoying these activities as leisure and commercial guided tours. The changes in the number of fatalities for each of these winter outdoor activities were summarized as follows: (1) Mountaineering fatalities, which accounted for about 70% of all fatalities in the 1990s, declined in the 2000s, and have not changed significantly since then; (2) Skier fatalities have increased significantly between 2006 and 2016, but have declined in recent years; (3) Major accidents with more than three fatalities have decreased; (4) Snowboarder fatalities are slightly increasing; (5) Half of the skier fatalities in the last 10 years have been foreign nationals, with many accidents involving expert skiers such as guides or professional skiers. This paper reports on the changes in the number of fatalities by activity, and the effectiveness and challenges of the various safety measures implemented by our organization thus far. At the same time, this paper expresses a strong sense of urgency about the increasing number of fatalities among those who visit Japan in search of "JAPOW" snow, and highlights the need for cooperative relationships with specialized institutions in various countries.

KEYWORDS: Avalanche Accidents,

1. INTRODUCTION

Our organization's core activities are in the field of winter outdoor recreation. We issue avalanche bulletin in the same format as in North America across six mountain regions nationwide. We provide several avalanche education programs for recreational users and professionals, such as mountain guides and ski patrol members; we also provide educational resources and conduct accident investigations. In advancing such comprehensive avalanche safety measures, it is important to understand the changes in the number of avalanche fatalities by user activity and their characteristics.

2. CLASSIFICATION OF DATA USED

2.1 Location

The locations where fatal avalanche accidents occurred are mountain terrain, ski areas, worksites, facilities, and roads. "Mountain terrain" refers to locations with natural terrain that is not safety-managed. "Ski areas" refers to areas enclosed by outer perimeter courses. "Worksites" refers to locations where various types of construction are being carried out by contractors and where some form of safety measures are in place to protect workers. "Facilities" refer to structures such as buildings. The definition of ski areas is established by and based on the safety standards and laws governing the ski resort industry. In other words, within the boundaries of Japanese ski areas, there are only "courses" and "closed areas," and there are no locations corresponding to "off-piste" as seen in European ski areas.

The locations considered for outdoor recreation are mountain terrain and ski areas, and we organized the data for these two locations.

2.2 Activity

In "mountain terrain," activities such as climbing, skiing, snowboarding, snowmobiling, mountain stream fishing, and snowshoeing correspond to outdoor recreation. Fatal work-related accidents, such as those

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involving facility management, hunting, forestry, and rescue-team activities in mountain areas, are excluded from the analysis. In ski areas, only fatal accidents of visitors were included, and data during safety management work by ski patrol members were excluded.

3. RESULTS

3.1 *Overall Trends*

Because avalanche fatalities vary greatly from season to season, the data were organized in five-year blocks. Of the 316 fatalities, 267 (84%) belong to the outdoor recreation category. Looking at the recent 20 years, fatalities in outdoor recreation are decreasing (Figure 1).

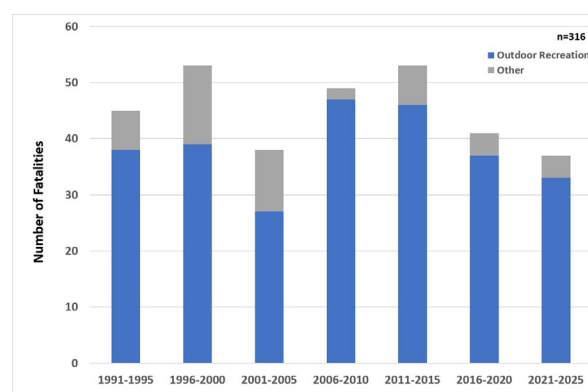


Figure 1 Changes in avalanche fatalities (1991–2025)

3.2 *Changes by Activity*

To understand the changes in the number of fatalities by activity in outdoor recreation, the data were organized into four categories: “climbers,” “skiers,” “snowboarders,” and “others.” Because fatalities from snowmobiling, mountain stream fishing, and snowshoeing are limited, they were grouped as “others” (Figure 2).

Climbers accounted for 74% of outdoor recreation fatalities in the total for the 10-season period starting from 1991. Thereafter, the number decreased but has shown little change. Although the number temporarily increased during the 2016–2020 period, this includes the accident at Nasu-dake where a total of eight high school students and teachers died.

For skiers, fatalities increased markedly during the 10-season period starting in 2006, accounting for 60% of outdoor recreation fatalities during this period. Additionally, snowboarder fatalities have shown an increasing trend in recent years, and fatalities are now occurring among those not carrying avalanche beacons, which had rarely been seen until now.

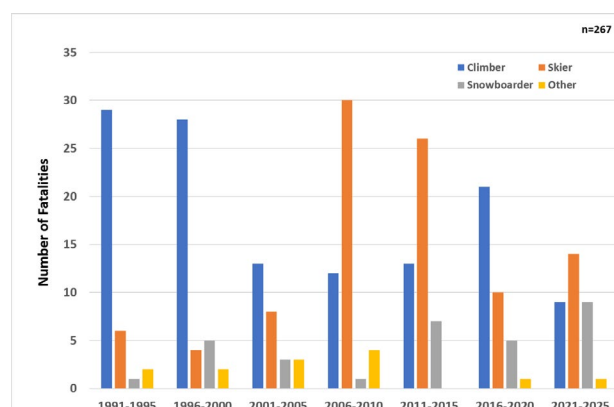


Figure 2 Changes in avalanche fatalities by activity in outdoor recreation (1991–2025)

3.3 *Influence of Large-Scale Accidents*

Accidents in which three or more fatalities occurred in a single avalanche were defined as “large-scale accidents,” and the number of these fatalities was plotted on the graph in Figure 2 (Figure 3). In the 2011–2015 period, accidents involving climbers, skiers, and snowboarders have occurred. The four fatalities in “other activities” during the 2006–2010 period were due to snowmobiler accidents.

It can thus be seen that if the number of fatalities increases significantly in a given five-year period, multiple large-scale accidents have occurred. Furthermore, no large-scale accidents have occurred in the most recent five years. Furthermore, over the most recent 10 years, no large-scale accidents have occurred among skiers and snowboarders.

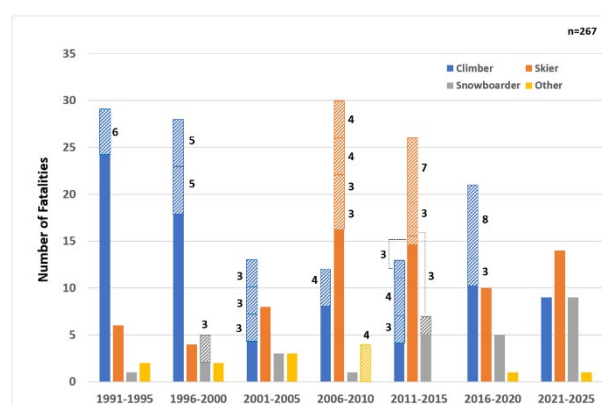


Figure 3 Large-scale avalanche accidents by activity (1991–2025)

3.4 *Influence of Foreign Visitors to Japan*

Over the past 35 years, 20 foreign nationals have died in avalanches. Looking by activity, there have been no climber fatalities to date, whereas 16 skiers and 4 snowboarders have suffered fatalities. The nationalities and number of people are NZL (6), USA (6), FRA (2), ARG (2), NOR (1), DEU (1), GBR (1), and RUS (1). Furthermore, no fatal accidents have as yet occurred among Australians, who make up a very large number of visitors to Japan.

Over the past 15 years, during which the number of visitors to Japan seeking “JAPOW” has rapidly increased, the number of fatalities has risen, with 16 people dying during this period. Of these, 11 people died in accidents during commercial guided tours, or in accidents that occurred while guides or professional riders were on private mountain trips.

Furthermore, looking at the number of fatalities over the past 10-year period by activity, there were 13 skiers and 1 snowboarder. The number of fatalities among foreign-national and Japanese skiers is given in Table 1. Looking at fatalities over the past 10-year period, 54% of those who died were foreign nationals. Furthermore, it is necessary to consider that there were almost no visitors to Japan during the two seasons of 2021 and 2022 due to the COVID-19 pandemic.

Table 1 Number of deaths of foreign nationals among skiers

Season	Japanese	Foreign nationality
2016–2020	5	5
2021–2025	6	8

4. DISCUSSION

4.1 *Climbers*

Many of the climber fatalities in the 1990s were due to “classic mountaineering.” Classic mountaineering is a style where climbers carry heavy loads, push through deep snow reaching up to their waists or chests, and traverse mountains over an itinerary of nearly a week. Because members take turns trail-breaking through deep snow, the distance between members tends to become short. This can trigger the collapse of cornices formed near ridges, resulting in avalanches. As a result, the number of people caught in them also increases.

This highly committed type of mountaineering has traditionally been practiced by climbers belonging to amateur mountaineering clubs. However, as times have changed, the number of participants has decreased in recent years. When interviewed, several executives of mountaineering club federations pointed out the aging of members and the decline in the numbers of people who aspire to engage in this type of mountaineering.

4.2 *Skiers*

As modern skiing was introduced to Japan in 1911, skiing in the mountains has been actively practiced. However, this was a style described as “Ski Mountaineering” or “Ski Touring” and was mainly enjoyed during the spring season. In the mid-1990s, an influx of North American skiing culture occurred. A more aggressive style of mountain-terrain skiing during the midwinter season emerged under the name of “backcountry skiing.” This was accompanied by the phrase “Steep & Deep & Dry.”

Based on these factors, three elements are related to the rapid increase in skier fatalities starting from the 2006 season. First is the evolution of equipment. There has been an increase in easy-to-use, wide skis suitable for riding on fresh snow. Second is the increase in the participating population. From the late 1990s, groups oriented toward freestyle skiing began actively venturing into the backcountry. At that point, a Japanese woman won a gold medal in moguls at the 1998 Nagano Olympics, and skiing in a freer, more aggressive style became the “trend of the era.” Magazines also emerged featuring photos of skiers dynamically skiing down winter snow and ice face routes that trained climbers had challenged. Third is the shift away from classic mountaineering. A segment of climbers, for whom “toilsome” hardcore mountaineering had become physically difficult, transferred to the world of “enjoyable skiing,” supported by the evolution of equipment.

Examining the background of the surge in skier fatalities due to avalanches during the 2006–2015 period reveals that the fatalities can be divided into two groups: those belonging to traditional mountaineering clubs and those of general ski enthusiasts, with roughly the same number of fatalities in each group.

4.3 Snowboarders

Snowboarding entered Japan in the early 1980s. However, it was a pleasure enjoyed by only a small group of enthusiasts. In the early 1990s, when the Japanese bubble economy burst and the number of visitors to ski areas began to decline, the popularity of snowboarding ignited along with North American culture, and the participating population increased.

From the late 1990s to the early 2000s, the aforementioned new trend of skiers was also added, giving rise to the first backcountry skiing boom, which also played a role in the spread of avalanche beacons. The first Japanese-made avalanche beacon was produced in 1993. This was thanks to the immense efforts of a group dedicated to avalanche education. It possessed state-of-the-art functions for its time, including the use of multiple LED lamps to visually indicate receiving signal strength, lithium batteries, and a cleverly designed strap. However, popularizing it was a major challenge. Fortunately, the advent of the backcountry skiing boom changed the situation immediately, and by the end of the 1990s, avalanche beacons from countries around the world were readily available at mountaineering equipment shops. Furthermore, snowboarders drove this business as buyers.

The relatively low number of snowboarder fatalities is thought to be because their groups tend to be small. Looking at the group sizes involved in fatal accidents, the maximum group size for snowboarders was six people, and there have been only three accidents involving this group size over the past 35 years. Of those, one was a mixed group with skiers, and two were guided tours. However, for climbers and skiers, there have been 19 fatal accidents each involving groups of six or more people.

4.4 Large-Scale Accidents and Avalanche Education

Avalanche education is important for reducing avalanche fatalities over the medium to long term. With the goal of eliminating large-scale accidents, our organization has been conducting a safety awareness initiative named “Think SNOW” since 2006. By using four simple questions during travel, this aims to maintain situational awareness by enhancing observation of the surroundings, while simultaneously serving as a trigger to recall knowledge.

The four questions are as follows: “Q1: Where are you right now?” “Q2: What is your reason for deciding it is stable enough?” “Q3: What will happen if an avalanche occurs?” and “Q4: Are there any other choices?”

Q1 is terrain recognition. This is a question designed to confirm whether one is in avalanche terrain by always looking around when resting or waiting for companions to ski. Q2 is the recognition of snow-pack instability. This is a question designed to confirm whether direct evidence or intense weather phenomena have been overlooked. Q3 is behavior management based on terrain recognition. This is a question designed to not only appropriately minimize the number of people entering avalanche terrain but also confirm whether there are any “terrain traps” below the slope. Q4 refers to risk tolerance and decision-making. This is a question designed to confirm whether the risk is of a size that the group can accept, including the possibility of other options. The “Think SNOW” safety awareness-raising campaign has been repeatedly promoted through safety seminars for beginners, on-snow workshops, and through social media and other means.

We believe that one factor behind the recent downturn of large-scale accidents among skiers and snowboarders is that this safety awareness-raising has become widespread. One of the reasons for this thinking is the reaction of users to the avalanche accident that occurred on Nasu-dake in 2017. Because it was an accident during training for a public high school mountaineering club, Tochigi Prefecture, as the responsible authority, established a third-party committee and prepared an accident investigation report. However, unfortunately, it did not mention the issues of terrain recognition and behavior management, which were the most critical aspects of the accident. However, we were relieved to learn later through communication with past participants that groups who had received avalanche education from our organization appropriately understood this issue.

To those who understand North American-style avalanche education, which teaches terrain recognition first and thoroughly reinforces it, this may seem strange, but until our organization was established in 2000, Japanese avalanche education was missing the terrain component and focused mainly on snow.

Emphasis had been placed on snow quality, metamorphism, and weak layer tests, and the idea of evaluating snowpack instability based on the concept of class data was lacking. This is also one of the reasons why there were many accidents involving climbers in the 1990s.

4.5 Foreign Visitors

According to the classic adage, “The avalanche does not know who you are,” distinguishing avalanche fatalities by nationality could cause us to lose sight of what is important. However, some of the data are concerning. Over the last 15 years, during which the number of visitors to Japan has increased, there have been nine fatal avalanche accidents during guided ski or snowboard tours. Of these, five cases involved foreign guides.

The breakdown of certifications held by the guides is one IFMGA Mountain Guide, one Ski Guide, one Tail Guide, and two uncertified persons. In countries that are members of the IFMGA, there is a gentlemen’s agreement that when working as a guide in another member country, one must hold the IFMGA mountain guide qualification. However, this has become a mere formality.

The total number of visitors to Japan exceeded 10 million in fiscal year 2013. Thereafter, the number surged, reaching 30 million in fiscal year 2019, and although there was a major drop due to the COVID-19 pandemic, it reached 42 million in fiscal year 2025. Meanwhile, the Government of Japan has set a target of 60 million people for fiscal year 2030. Although no fatal avalanche accidents have occurred yet, addressing Chinese and Taiwanese visitors, whose numbers are rapidly increasing, is an urgent priority.

4.6 Polarization of Users

Regarding accidents involving skiers and snowboarders, interviews are being conducted to determine what kinds of avalanche education these groups have received up to now and what their typical behavioral patterns are. As a result, in recent years, the user base seems to have polarized.

Type A is a group that, regardless of whether they have received our organization’s avalanche education, trains with their peers, checks avalanche information daily, and enters the backcountry cautiously. As this is a group that our messages are reaching, providing good resources and information can help facilitate their safe behavior.

Type B is a group that usually plays in parks, powder areas, and tree runs inside ski areas and occasionally ventures into areas adjacent to the ski areas. They lack both avalanche safety equipment and the necessary gear for operating in unmanaged areas, and they have not received basic education. Furthermore, they have low awareness regarding the diverse hazards that exist beyond the boundary lines of ski areas. For this group, our organization has been conducting a safety awareness campaign called “Beyond the Rope” in cooperation with administrative agencies since 2015, but it can hardly be said to be going well. The reason we are having difficulty is simple: there are ski areas that prioritize lift-ticket sales over safety measures by allowing easy lift-accessed skiing in the backcountry adjacent to the ski areas. In other words, Type B, certain ski areas, specialized magazines, and manufacturers are in a complicit relationship, forming a structure in which each party profits.



Figure 4 Example of “Beyond the Rope” contents

When the term “sidecountry” was created in the United States as a marketing term, the National Ski Areas Association (NSAA) published an insightful article titled “There’s No Such Thing as ‘Sidecountry’” in its journal (December 2012 issue). Around the same time, a certain ski area in Japan created a course named “Sidecountry” right in the middle of its resort. At another ski area, gaps were made in the boundary ropes, and snowboarders with no equipment were tacitly permitted to head outside one after

another. However, once an accident occurred, the manager made statements as if they were a nuisance that had committed an illegal act. Additionally, at another ski area, gates were installed to attract customers despite the location having a complex terrain that was inherently unsuitable for backcountry skiing. As a result, non-avalanche accidents also occurred one after another, and newspapers and television repeatedly ran sensationalist reports. As a result, “backcountry skiing” has become a term with a negative image in Japan. This situation has become unbearable for Type A individuals who enjoy backcountry skiing seriously.

5. CONCLUSION

Based on the characteristics of fatalities by activity in outdoor recreation, the following points are issues and challenges going forward. Because climbers have poor terrain recognition and an extremely low possession rate of avalanche beacons, although the probability of occurrence is low, large-scale accidents could occur. In recent years, the number of young climbers expanding their activities from summer mountains to winter mountains has been increasing, and responses to this are also necessary. Therefore, starting from the 2026 season, our organization, in cooperation with multiple regions, is jointly conducting an “Avalanche Awareness Day” targeting climbers in particular. We plan to continue expanding this in the future.

For skiers and snowboarders, we have started the “Avalanche Safety Supporters Club” from the 2026 season, focusing on Type A individuals. We have created a website where members can easily post important data observed in the backcountry from their smartphones. For registered members, we have held bi-weekly online sessions where our organization’s instructors act as facilitators, providing information on avalanche knowledge and current avalanche conditions. As it is impossible to reach all backcountry users with our message, the goal is to use Type A users to create opportunities for a wider range of people to access appropriate information.

However, for Type B, there is a concern that a succession of accidents may occur if an avalanche cycle coincides with the weekend. Because some ski areas still neglect the starting point of avalanche safety measures—that “the world inside and outside the boundary is completely different”—improving the situation is expected to take time.

Regarding response to inbound tourists, the government and local administrations provide funding to attract visitors, but they have not taken any concrete and effective safety measures. In Europe and North America, public institutions or government-related NPOs are involved in avalanche bulletin as social infrastructure, but in Japan, only our organization is responsible for relaying such information and in a limited capacity. Our organization has never received funding from the government, and its operation is on a volunteer basis. Furthermore, it is operated using donations from corporations that understand the importance of its activities.

The United States, Canada, New Zealand, and Japan share a similar avalanche culture, and practitioners such as guides and ski-patrol members receive similar kinds of avalanche education. Against this background, we would like to express our deepest gratitude to the outstanding foreign-national guides visiting or residing in Japan who have devoted themselves to cooperating in the provision of avalanche bulletin.

In the 2026 season, there were five avalanche fatalities in Japan, three of whom were foreign-national skiers (CAN, RUS, and USA). Moreover, there was an avalanche accident involving a visitor from Taiwan who miraculously survived. We hope that visitors to Japan will safely enjoy Japan’s snow, which is among the finest in the world, and we are committed to making every effort toward that goal.