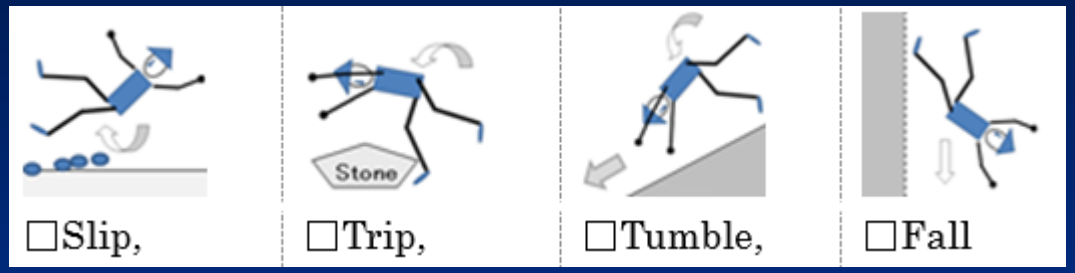
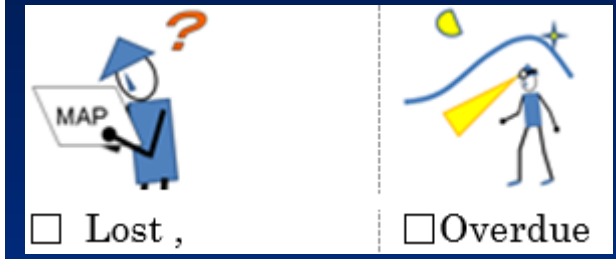
20th Mountain accident report

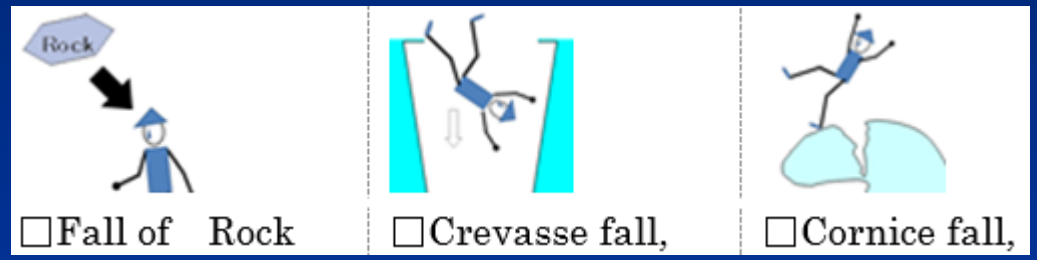


☐Slip, ☐Trip, ☐Tumble, ☐Fall

☐Sliding down,



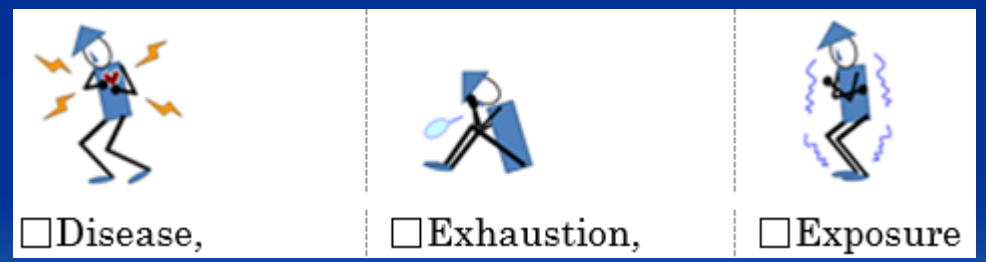
☐ Lost , ☐Overdue



☐Fall of Rock ☐Crevasse fall, ☐Cornice fall,

☐Avalanche, ☐Lightning, ☐Bad weather,

☐Drowning, ☐Bad visibility ☐Collision



☐Disease, ☐Exhaustion, ☐Exposure

The icons are part of the accident factors used in International Mountaineering Federation accident investigations.

UIAA MountCom,
JMSCA ,JWAF and IMSARJ
Chiaki Aoyama

20th mountain accident investigation report

This is the 20th edition of the mountain accident investigation report, which began in 2003 . During this time, we have been building a mountain accident database and reporting based on accident analysis. As of 2023 , the database has registered data of 4669 accidents.

The result of this report was to change the image that many people have of mountain accidents (bad weather, rocky areas, winter mountains, avalanches, etc.) to images of human error accidents that occur on a daily basis. In addition, mountain accidents used to be handled only by veteran mountaineering experts , but by visualizing them in an easy-to-understand manner, it has become possible for the general public to understand accidents as something familiar to them.

1. Characteristics of survey content for database construction

To begin this report , we consulted the annual report booklet Accidents in North American Mountaineering (1948–), which analyzes and provides detailed descriptions of climber accidents that occur in North America. However, although this booklet contained a small number of accident statistics, most of it was presented in a descriptive format aimed at experts, making it difficult for the general public to understand accident trends.

As with police statistics , the database was surveyed on all types of accidents that occur in the mountains, and because the study was based on quantitative analysis , the number of open-ended responses was reduced , and most of the responses were multiple-choice with multiple answers . The survey items are broadly divided into five blocks. (1) Overview of the accident (injury/treatment status, accident location, etc.), (2) Basic data (physical strength/pre-existing conditions, mountaineering experience/purpose of mountaineering, risk response),

(3) Immediately before the accident (accidents , troubles, physical condition, etc.), (4) At the time of the accident (conditions, weather, location and route at the time of the accident, cause and cause of the accident), (5) After the accident (immediate awareness and situation, first aid, accident notification, rescue methods) . In consideration of the response format, data input per person was 687 items+the sketch in accident field.

2. Why is quantitative analysis necessary?

Even among those involved in disaster prevention, there is a strong tendency to differentiate disaster accidents from ``accidents that involve slipping and falling .'' However, even if the number of accidents is just a small slip & fall, it may be due to problems related to basic physical strength (muscle strength, balance, eyesight, hearing), decline in reflexes and concentration, and other aging problems and Mountaineering plans. Issues such as the nature of damage, the characteristics of damaged areas, and risk management issues are emerging.

Even if an accident seems to be simple, if you can grasp the quantitative trends of the circumstances under which accidents occur based on these factors, simply communicating the characteristics can be a major preventive measure. A typical example of this is the ``devil 14 o'clock'' period , when accidents tend to occur . I believe that simply knowing this fact would have put many climbers and hikers on alert and prevented accidents caused by human error.

3. 20th report break

This report commemorates the 20th Mountain Accident Report and compiles two types of accident databases and trial mountain accident database.

(1) History of mountain accidents seen from the National Police Agency's accident statistics

(2) Summary of the 20th report and information on the mountain accident database information of JMSCA and JWAF.

(3) Furthermore, we featured Mr. Mizote's ``Trial Accident Cases Regarding Important Mountaineering Accidents'' in this report.

Cases of court accidents related to important mountaineering accidents in Japan

JMSCA UIAA qualification committee
member, IMSARJ director
lawyer Yasushi Mizote

civil trial 1-22

civil judgment

○：responsible　×：not resposible

	accident year	location of accident	judgment date	court	month of accident	moutaineering mode	accident mode	victim	number of victims	defendant	responsibility	remarks
1	1970	Nishizawa Valley	1978.9.18	Tokyo District Court	May	fellows	broken fence	adult hiker	death 1	state	○	trail management responsibility
							fall			local government		
2	1977	Kiso Komagatake	1988.3.24	Tokyo District Court	March	technical college club activity	avalanche	technical college student	death 7	local government	○	led by teacher
								and alumnus				○：appellate court and Supreme Court
3	1978	Yatsugatake	1983.12.9	Shizuoka District Court	April	non-profit climbing tour	slipping down	adult climber	death 1	association, staff	○	○：officers who are not at the accident scene
										association officer		
4	1979	Osugidani	1983.12.20	Kobe District Court	September	group hiking	suspension bridge collapse	adult hiker	death 1	state	○	trail management responsibility
							fall		severe 1	local government		○：appellate court
5	1983	Tadami Shirato River	1986.9.26	Kyoto District Court	July	school club activity	sawanobori	high school student	death 1	local government	×	not led by teacher
		Melga Edazawa					failed crossing river					×：appellate court
6	1985	Mt.Hiwada	1991.1.21	Yokohama District Court	May	mountaineering club	climbing	adult climber	severe 1	fellow climber	○	accident at climbing rock area
							failure of rope belay					
7	1985	Mt. Rokko	1992.3.23	Kobe District Court	november	school hiking	rockfall accident	high school student	death 1	private school	×	not led by teacher
8	1986	Mt. Ishizuchi	1989.6.27	Matsuyama District Court	May	school hiking	fall	middle school student	severe 1	local government	○	
				Imabari Branch								
9	1987	Mt. Mituboshi	1992.5.26	Okayama District Court	May	school hiking	fall	elementary school student	death 1	local government	○	led by teacher
10	1989	Goryudake	1995.11.21	Nagano District Court	March	training session	avalanche	trainee	death 1	local government	○	snowy mountain training session
				Matsumoto branch								

Table 1

11	1994	Karasawadake	2001.10.26	Nagoya District Court	January	university mountaineering club	slipping down	uneversity student	death 1	state university student university alumnus	×	×：appellate court
12	1994	Ooasahidake	2000.3.15	Urawa District Court	July	school club activity	heatstroke	high school student	death 1	local government	○	
13	1998	Kanzaki River	2000.12.8	Nagoya District Court	not clear	fellows	sawanobori failed crossing river	adult climber	death 1	fellow climber	×	×：appellate court
14	2000	Dainichidake	2006.4.26	Toyama District Court	March	training session	snow eaves collapse	uneversity student	death 2	state	○	settled in appellate court
15	2006	Shiroumadake	2012.7.20	Kumamoto District Court	October	guided hiking	bad weather hypothermia	tour guest	death 4	guide	○	same accident as criminal judgment no.7
16	2006	Oze	2009.3.23	Fukushima District Court Aizuwakamatsu Branch	October	friendship	fallen tree	adult hiker	death 1	state local government	×	trail management responsibility
17	2007	Shiroumadake	2018.10.18	Sendai District Court	February	guided ski tour	avalanche	tour guest	death 2 injury 7	tour company	○	
18	2009	Shakotandake	2012.11.19	Sapporo District Court	February	solo snowboarding	fall during rescue	adult snowboarder	death 1	local government	○	police rescue operation ○：appellate court and Supreme Court
19	2013	Aconcagua	2015.3.17	Sendai District Court	January	guided climbing	frostbite	tour guest	Severe 1	guide	×	overseas guided climbing settled in appellate court
20	2013	Mt.Fuji	2017.12.7	Kyoto District Court	december	mountaineering club	fall during rescue	adult climber	death 1	local government	×	fire department rescue operations settled in appellate court
21	2014	Mt. Ontake	2022,.7.13	Nagano District Court Matsumoto branch	September	various	volcanic eruption	various	death 58 missing 5	state local government	×	volcanic eruption management respnsibility
22	2017	Chausudake(Nasu)	2023.6.28	Utsunomiya District Court	March	school club activity	avalanche	high school student teacher	death 8 injury 40	local government teacher	○：local government ×：teacher	

Table 2

criminal trial 1-7

criminal judgment

○：responsible　×：not resposible

	accident year	location of accident	judgment date	court	month of accident	moutaineering mode	accident mode	victim	number of victims	defendant	responsibility	remarks
1	1952	Ashibetsudake	1955.7.4	Sapporo District Court	June	school club activity	slipping down	student	death 2	teacher	○	fine led by teacher
2	1967	Ooasahidake	1974.4.24	Yamagata District Court	April	school club activity	bad weather hypothermia	student	death 3	teacher	×	snowy mountain climbing led by teacher
3	1988	Niseko Annupuri Harunotaki	2000.3.21	Sapporo District Court Otaru branch	January	guided snowshoe hiking	avalanche	tour guest	death 1 injury 1	guide	○	suspended prison sentence
4	1999	Mt.Youtei	2004.3.17	Sapporo District Court	September	guided hiking	bad weather hypothermia	tour guest	death 2	guide	○	suspended prison sentence
5	2002	Tomuraushi	2004.10.5	Sapporo District Court	July	guided hiking	bad weather hypothermia	tour guest	death 1	guide	○	suspended prison sentence
6	2004	Yakushima	2006.2.8	Kagoshima District Court	May	guided climbing	sawanobori failed crossing river	tour guest	death 3 injury 1	guide	○	suspended prison sentence
7	2006	Shiroumadake	2012.7.20	Nagano District Court Matsumoto branch	October	guided hiking	bad weather hypothermia	tour guest	death 4	guide	○	suspended prison sentence ○：appellate court

Table 3

civil trial

1. Nishizawa Valley sidewalk accident

In May 1970, a footpath fence in Nishizawa Valley broke and one hiker fell to his death. The court found that the fence lacked the ″normal safety″ and held the municipality that manages the fence liable for the structure (Article 2 of the National Compensation Law) and the national government's cost bearer (Article 3 of the same law). . 40% negligence offset.

2. Kiso-Komagatake Metropolitan National College of Technology accident

In March 1977, an avalanche occurred while the National College of Technology's mountain club party was traversing the slopes of Mt. Kisokomagatake, killing six students and one alumnus . The court found that the teacher's employer, the local government, was liable for damages on the grounds that the teacher had breached his duty of care. The victims of the accident were between 16 and 19 years old.

3. Yatsugatake Cultural Association accident

In April 1978, an employee of the cultural association was leading a group of 30 participants who had been recruited from the public and traversed a snowy rocky ridge near Mt. Yatsugatake, when one of the participants slipped to his death. The court found that the staff member who led the child had breached his duty of care, and held the staff member who led the child, the president and secretary general of the association who did not lead the child, and the association, which is the employee's employer, liable for damages. 30% negligence offset.

4. Osugidani Suspension Bridge Accident

In 1979, a suspension bridge in Osugidani collapsed and a hiker died after falling from the bridge. The court recognized the liability of the local government, which is the operator of the suspension bridge, for the structure, and the responsibility of the national government as the person responsible for paying the costs. 30% negligence offset (40% in the High Court judgment)

5. High school Mountaineering club accident

In July 1983, one student was washed away in a stream and died while climbing in the stream as part of his high school mountaineering club's club activity. The court denied that the local government, which is the teacher's employer, was liable for damages, stating that there was no breach of duty of care on the part of the teacher advisor who was not supervising the teacher.

6. Tokyo Seiryokai accident

In 1985, while trying to secure a second climber (it was his first time climbing) at a rocky area on Mt. Hiwada, a fellow member of a mountaineering club failed to secure the second climber, causing the second to fall to the ground, resulting in severe after – effects . The court found that the guarantor had breached his duty of care . 30% negligence offset.

7. Mt. Rokko hiking accident

In November 1985, one student was killed by a falling rock during a private high school event where students hiked Mt. Rokko. The teacher is not leading the class. The court denied the school corporation, the teacher's employer, liability for damages, stating that the school had not breached its duty of care.

8. Mt. Ishizuchi accident

In May 1986, while hiking Mt. Ishizuchi at a junior high school, a student dropped his hat and went to pick it up, falling off a cliff and sustaining serious injuries. The court held that the teacher's employer, the local government, was liable for damages, finding that the teacher who permitted the student's behavior was negligent. No set-off of negligence.

9. Mt. Samsung excursion hiking accident

In May 1987, during an elementary school field trip to Mt. Samsung (233 meters above sea level), the children took a wrong turn while descending the mountain, and one of them fell off a cliff and died. The court found that the teacher was negligent and

10. Goryu-dake Tomi-ridge accident

In March 1989, an avalanche at a mountaineering course for high school students and teachers on Mt. Goryu Tomi-ridge killed one teacher. The court held that when conducting snow training, there is a duty of care to thoroughly investigate the topography of the training location, snow conditions, weather conditions near the training site, etc. in advance, determine the risk of an avalanche, and avoid avalanche accidents. The local government, which is the instructor's employer, was held liable for damages caused by the instructor.

11. Karasawadake West Ridge Accident

In January 1994, a university mountaineering club member (sub-leader) fell to his death while descending Mt. Karasawadake's west ridge . The court denied the responsibility of the leader (a university student), the mountaineering club alumnus who served as the headquarters , and the university, stating that university students are generally responsible for their own responsibility.

12. Asahi mountain range heatstroke accident

In July 1994, one student in the high school mountaineering club died of heatstroke while hiking Mt. Daiasahidake. The court held that the local government, the teacher's employer, was liable for damages, stating that the teacher should have been taken to a medical facility sooner.

13. Kanzaki Kawasawa climbing accident

In 1998, while a group of friends were Mountaineering in the Kanzaki River in the Suzuka Mountains, one of them was swept away by the stream and died. The court ruled that there is no special duty of care between friends , and denied the person in a leadership position liability for damages.

14. Dainichidake accident

In March 2000, two trainees (university students) died when a snow eaves collapsed during a mountaineering training session held at Mt. Dainichi in the Northern Alps. The court found that the instructor's employer, the state, was liable for damages, stating that the instructor had a duty of care to investigate the size of the snow eaves in advance and not to enter the snowdrifted part of the snow eaves.

15. Mt. Hakuba guide hiking accident

In October 2006, four guests died due to wind and snow during a guided hike from Sobodani Onsen to Mt. Hakumadake. The court found that the guide had a duty of care to collect information in advance and take appropriate measures, such as canceling the hike, and found the guide liable for damages.

16. Oze falling tree accident

In October 2006, a hiker was killed while hiking a trail in Oze when a tree branch near the trail fell due to strong winds. The court denied that local governments, etc. are liable for structures in the event of falling trees caused by strong winds, citing reasons such as the fact that sidewalks cannot be said to lack the ``safety that they should normally have.'' Incidentally, accidents such as the 2003 Oirase Gorge falling tree accident and the 2000 Jogakura rockfall accident occurred on promenades. There are many precedents for accidents on promenades.

17. Mt. Hakkoda ski tour accident

In February 2007, an avalanche occurred during a ski tour in Mt. Hakkoda (5 guides, 1 employee, and 18 customers), killing 2 customers and injuring 7 others . One of the injured persons filed a lawsuit against the guide's employer, the tour company, but the defendant did not dispute negligence, and the court determined the amount of damages.

18. Mt. Shakotan rescue operation accident

In February 2009, while a police mountain rescue team was working to rescue a snowboarder on Mount Shakotan, the snowboarder fell to his death . The court found that the police officer's employer, the local government, was liable for damages because the police officer had breached his duty of care. 80% error in the district court and 70% in the high court.

19. Aconcagua guide climbing accident

During a guided climb in Aconcagua in 2013, a visitor suffered frostbite due to bad weather and suffered severe after-effects. The court denied liability for damages, stating that the guide had not breached his duty of care.

20. Mt. Fuji rescue operation accident

In December 2013, a firefighter fell to his death while a fire helicopter was hoisting him up from Mt. Fuji. The court denied that the local government, the employer of the fire department, was liable for damages, stating that there was no breach of duty of care in the fire department's lifting method.

21. Mt. Ontake eruption accident

In September 2014, Mount Ontake erupted, killing 58 people and leaving 5 missing. The court denied the national and local governments' liability for damages, stating that even if they had properly managed the eruption level, they could not have prevented the accident.

22. Nasu, Mt. Chausu avalanche accident

In March 2017, an avalanche occurred during a snowy mountain seminar for a high school mountaineering club, killing seven students and one teacher. The court recognized the teacher's negligence and held the local government liable for damages, but denied the teacher's liability for damages based on the provisions of the National Compensation Act, which states that individual public servants are not liable for damages.

Criminal trial (all charges are professional negligence resulting in death or injury)

1. Mt. Ashibetsu accident

was indicted for violating the duty of care to turn back. The teacher did not dispute negligence, and the court fined him.

2. Asahi mountain range freezing accident

In April 1967, three students of the high school mountaineering club died of hypothermia while hiking Mt. Daiasahidake through wind and snow . The court made a strict judgment regarding negligence, and found the instructor not guilty as there was no proof of negligence.

3. Spring waterfall avalanche accident

In January 1998, during a guided snowshoe tour near Mt. Niseko Annupuri (commonly known as Spring Falls), an avalanche occurred at the top of the stream while taking a break at the bottom of the stream, killing one tour passenger. , one person was injured. The lead guide was sentenced to eight months in prison, suspended for three years, for violating his duty of care to avoid entering an avalanche danger area.

4. Mt. Yotei accident

During a tour hiking Mt. Yotei in bad weather (one guide and 14 guests), two guests who were late from a party got lost and died of hypothermia near the summit. The tour guide who led the tour was sentenced to two years in prison, suspended for three years, for violating his duty of care to ensure the safety of his guests by waiting for them to join his group.

5. Tomuraushi guide hiking accident (2002)

In July 2002, during a guided hike in Tomuraushi in bad weather (one guide and seven passengers), one passenger became unable to move near the summit and died of hypothermia . The tour guide was sentenced to August in prison and suspended for three years (this is a different accident from the 2009 Tomuraushi accident in which eight tour passengers died).

6.Yakushima sawawa climbing accident

In May 2004, during a Mountaineering trip in Yakushima (one guide and four guests), three guests drowned while attempting to cross a stream that had swollen due to rain, and one was seriously injured. The guide was sentenced to three years in prison, suspended for five years.

7. Mt. Hakuba guide hiking accident

Criminal trial regarding 15 civil accidents .

The district court ruled that the foreseeability of the accident was sufficient to indicate that the person could freeze to death if the weather worsened, and sentenced the guide to three years in prison, with a five-year suspended sentence.

The high court's ruling stated that the content of foreseeing an accident is sufficient to be ``the possibility of deterioration in the weather such that there is a risk of an accident.''

The circumstances of the accident are similar to the accident involving Detective 2, but the court's method of determining negligence is stricter in cases involving Detective 2 and less lenient in cases involving Detective 7.

Organizational information and accident investigation of JMSCA & JWAF

Recover rate

1. Number of members and accident occurrence status at JMSCA / JWAF

As shown in Figure 1, the number of members of JMSCA and JWAF continues to decline, although the rapid decline in JMSCA has eased.
The total number of members for both was 58,990 , less than 60,000 (Table 4) .
The number of accidents increased by 65 at JWAF compared to the previous year, and decreased by 155 at
JMSCA , resulting in a combined total of 747 .
In addition, there were a total of 12
deaths , and the overall trend is on the safe side.
The mortality rate among those involved in accidents is also decreasing every year , probably due to changes in mountaineering styles due to the aging of the population.

Figure 1 Changes in the number of JMSCA / JWAF members

日山協（JMSCA）,労山(JWAF),都岳連共済(jRO)

2003－2022	Year	Num.of Member	Num.of Accidents	Fatalities	Quantity of Responses	Recover rate	Accident ratio to members 1:x	Death to member ratio 1:x	Death/accident person
日山協、労山、都岳連共催	2003	59428	528	23	199	37.7	112	2584	4.4
日山協、労山、都岳連共催	2004	65238	420	11	169	40.2	155	5931	2.6
日山協、労山、都岳連共催	2005	68430	446	28	96	21.5	153	2444	6.3
日山協、労山、都岳連共催	2006	70417	479	31	230	48.0	147	2272	6.5
日山協、労山、都岳連共催	2007	73448	516	24	227	40.9	142	3060	4.7
日山協、労山、jRO	2008	73668	527	22	218	46.9	139	3349	4.2
日山協、労山、jRO	2009	79390	530	37	179	29.4	149	2146	7.0
日山協、労山、jRO	2010	85454	574	24	188	34.1	148	3561	4.2
日山協、労山、jRO	2011	89751	629	21	190	34.1	142	4274	3.3
日山協、労山	2012	74405	613	18	214	34.9	121	4134	2.9
日山協、労山	2013	74835	703	31	220	31.3	106	2414	4.4
日山協、労山、jRO	2014	110516	850	38	221	26.0	130	2908	4.5
日山協、労山、jRO	2015	130111	940	37	247	26.3	138	3517	3.9
日山協、労山、jRO	2016	138960	1090	30	228	20.9	127	4632	2.8
日山協、労山、jRO	2017	148153	1077	37	382	35.5	137	4004	3.4
日山協、労山、jRO	2018	156601	1077	42	315	29.2	145	3729	3.9
日山協、労山、jRO	2019	163419	1038	30	251	24.2	157	5447	2.9
日山協、労山	2020	63981	801	16	239	29.8	79	3999	2.0
日山協、労山	2021	60585	837	14	229	27.4	72	4328	1.7
日山協、労山	2022	58990	747	12	232	31.1	78	4916	1.6

Table 4 Changes over time in the number of members and number of accidents at JMSCA, JWAF, etc.

Based on JMSCA member age distribution

Estimating the age distribution of hikers and climbers

Figure 2 show the generational distribution of JMSCA members over seven years. The age distribution of JWAF members attached to the figure also draws a similar curve. On the other hand, the age distribution of accident victims in the figure is a bar graph of Figure 6 (described later) in 2022 .

Both mountaineers and accident victims form a curve that peaks in their 70s . It is estimated that the age distribution of mountaineers nationwide will show a similar distribution.

In the figure, over seven years, the distribution curve steadily shifts to the right and declines overall, converging to the aging curve on the right side of the peak. It will be interesting to see whether the flow of this group of curves indicates a halt in Mountaineering activities due to the aging of hikers & climbers, or whether a new curve will emerge.

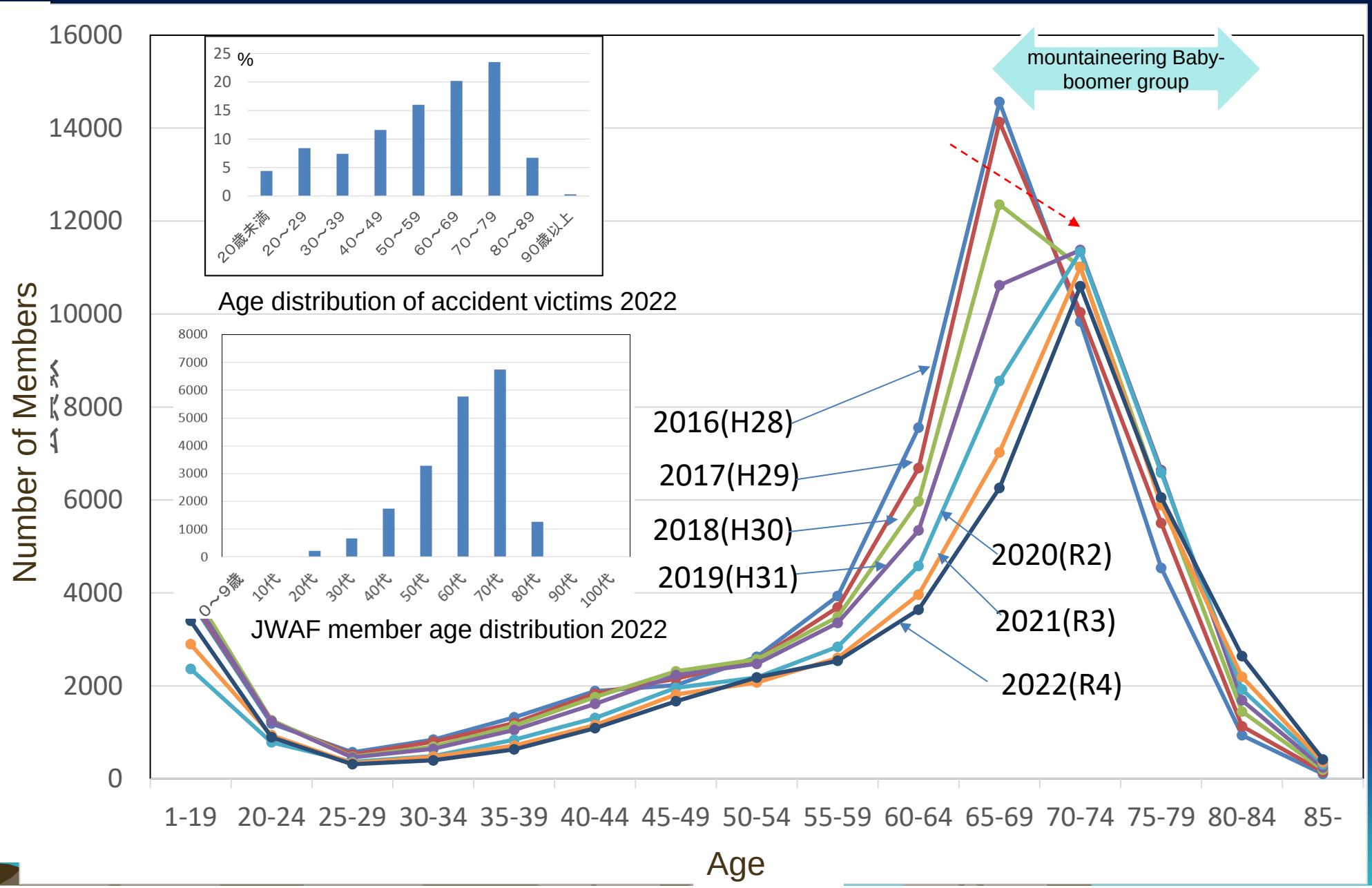


Fig.2 Changes in the number of JMSCA members (2016-2022)

Mountaineering activities researched by the Leisure White Paper

The White Paper on Leisure was conducted in 1979 by surveying approximately 3,000 men and women over the age of 15 using the door-to-door questionnaire method, and then switched to an Internet survey in 2009

The results of this survey are mainly used to estimate the Mountaineering population.
Please note that the Leisure White Paper will be published in October, so the "published in 2022 " reported here means 2021.

Mountaineering population drops to 4 million

Mountaineering popuration in Japan has cooled down to 4.4 million as seen in Figure 3 , as the long-lasting ``Heisei Mountaineering boom'' has come to an end . This is likely due to restrictions due to the coronavirus and the aging of the generation that supported the Mountaineering boom . I look forward to recovery from the coronavirus.

Furthermore, in the White Paper's table of ``Top 10 Leisure Activities in Participation Rate '' , ``Mountaineering'' had been appearing at around 8th place for many years, but it has almost disappeared. On the other hand, in a survey limited to people in their 80s , walking ranked first in terms of participation rate, while Mountaineering ranked 10th for men, which is close to extinction.

In a minor trend, Yoshida Rui 's Nippon Hyakkosan (below 1500 m) 2020 ~, produced by NHK based on the artist Yasuhiko Kobayashi's ``Japan Hyakkosan (Bunshun Bunko)'' , has been well received and the number of mountain mountaineers has increased slightly. is calling back.

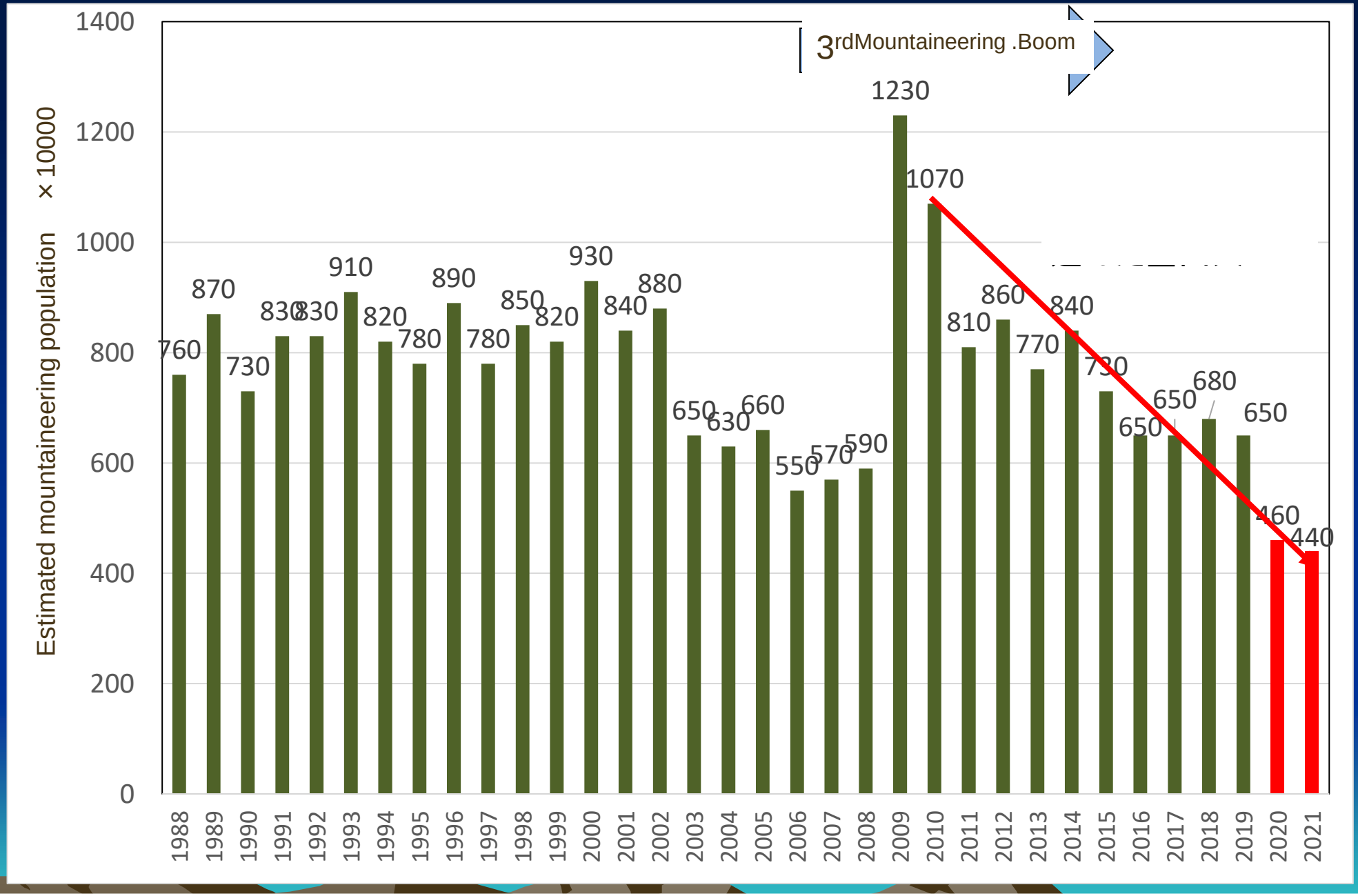


Figure 3: The number of mountain mountaineers has suddenly decreased due to the influence of the coronavirus. I look forward to future recovery.

I like the outdoors, but I'm not interested in Mountaineering.

Looking at the second camping boom has arrived due to the government's announcement (corona policy) to avoid the Three Cs , but it is said that the camping boom will end in 2023 as the coronavirus begins to be eased and sightseeing returns . On the other hand, camping at home and beramping (high-quality camping on one's own balcony) are expanding.

Various outdoor activities are being developed and people like outdoor activities, but the current situation is that they do not lead to Mountaineering activities.

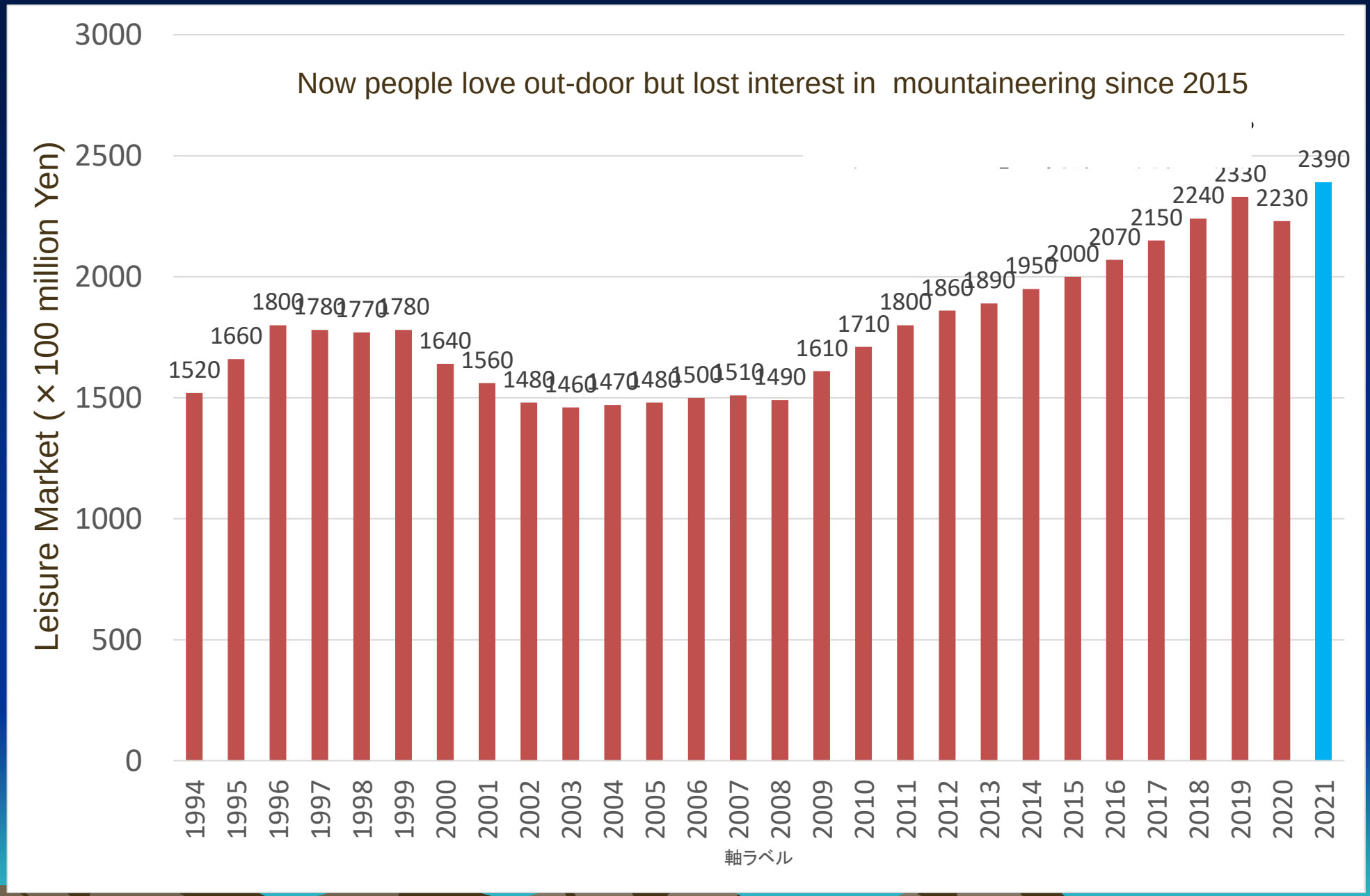


Figure 4 Trends in the leisure market (1994-2021)

2022 National Police Agency’s mountain accident statistics

This data has been reanalyzed and processed based on the National Police Agency's accident statistics published in June by Chiaki.

The National Police Agency is reporting the results of the investigation from January to December in 2022.

1. Trends in mountain accidents

In 2022 , the number of people lost in mountain accidents increased sharply by 431 people from the previous year, returning to the upward trend that had been rapidly increasing since around 2013 (Figure 5) . As a result, the number of people in distress reached an all-time high of 3,506 , and the number of accidents occurred at 3,015 .

There has been a rapid increase in the number of victims due to recovery from the coronavirus, but although 70- year-olds have become the main victims, this means that the number of victims has not yet begun to decline due to aging.
Furthermore, 1,306 people were injured and 1,873 people were safely rescued, both the highest numbers ever.

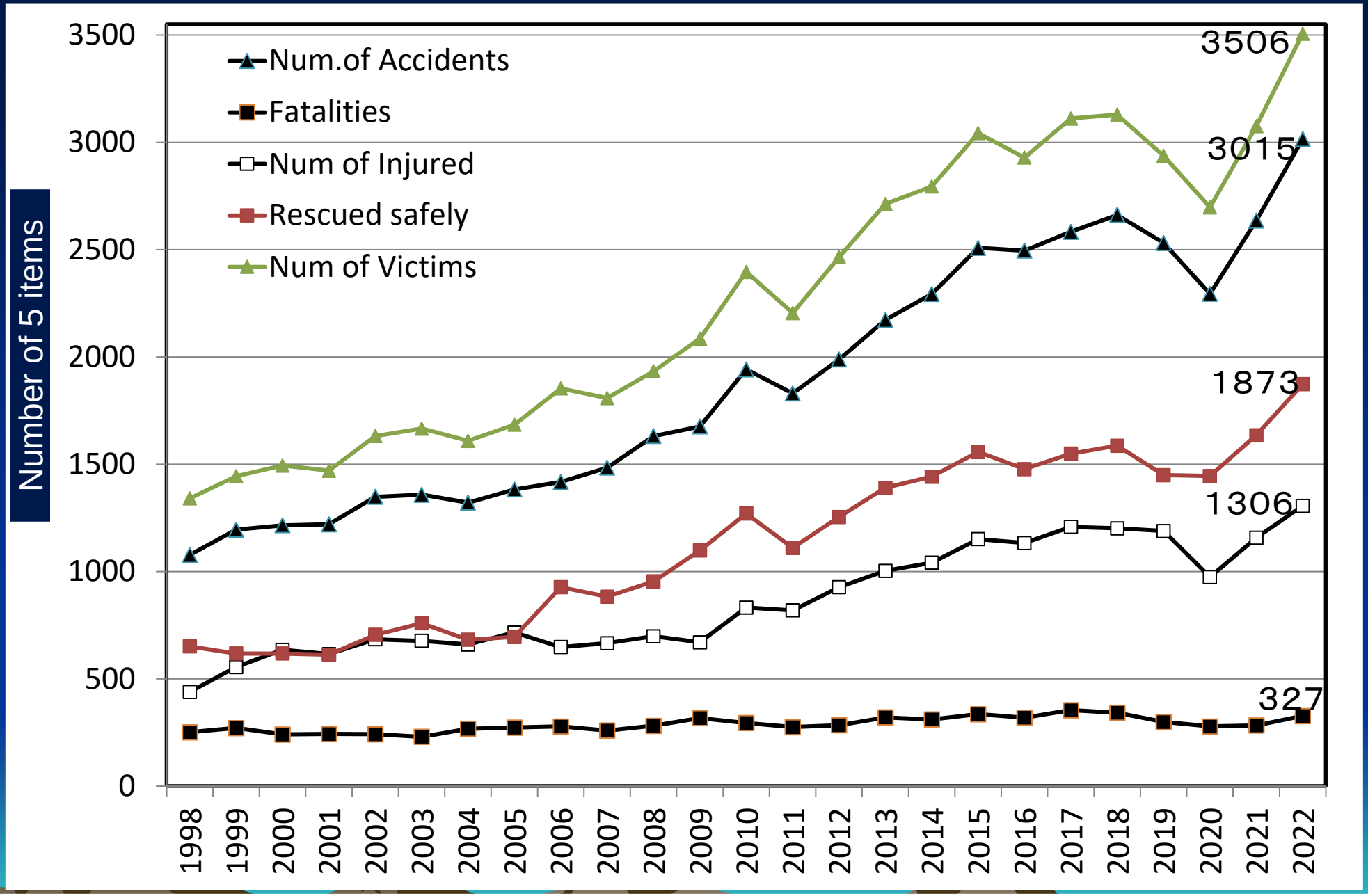


Figure 5 Occurrence status of mountain accidents in

2. Age distribution of accident victims

Figure 6 shows that the age distribution of accident victims peaked in their 70s (23.5%), as in the previous year. The typical age pattern of accident victims remains the same: 30.5 % are over 70 years old , and half (50.7%) are over 60 years old .

Figure 7 shows the age distribution of accident victims by generation . If we assume that the future curve for people in their 70s will be similar to the curve for people in their 60s , it will start to decline within the next two to three years. However, it is difficult to imagine that all of this decrease will shift to people in their 80s . If the number of people in their 80s increases significantly, we will be heading into an era of super-aging sports that has never been experienced in human history.

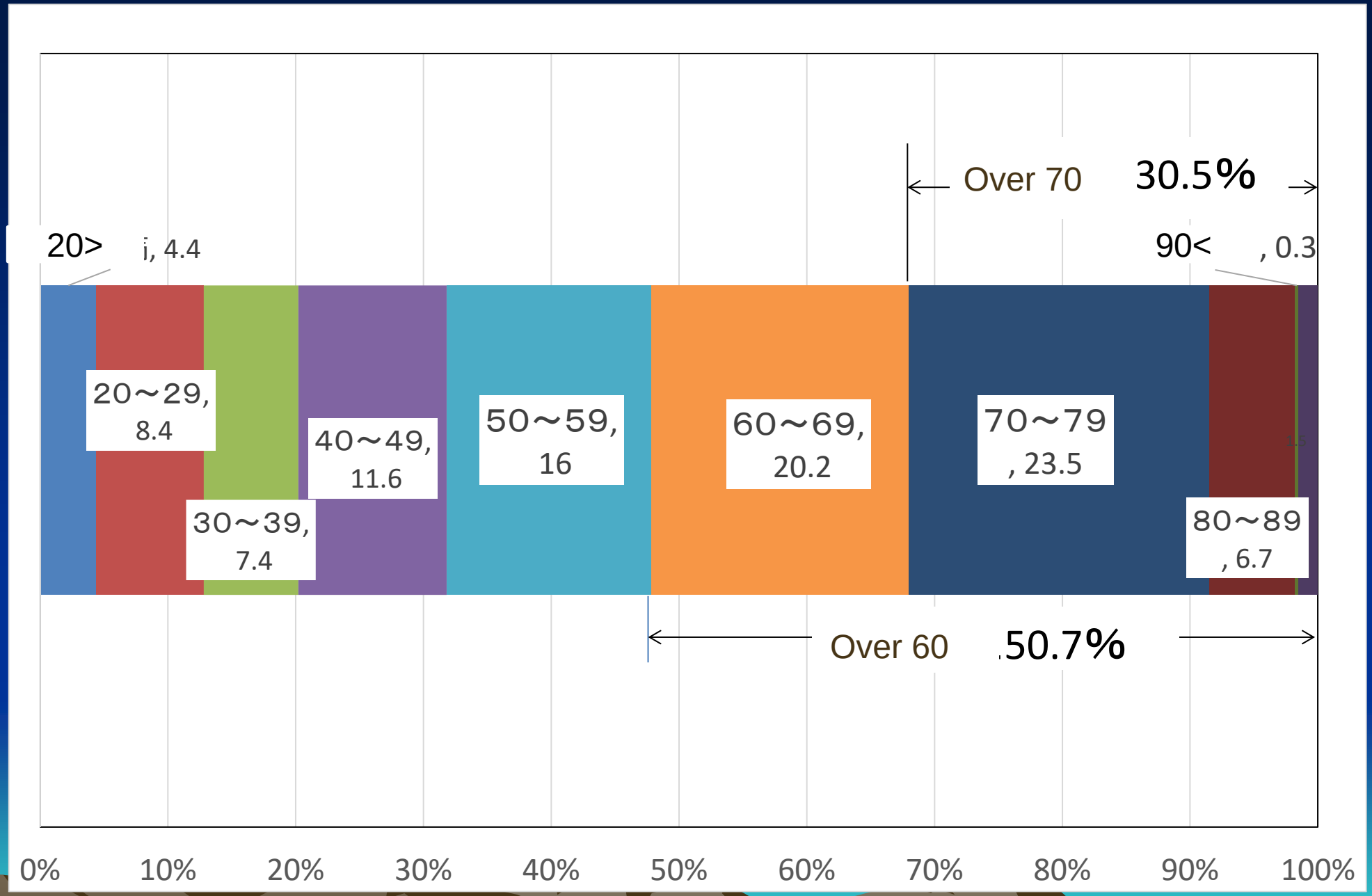


Figure 6 Age distribution of accident victims

Accident rate by generation

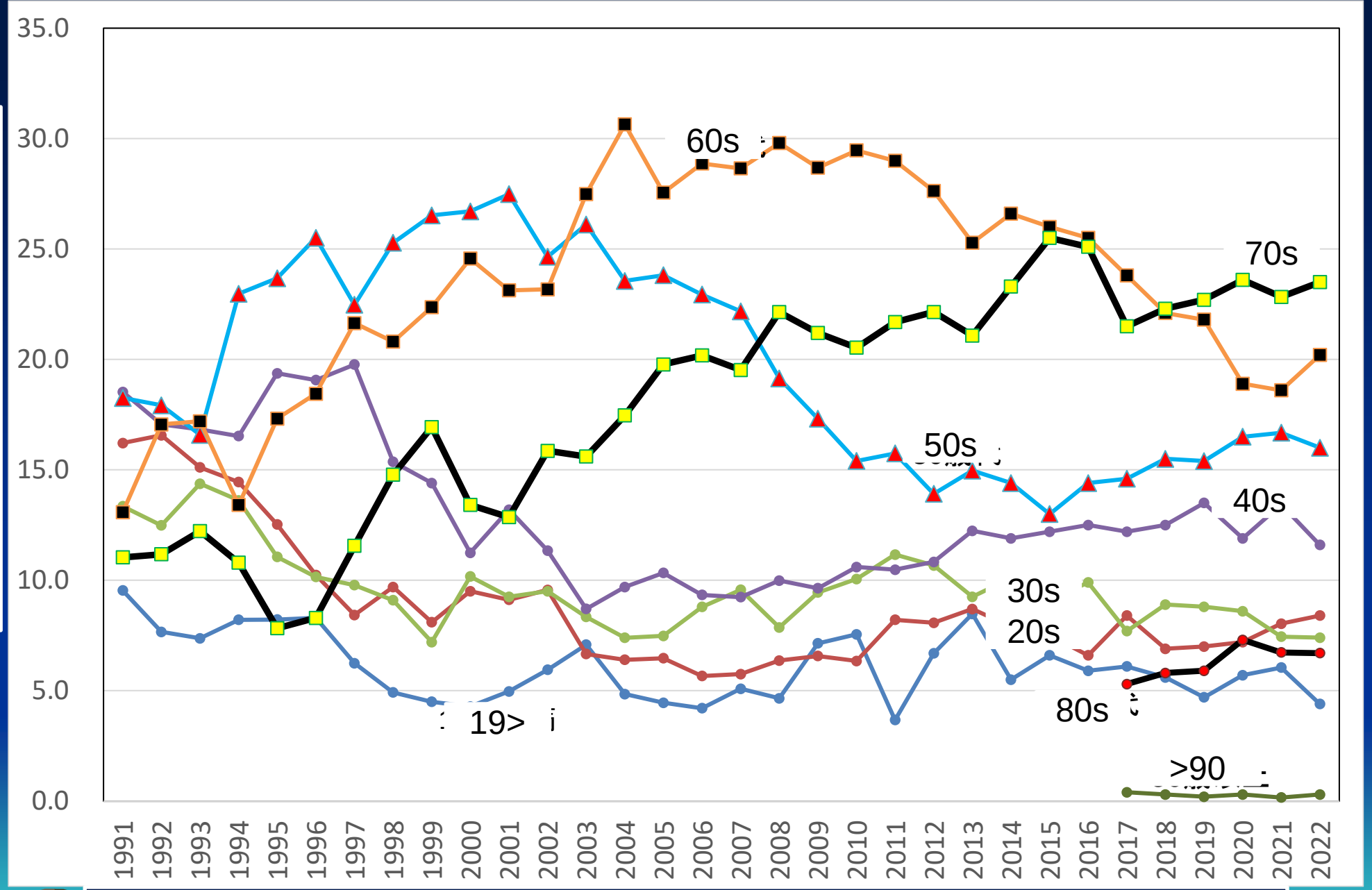


Figure 7 Changes over time by each generation

3. Activity

We believe that the behavioral awareness of mountaineers has been greatly affected by the coronavirus. Assuming that the number of people lost is reflected in the number of mountaineers, in order to see the trends in each item, the percentage change was calculated for each year based on 2018, the peak of accidents before the coronavirus. It is

Focusing on the Activity, the number of accidents decreased sharply, reflecting the decline in the number of mountaineers, which suffered the most damage from the coronavirus in 2020 . After that, it increased slightly in 2021, and in 2022 it reached 2333 people, 1.15 times higher than the peak period (Table 5).

The number of hiking accidents related to nearby Mountaineering, which has increased due to the influence of the coronavirus, continues to be high. On the other hand, activities such as wild vegetable picking and tourism remain low.

Item	Victim
Hiking	2333
Walking	248
Mountain Ski	38
Canyoning	47
Climbing	60
Vegetable Picking	319
Fishing	47
Job	52
Sightseeing	70
Photography	28
Montain Faith	12
Sightseeing	23
Hunting	11
Other	218
Total	3506

Table 5 2022 Number of victim in mountain activity

Other	2019/18	2020/18	2021/18	2022/18
Hiking	0.94	0.83	0.99	1.15
Walking	0.99	1.45	1.61	1.54
Mountain Ski	1.30	0.80	0.89	0.70
Canyoning	1.21	0.89	1.06	1.00
Climbing	1.13	1.26	1.35	1.94
Vegetable picking	0.94	0.99	0.90	0.83
Fishing	1.64	1.60	1.48	1.88
Job	0.84	0.88	1.07	1.21
Sightseeing	0.44	0.23	0.35	0.50
Photography	0.65	0.57	1.00	1.22
Mountain faith	2.00	1.00	1.50	3.00
Nature viewing	0.92	1.69	1.38	1.77
Hunting	1.80	1.20	2.60	2.20
Other	0.98	0.70	0.81	1.25
Number of accidents	3129	2937	2697	3075	3506
	Before		CORVID		Before

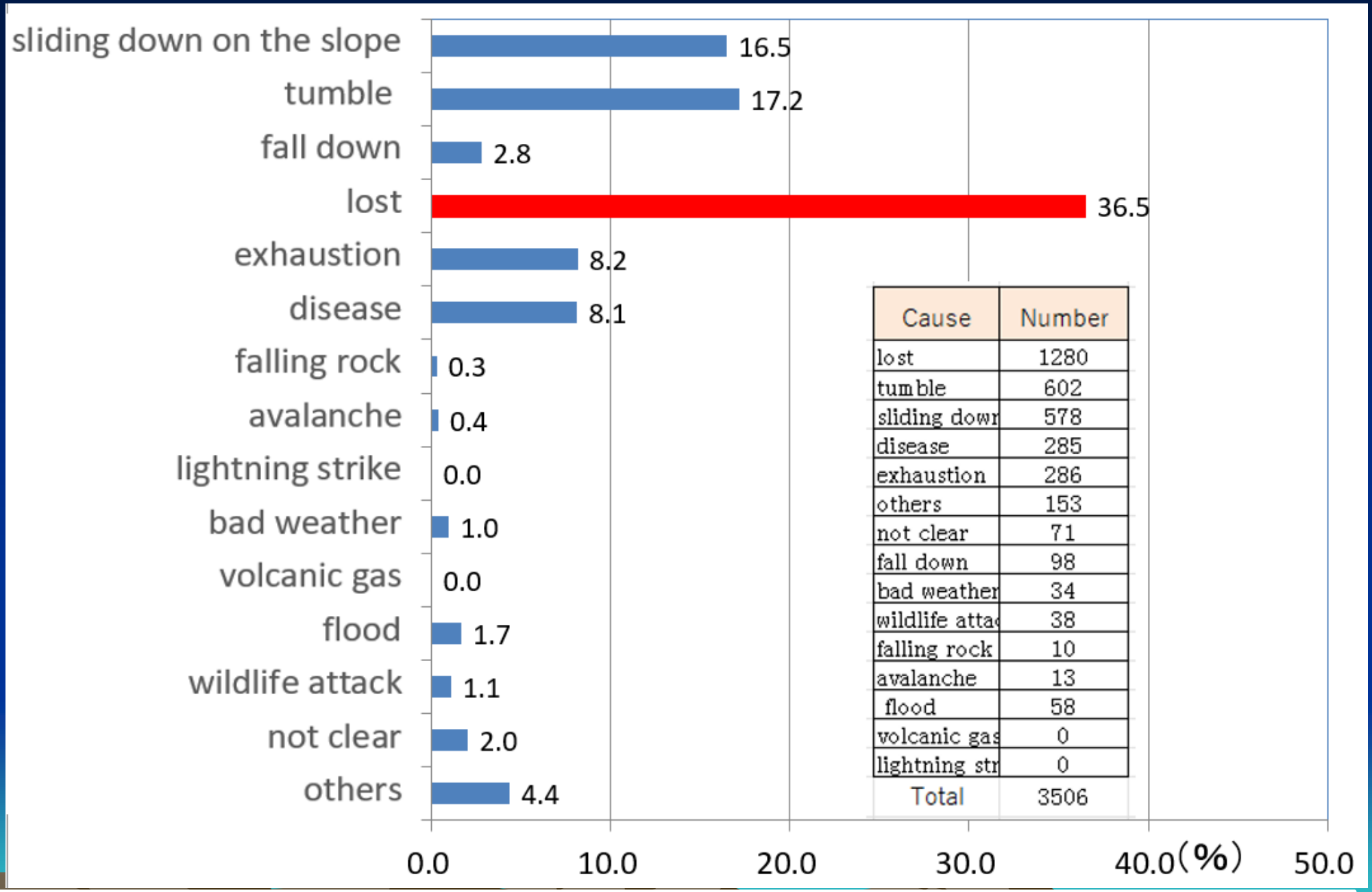
Table 6 Change ratio for four years based on the highest value before the coronavirus in 2018 (skin tone indicates a decrease, light blue indicates an increase)

4.Cause of accident

Figure 8 shows that the percentage of people getting lost has fallen from 41.5% in the previous year to 36.5 %, but the number of incidents remains unchanged at 1,280 (1,277 in the previous year). The reason why the number of accidents did not increase compared to the increase in the total number of accidents (see Figure 5) is thought to be due to a decrease in the number of wild vegetables and mushrooms collected.

In addition, slips and falls (+82) , falls (+92) , illnesses (+67) , and fatigue (+82) each increased significantly from the previous year.

On the other hand, flash floods, which are rarely recorded in previous years, have increased. Fifty-eight people were stranded in the flash floods that occurred in August at Ta Falls and Gengawa River in Ogimi Village, Nago City, Okinawa . One person died at Ta Falls . This accident is one of the reasons for the increase in the number of people lost.



Cause	Number
lost	1280
tumble	602
sliding down	578
disease	285
exhaustion	286
others	153
not clear	71
fall down	98
bad weather	34
wildlife attac	38
falling rock	10
avalanche	13
flood	58
volcanic gas	0
lightning str	0
Total	3506

Figure 8 Rate of Causes

Impact of coronavirus and number of accidents by prefecture

Looking at the number of accidents by prefecture, we can see that since 2020 , when the coronavirus rapidly spread nationwide and all mountaineering activities were canceled, despite the impact of the coronavirus, methods to respond to the coronavirus have become more widespread . It gradually increased again in 2022 and 2022 (Table 7).

This process can be seen in Figure 9 , a graph of five Mountaineering prefectures based on the peak season of 2018 . This graph shows a rapid return, but it is clear that Mountaineering prefectures have not yet returned to 2018 levels . On the other hand, on a national scale, as shown in Figure 10 , a linear return curve and increase curve far exceed the 2018 level are drawn . Mentally, it seems that the constraints from the coronavirus have eased and Mountaineering activities have become more active nationwide, but details are not known.

Prefecture	Num. of Accident
Nagno	284
Tokyo	205
Hokkaido	192
Yamanashi	155
Kanagawa	151
Gunnma	130
Gifu	129
Shizuoka	124
Hyougo	123
Toyama	115
Niigata	114
Saitama	87
Tochigi	86
Yamagata	86
Nara	74
Akita	72
Fukuoka	71

Table 7 Number of accidents by prefecture in 2022 (top 20)

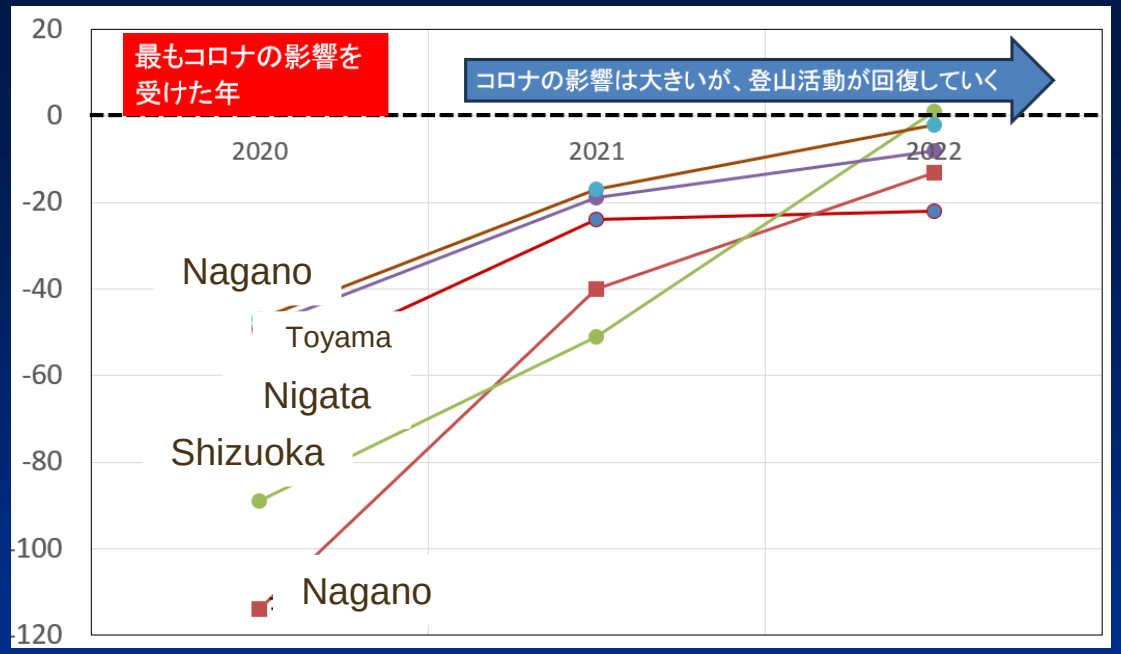


Figure 9
Decrease in the number of coronavirus cases and recovery process since the peak of 2018 in Mountaineering prefecture

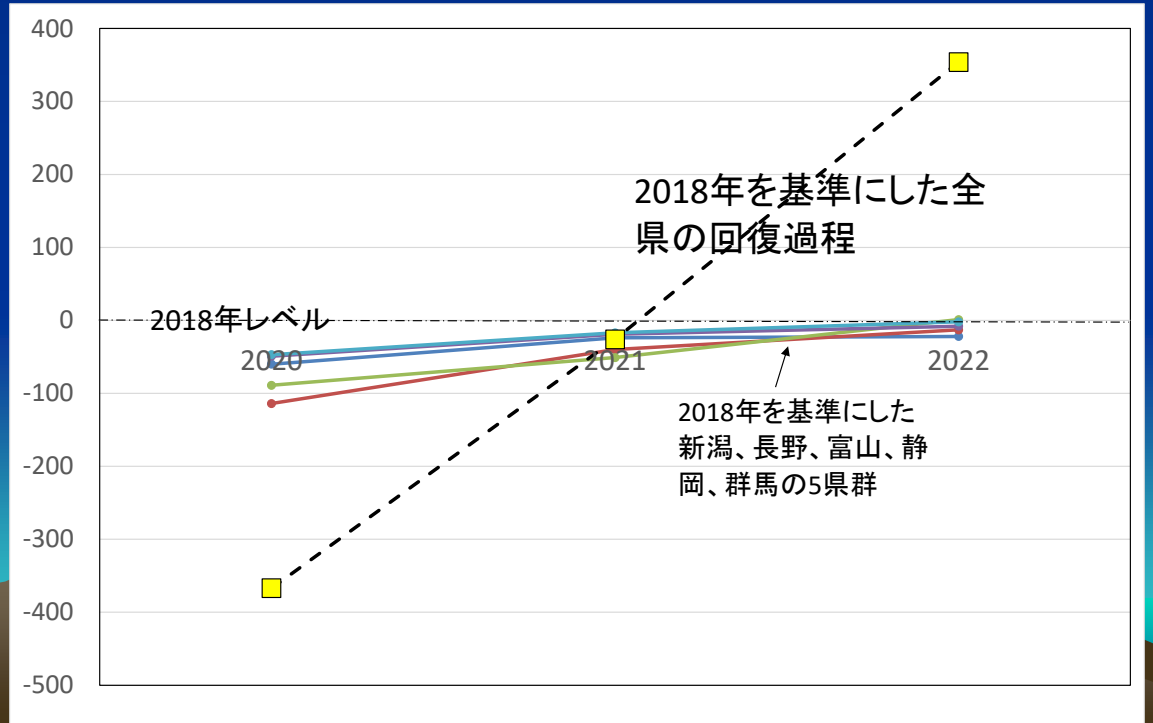


Figure 10
In addition to the five prefectures shown above, the recovery process for all prefectures is shown. It is increasing in a perfect straight line.

History of Mountaineering accidents as seen from National Police Agency accident statistics

1. Characteristics of police mountain accident statistics

For many years, the National Police Agency's mountain accident statistics have been the most important indicator for understanding the status of mountain accident occurrences in Japan.

Its characteristics are:

(1) Handles all accidents that occur in the mountains of Japan.

(2) Long term (1956 -present) It has been implemented for 68 years.

There are many problems. Mountain accidents require the police to be dispatched, accident data is incompletely disclosed (for example, by gender), there is no consistency with mountain accident data held by fire departments, and the determination of accident type has nothing to do with Mountaineering. This was done based on the judgment of those without knowledge, and the situation (cause) was determined based on the judgment of the situation at the time of dispatch.

The total number of data handled by the police

Police statistics were originally released by the Central Research Council for Mountain Accident. The starting year is ambiguous, and it is available from 1956 . Initially, the survey item was the ``number of accidents'' and did not include ``number of victims'' or ``safe rescue.‘’

- Total number of accidents handled by the police (from 1956 to present) is 69,682 data.
- Total “fatalities and missing” 14,806 people
  Total injured persons 34,129.

The total number of victim became available in 1976, when the item ``safely rescued'' was added . (1976 -Present)

- Total number of people safely rescued: 34,952 people
- Total number of people in distress: 74,080 people

Moujntaineering history seen from the perspective of changes over time in the occurrence of accidents

Figure 11 was drawn based on the number of accidents from 1956 to 2023 . In the figure, the first to third mountaineering booms are defined differently by Haneda, Kamiya, Kikuchi, Yamagata, and others. The lines are very different. Broadly speaking, we have seen a transition from adventure mountaineering to mass mountaineering to the age of mountaineering based on media information, and then we have entered the age of mountaineering for the elderly .

The generation that became obsessed with Mountaineering at the beginning of this era of mass mountaineering is known as the `` mountain baby boomer generation '' born between 1940 and 1955 . They are the generation that created the Mountaineering boom of the Heisei era and significantly rewritten the form of Mountaineering in Japan. This is creating a unique era of elderly mountaineering, which is rare even in the world (Figure 12). There is no doubt that as this generation enters the late-stage elderly population and eventually disappears due to old age, we predict that Japan's Mountaineering style will fundamentally change.

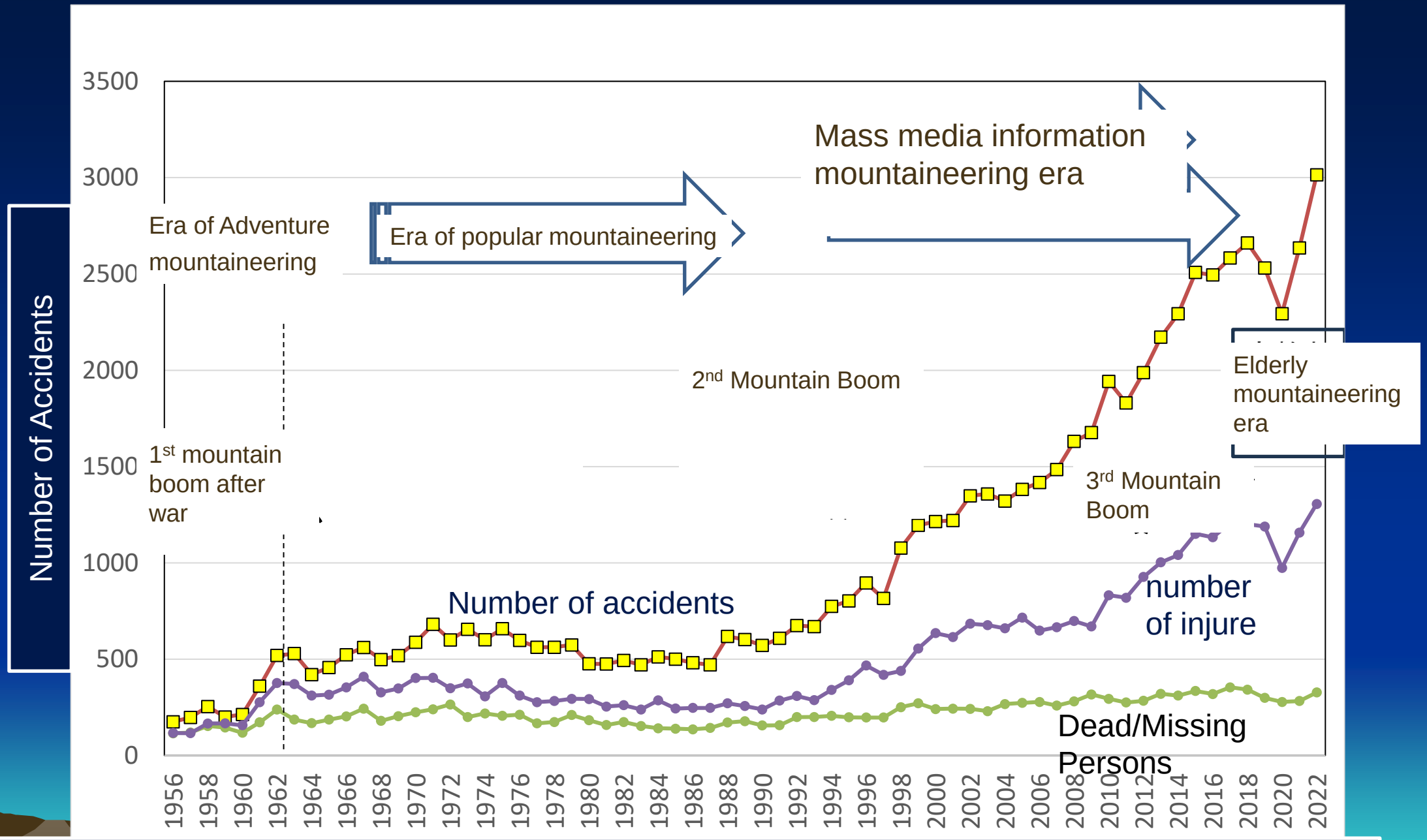
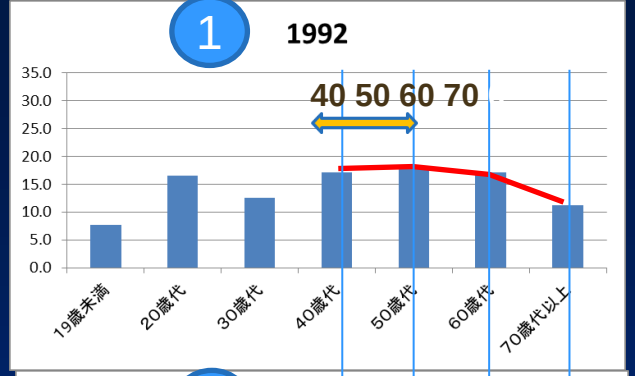
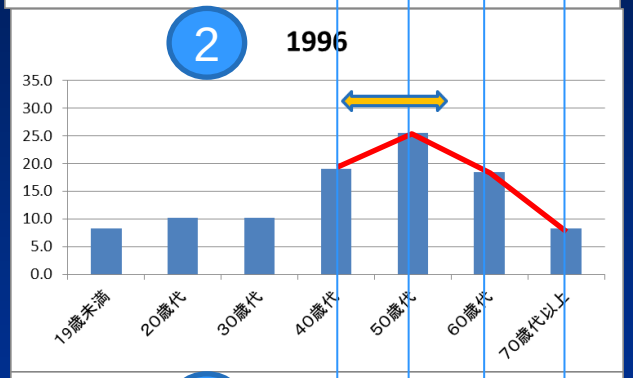
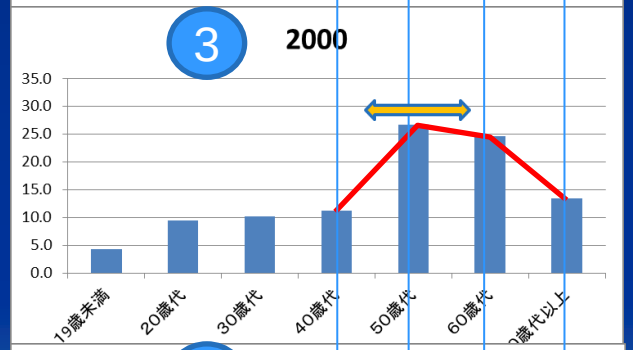
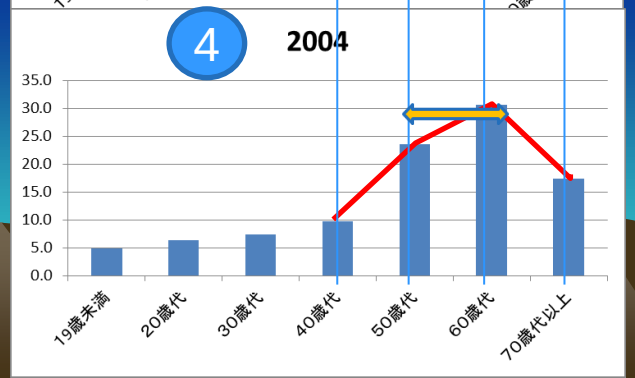


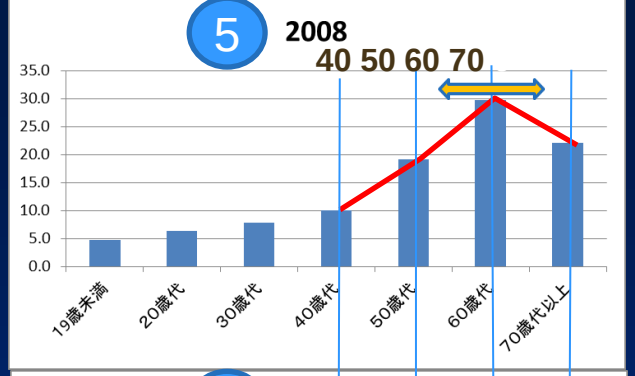
Figure 11 History of Mountaineering seen from the perspective of changes over time in the occurrence of accidents

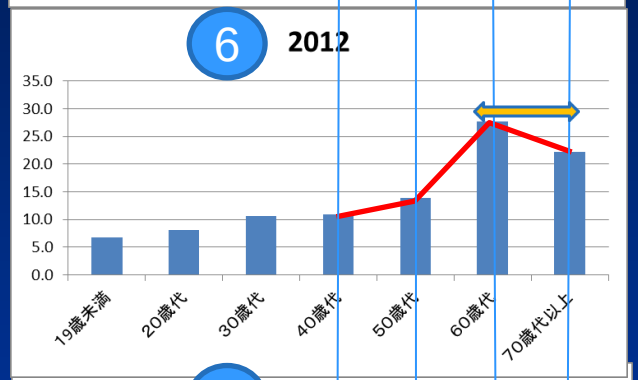


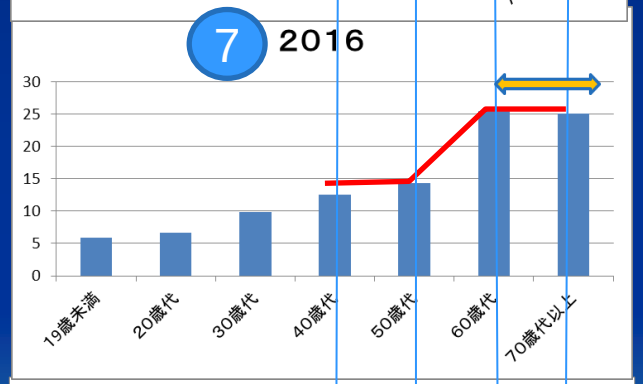


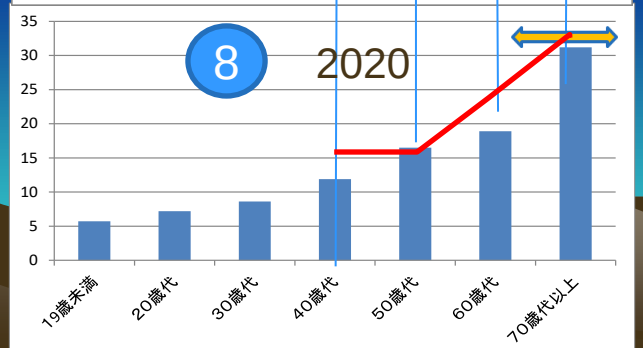












Aging mountain-baby-boomer generation

Born between 1940 and 1955 , the yellow arrows in the diagram indicate the age range of baby boomer

The left panel of Figure 12 shows how the peak of Accident Age distribution shifted

2. Trends in accidents by Activity

1998-2022 (25 years)

Mountaineering-related and non-mountaineering-related items have been used for Activity. Figure 13 shows the secular change over 25 years . ``Canyoning' was added to the list of items used in 1997 , and ``moutain skiing'' on the slopes was added in 2015

Mountaineering type = Mountaineering, hiking, ski mountaineering, Canyoning, rock climbing

Non-mountaineering = picking wild vegetables, mountain stream fishing, work, sightseeing, photography, mountain worship, admiring nature, hunting, etc.

The ratio of Mountaineering to non-mountaineering is approximately 7:3, but over the past 25 years, cmountaineering has increased. There is a tendency to Note that there are usually multiple purposes for Mountaineering, such as Mountaineering, nature viewing, and photography, but they are not categorized here.

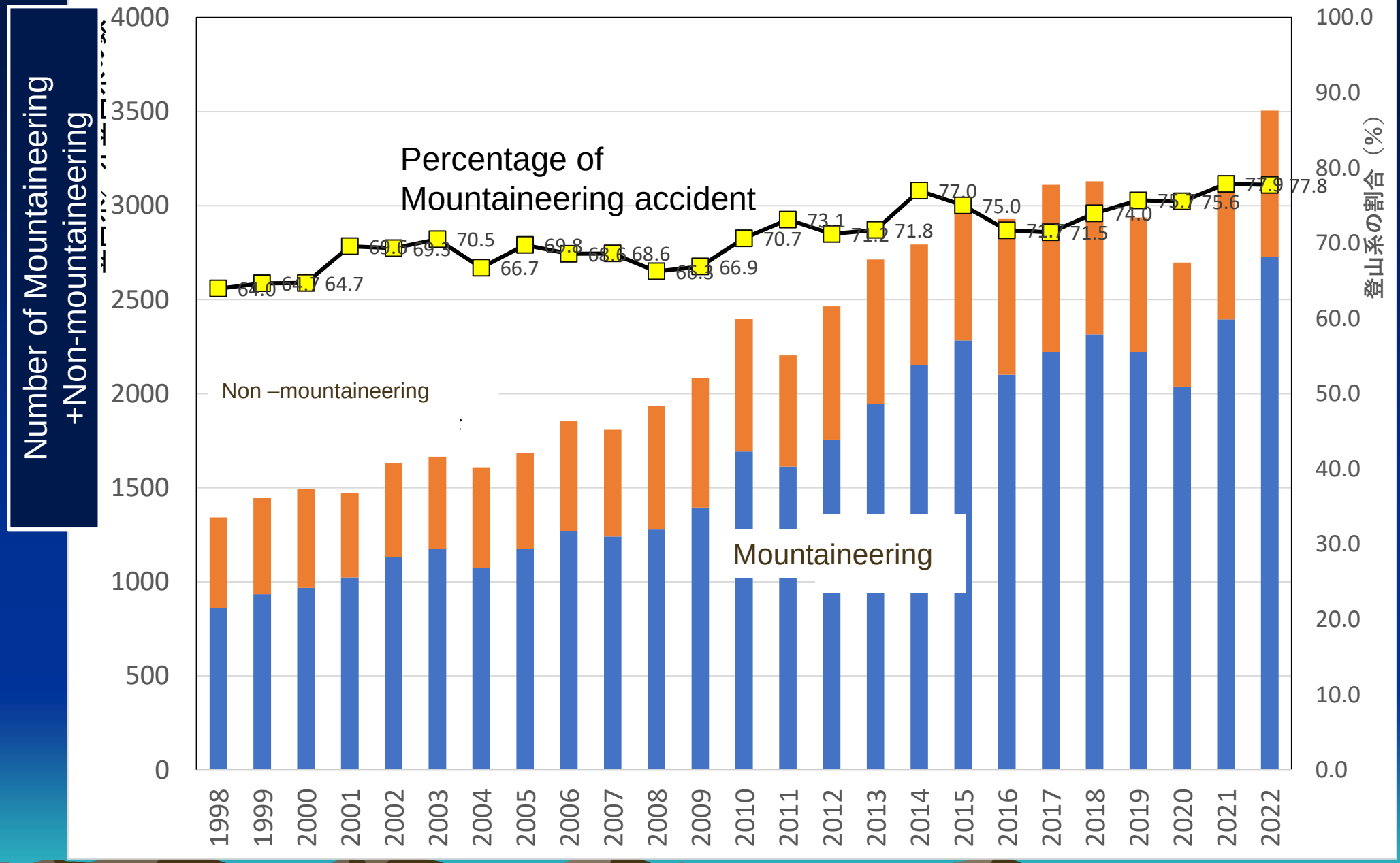


Figure 13 Activity in mountaineering and non-mountaineering (1998 - 2022)

3. Cause of Mountaineering accidents 1998-2022 (25 years)

There are 15 accident factors that are treated in accident statistics. However, there are very few cases in which the cause of a Mountaineering accident can be narrowed down to one factor, and even experts have difficulty narrowing it down to one factor. For this reason, it was a very good solution to use the ``situation'' of the accident instead of the ``cause'' in the nationwide accident investigation . Indeed, if we focus on the the situation at the time when the rescuer and the accident victim met at the accident scene, it becomes possible to make a choice. Since this judgment method also allows for a general understanding of the circumstances of an accident, they probably thought that it could be used as an indicator for understanding the situation of mountain rescue accidents.

25 years (1998 to 2022) regarding main aspects ① to ⑦ are summarized below.

① Characteristics and trends of getting lost accidents 1998-2022

The ``getting lost'' accident is the item that seems to be the most situation accident type.'' When a rescue request is made and the person is found and observed, if the person is not injured or weakened, the ``lost'' item on the survey form is selected as ``safely rescued.‘’

In Europe and America, getting lost is classified as `` overdue ,'' but getting lost by the National Police Agency is treated as the same thing. It is also estimated that many of those who get lost are people who went into the mountain to pick wild vegetables and got lost, but this is only a guess as the original police statistics are not made public.

As shown in Figure 14 , the number of people getting lost has rapidly increased from around 200 people in 1998 , and exceeded 1000 people in 2012 . The proportion of all accident causes has reached a maximum of 44 %. This sudden rise in numbers, which exceeded 1,000 , and the subsequent stagnation in the number of mountaineers is presumed to be due to the aging of mountaineers, but for the same reason as mentioned above, the data cannot be narrowed down.

On the other hand, ``getting lost'' has been positioned as the most effective cause of accidents in the accident reduction movement. By 2022, the number of accidents can be reduced to
2,226 people (2011 level) if we eliminate getting lost. Unlike accidents resulting in injury, getting lost is a factor that can be dramatically reduced simply by improving mountain trails and information boards.

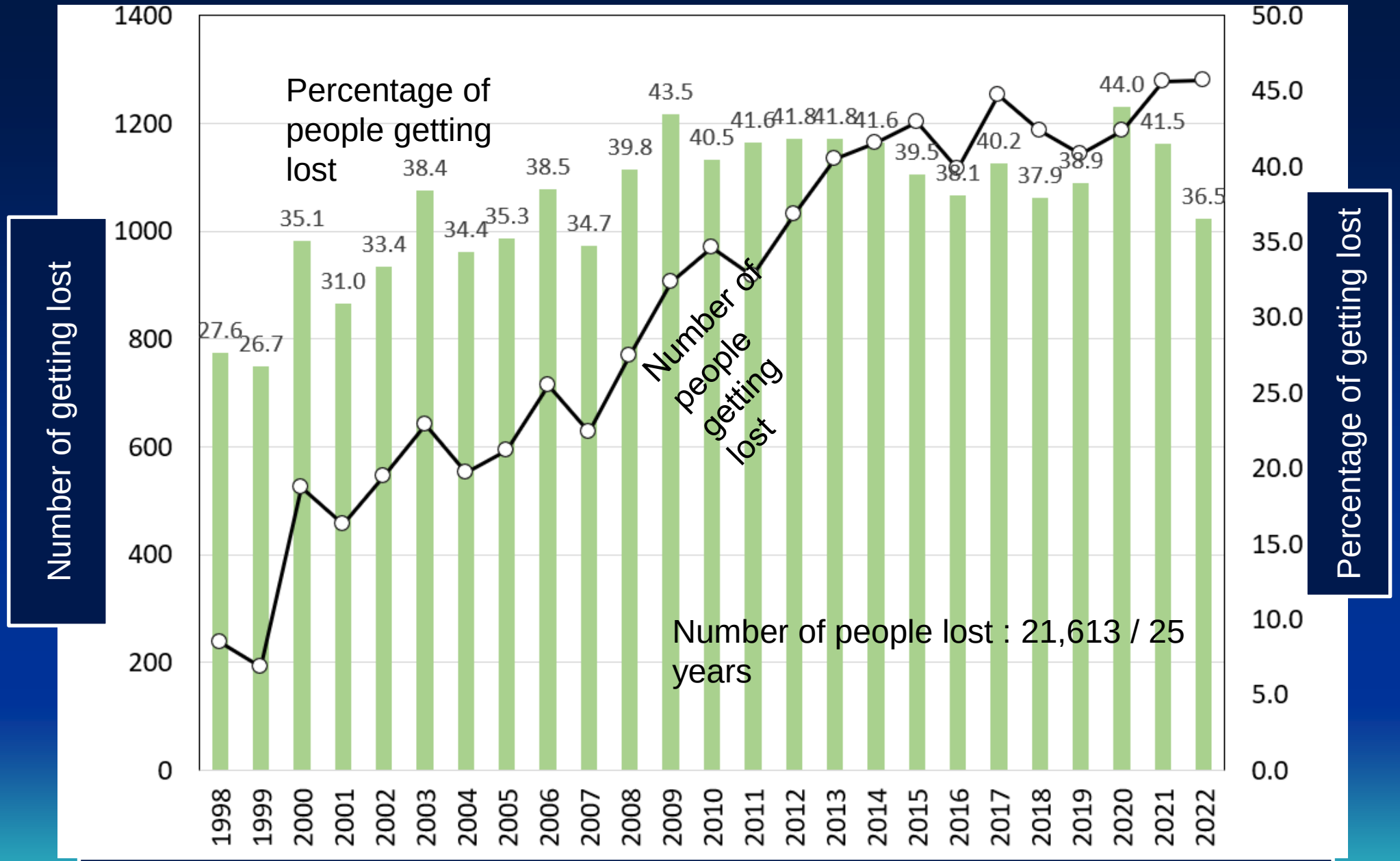


Figure 14 Changes over time in the number of getting lost and the proportion of getting lost in all accident factors

②Characteristics and trends of slidding down, tumble and falling accidents 1998-2022

Till 1996 , ``sliding down'' and ` `falling'' were treated as ``sliding down and free falling.'' The definition of the term is not clear. In the glossary, ``sliding down'' is defined as ``sliding down on icy and snowy slope,'' but in reality there are only a few cases of ``sliding down'' on icy and snowy slopes, and the majority of cases refer to cases of sliding down dirt or rocky slopes. On the other hand, a "falling" is generally used as "falling off a bed," and corresponds to a "fall" in which a person loses their balance and falls freely.

Since ``tumble'' also includes the act of falling to some extent while falling, ``tumble'' and ``falling'' are often only a distinction based on the difference in scale.

However, although the terminology is ambiguous, there is actually a huge difference between falling,sliding down, and tumble. This has become clear from the research results of damaged parts in the mountain accident database (see the 19th Accident Report).

Attention! Before reading here.
In Japan, five terms are used as "falling" terms in the mountain.
Tuiraku (free falling),Tenraku (turn and then free falling), Katuraku(sliding down on the slope), Tenkaturaku (sliding down and free falling) , Tentou(tumble).
But five term's definition is not clear. In this sentence, I discuss how to use them.
So it is difficult to transfer from Japanese to English.

Figure 15 shows the changes over time in falls, slips, and falling accidents . As is clear from the figure, only "fall" draws a curve with a different trend. "Fall" is used to refer to falls where a person loses their balance and falls freely on a steep rock, etc., so it is estimated that it does not occur as frequently as falls and slips.

The rate of falls, slips, and falls was high at 35 to 40 % around 1998-99 , but it has since declined, perhaps due to changes in mountaineering styles, and the rapid increase in the number of people getting lost. It is maintained at around 32%.

Furthermore, when comparing the overall curve shape of the accident person (see Figure 5) with the curve shape of falls and falls, the curve shapes are very similar, and we believe that this is one of the indicators that conveys the overall accident occurrence situation.

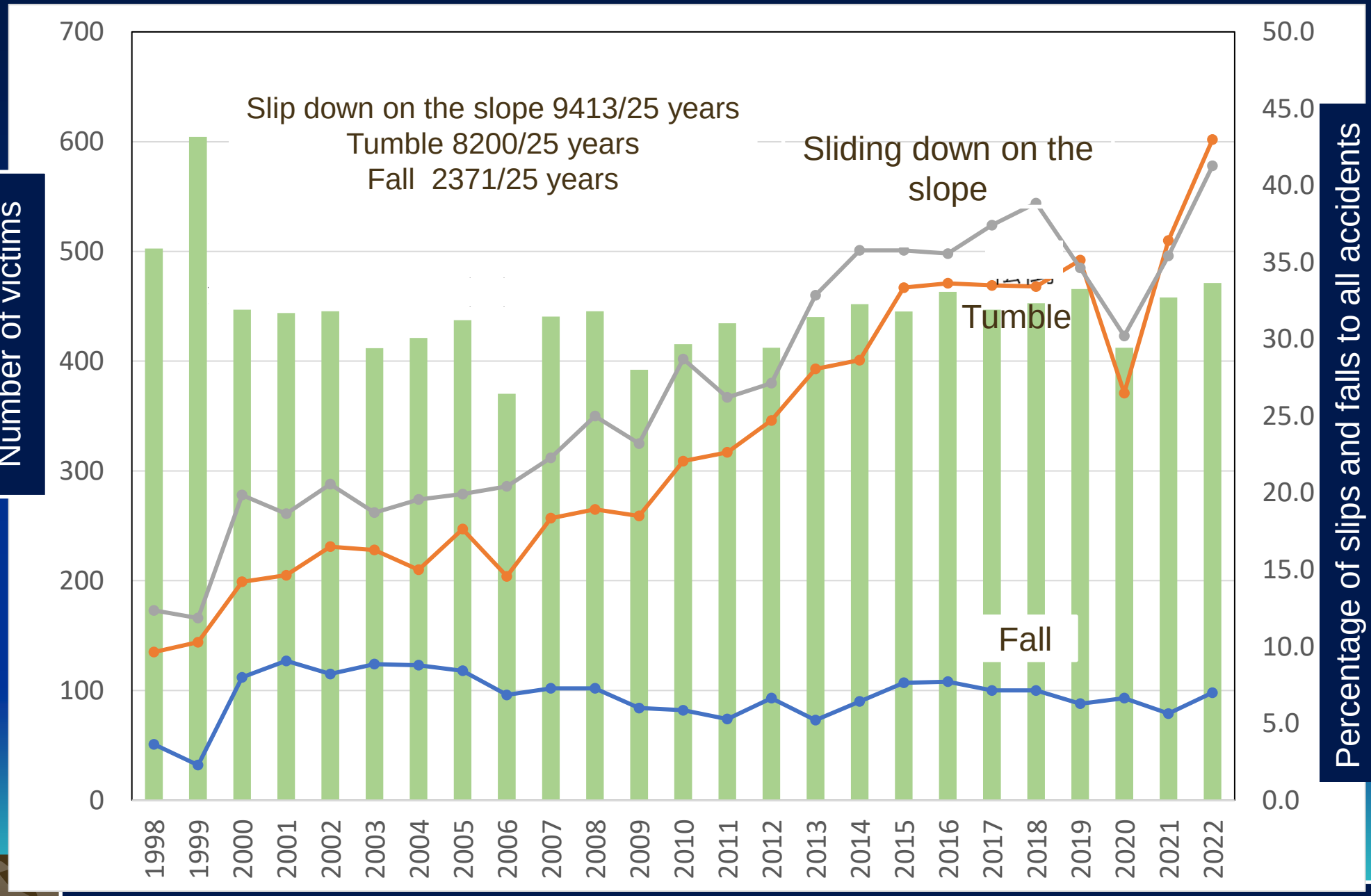


Figure 15 Changes in slidding down, fall, and tumble over time (1998-2022)

③ Changes in illness and fatigue over time

It was expected that the proportion of "illness" as a cause of accidents would increase as the mountaineering population aged, but as shown in Figure 16, it has remained stable at 7 to 8 % . . Considering that elderly people are characterized by ``careful planning and action", this was a natural result since they do not push their physical health to the limit to climb & hike mountains.

On the other hand, "Fatigue" in Figure 17 is a case other than illness, and is probably a case where a person is unable to move due to muscle or sinew pain and requests for rescue. The percentage of respondents reporting "sickness" is 4 to 7% , which is a slight increase overall. It is predicted that the impact of aging will be more on fatigue than on illness.

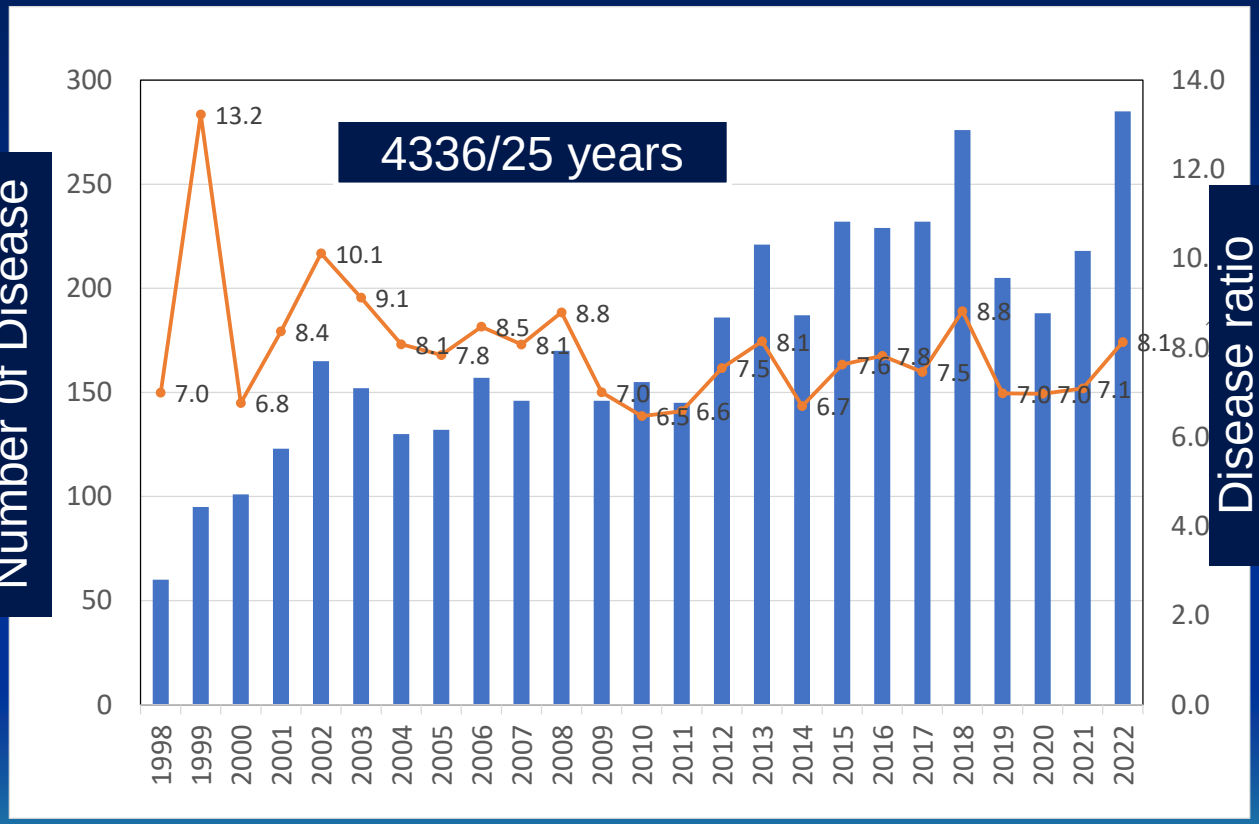


Figure 16 Changes in disease over time

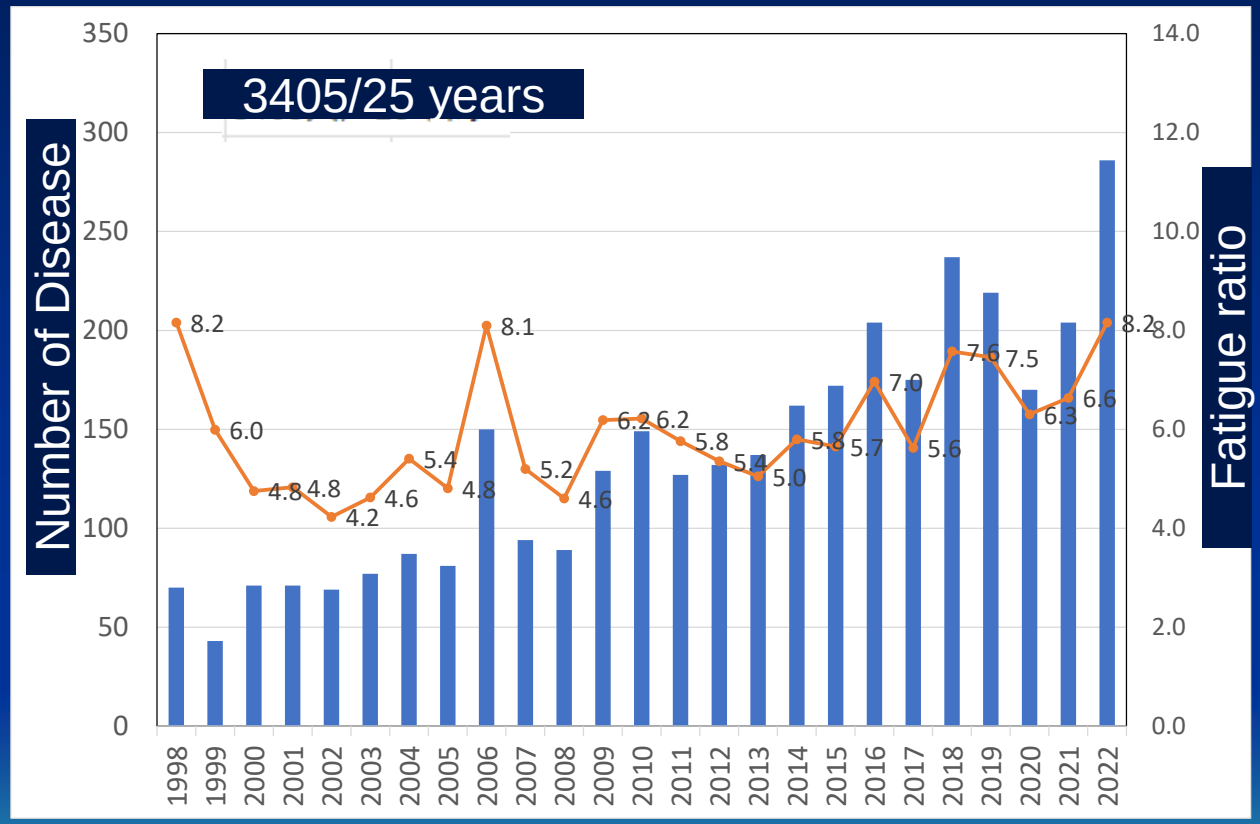


Figure 17 Changes in fatigue over time

④ Environmentally caused accidents with uneven occurrence (1998-2022)

As shown in Figure 18-20 , accidents caused by flash floods, toxic gases, and lightning strikes do not occur frequently every year for the past 25 years, but when they occur rarely, like flash floods, major accidents are recorded (58 people). There are cases. Because it depends on weather conditions and the activity level of the volcano, if it interferes with the actions of mountaineers, it can cause major accidents. Since it is not impossible to predict, accidents can be prevented if risks are addressed. Please note that the Mt. Ontake eruption accident is not included.

Fig.18 Flash flood

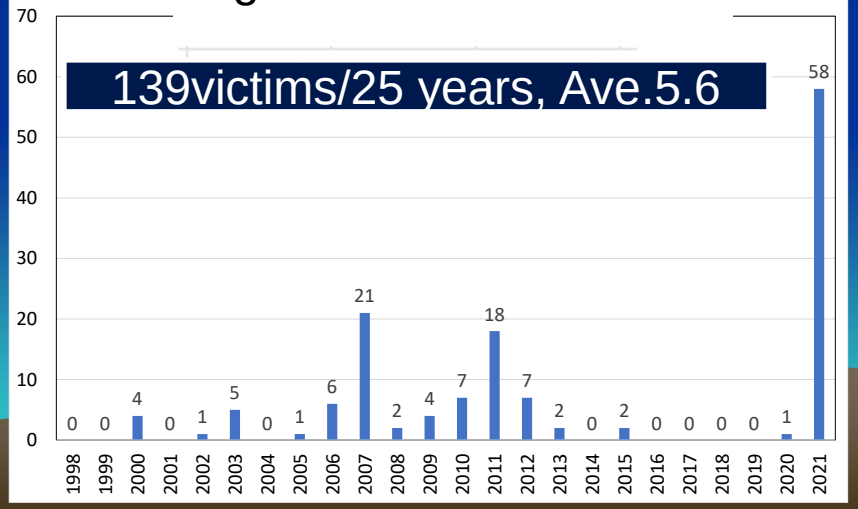


Fig.19 Toxic gas

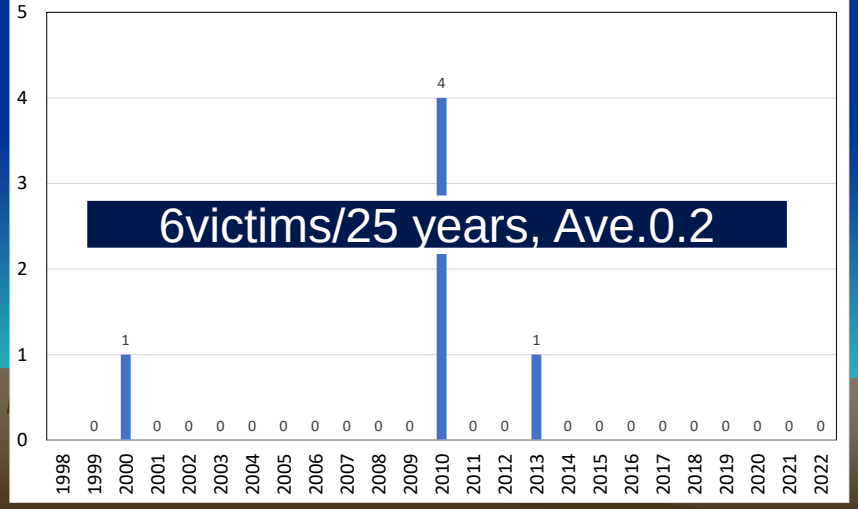
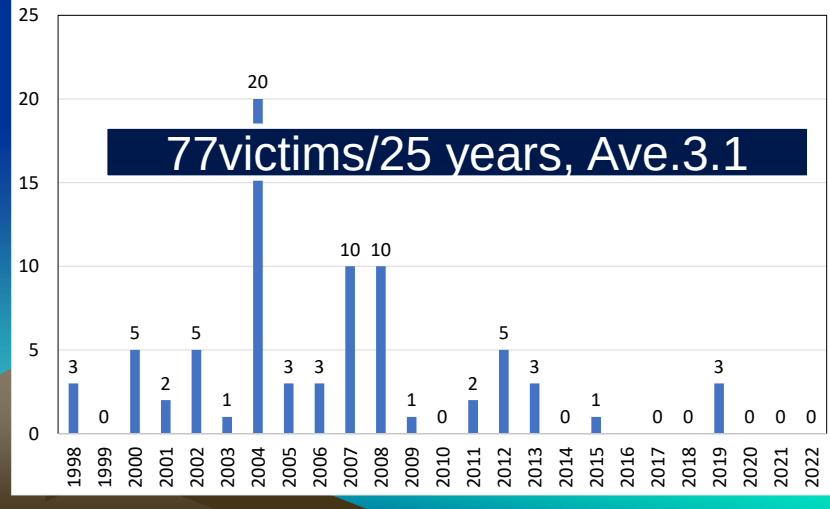


Fig.20 Lightning strike



⑤ Rockfall accident (1998-2022)

Rockfall accidents occur every year, as shown in Figure 21 . The causes include natural rockfalls (deterioration, weathering, earthquakes, etc.) and man-made rockfalls.

Information boards and other warning signs have been installed in areas prone to falling rocks, but it is difficult to warn people on mountain trails in general, and calm judgment is required.

In 1980, a large rockfall occurred on Mt. Fuji, killing 12 people and injuring 29 others.

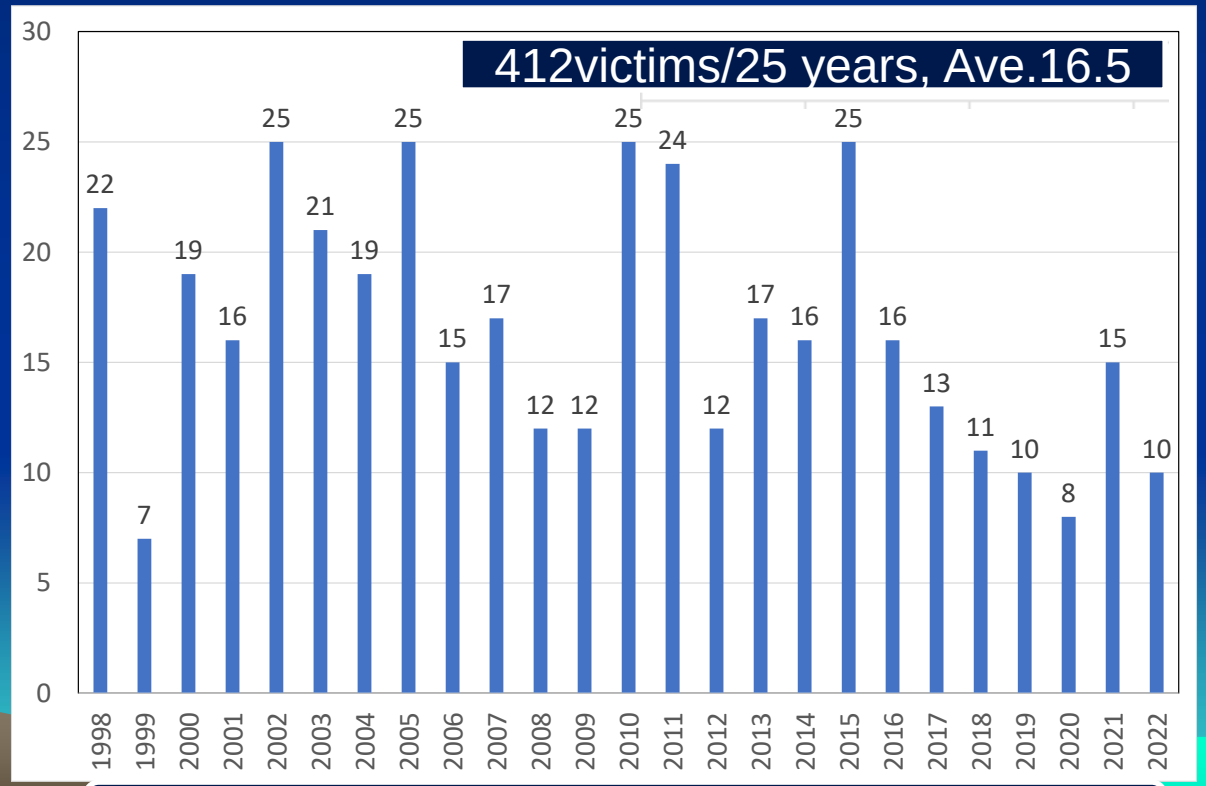


Figure 21 Changes in rockfall accidents

⑥ Bad weather (1998-2022)

"Bad weather" is a related term that leads to "weather disaster" and is a typical cause of Mountaineering accidents. However, although it is easy to understand intuitively, it is difficult to grasp the situation other than the weather, and there is a problem that it is difficult to distinguish it from other factor terms (

For example, in the case of hypothermia caused by bad weather, it is difficult to distinguish between "sickness" and "sickness."

Figure 22 does not show changes in the person's condition, but we have decided to interpret it as a case where a rescue request was made during bad weather.

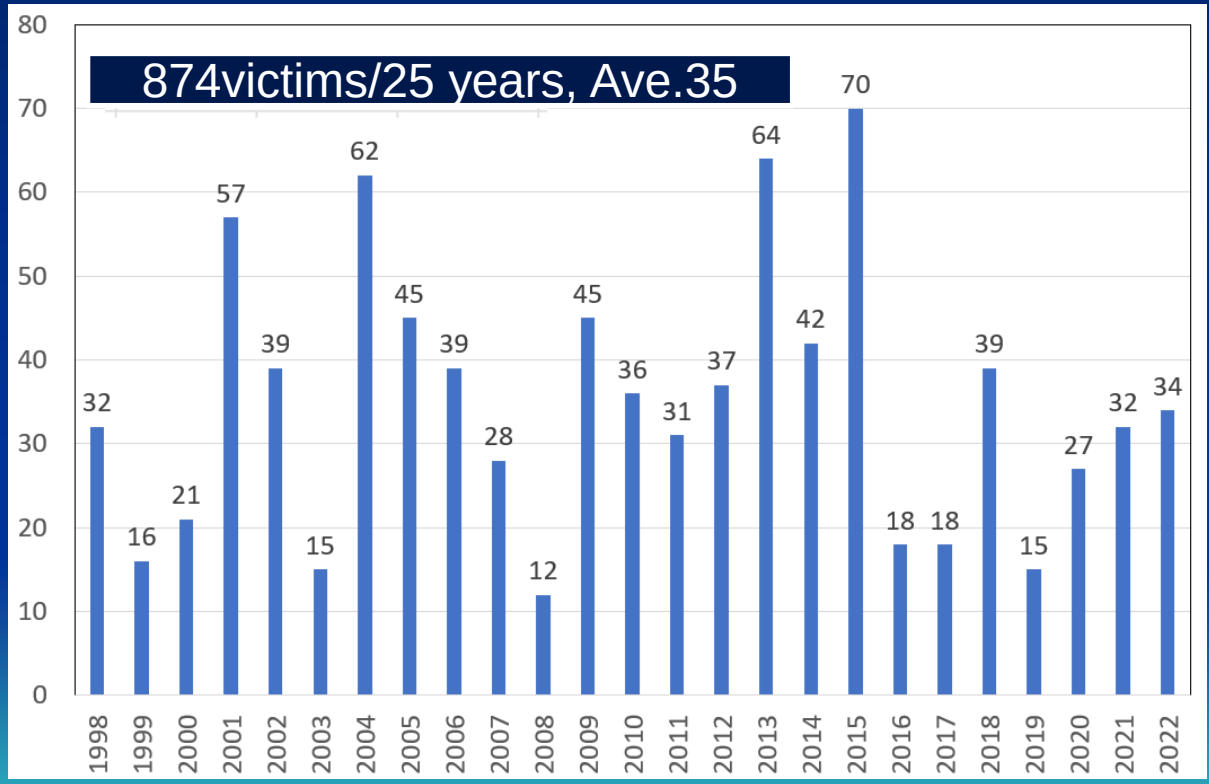


Figure 22 Changes in accidents caused by bad weather

⑦ Avalanche accident (1988-2022)

For many people, the image of winter mountain = avalanche accidents is well-established, but as shown in Figure 23 , about 10 accidents occur each year. However, a combination of weather and human factors can result in a large number of casualties in a given year. Examples from 2007 and 2017 are shown in the figure . Regarding this large number of avalanches, a report by Japan Avalanche
Network officials points out
problems such as the frequent occurrence of avalanches and the actions of multiple parties within the avalanche terrain .
In 2017,seven high school students and one advisor were killed in the Nasu avalanche
. This is introduced in Civil Affairs 22 mentioned above .

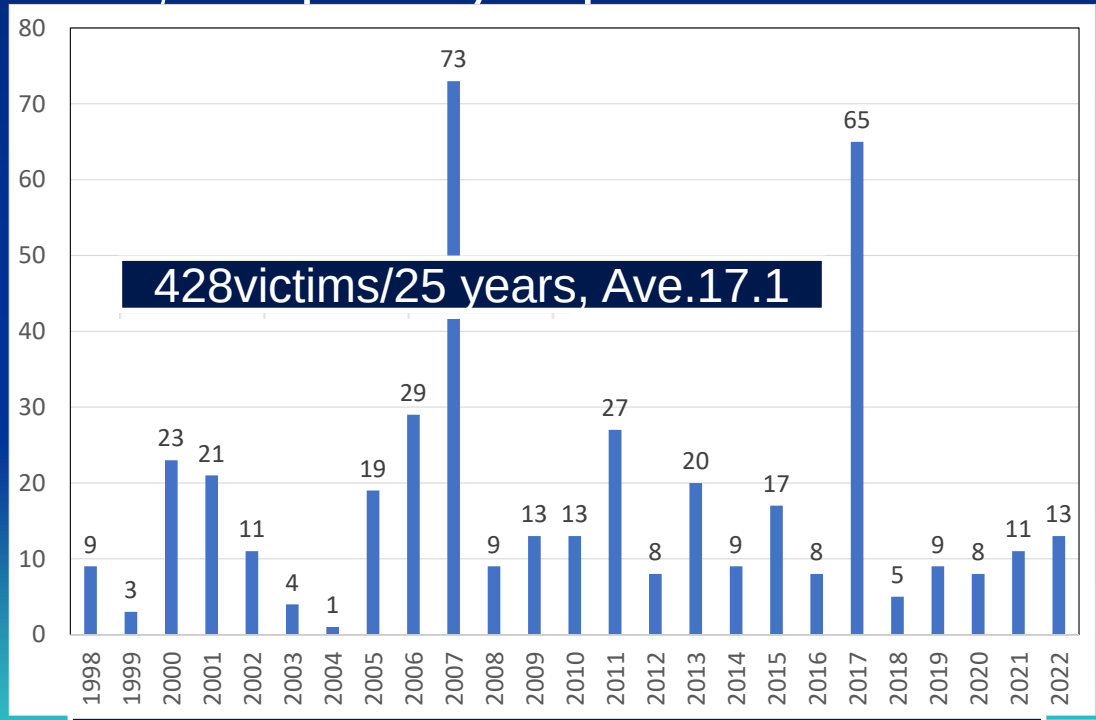


Figure 23 Changes in avalanche accidents

Mountain accident database

233 newly registered people
Slide 63 -72 Annual report

June 2023 , the accident data is new and 233 people have been registered, resulting in a total of 4,669 people .

77 people from JMSCA , 155 people from JWAF, and 1 other person.

Total number of data : 4669 people

Number of cells used in EXCEL (3,207,603 data)

687fields × 4669records

1 . Basic information for new registrants

Figure 24 shows the age distribution of accident victims by gender for the 233 new registrants in 2022. As is clear from the figure, in the age range of 46 to 75 , there were overwhelmingly more female accident victims. This is the first time such a trend has occurred.

For reference, looking at the gender ratio of members, there are JWAF members (9,844 men and 9,878 women), JMSCA members (22,422 men, 20,300 women), and female members. The present results cannot be explained as the number of cases is slightly small.

According to Mr. Kawashima of JWAF, it is true that women's activities are active, but detailed information on these activities is not available.

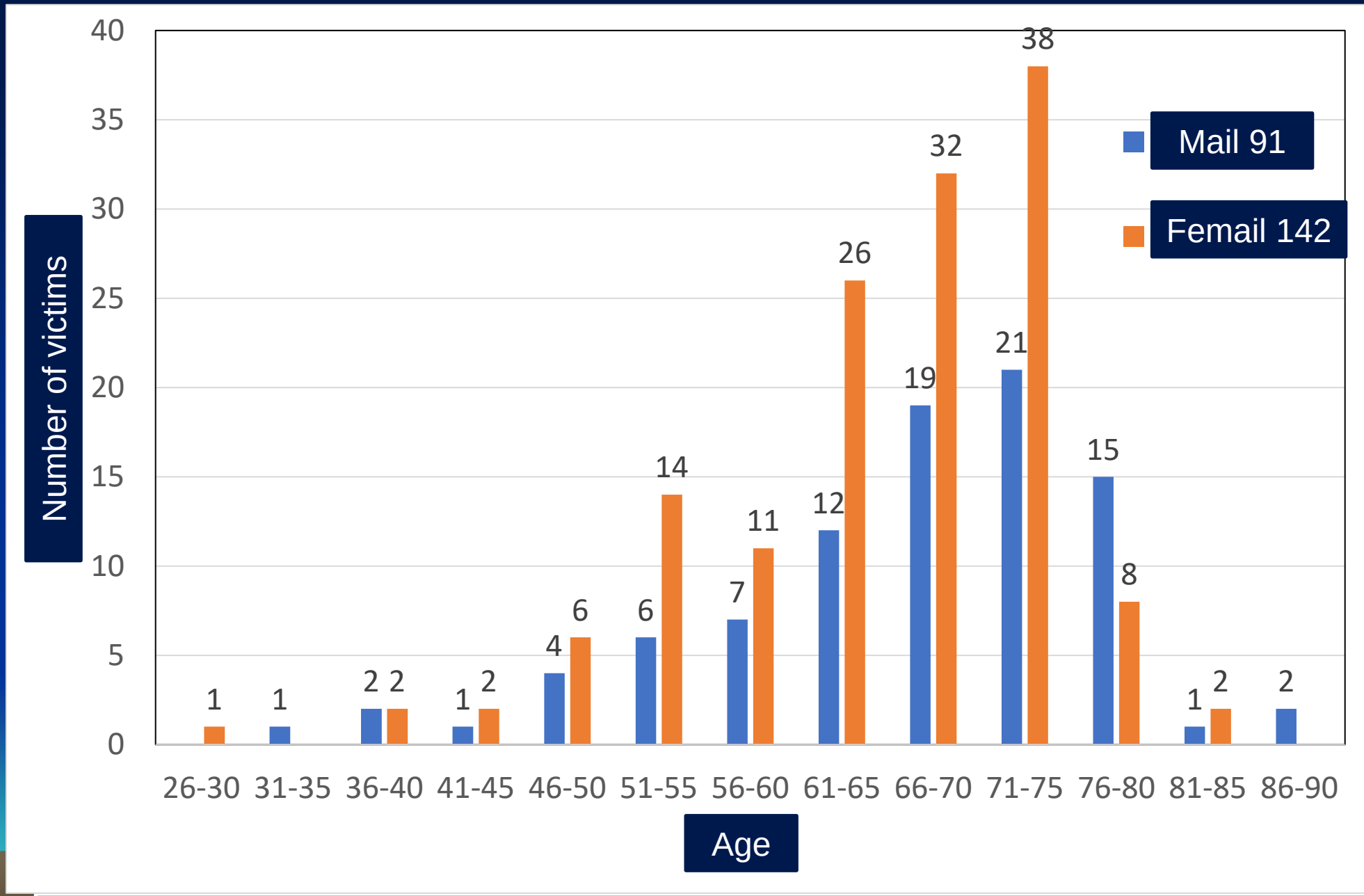


Figure 24 New registration by gender and generation in 2022

In recent years, in terms of age distribution by gender, the accident rate for women has tended to be higher, 1.56 times (91 for men and 142 for women) . This difference has become a problem that cannot be overlooked. We need to think about how to deal with the issue of women's accidents.

Table 8 shows the age distribution by gender based on the UIAA disability classification IIC. Fortunately, the number of deaths this time was significantly reduced to
one . A characteristic of recent accidents for women is that they tend to be between the ages of 61 and 75, and although the injuries are milder than for men, the number of accidents that result in serious injuries is far greater than

	UIAA Injury and Illness Classification (IIC)					
Age	1: mild symptoms	2: moderate symptoms	3: severe symptoms	4: critical condition	5death	総計
26-30		(1)				(1)
31-35			1			1
36-40	1		1(2)			2/(2)
41-45			1	(2)		1/(2)
46-50	1/(1)	1/(2)	1(3)	1		4/(6)
51-55	(2)	2/(6)	3(6)	1		6/(14)
56-60	2/(3)	2/(3)	2/(5)	1		7/(11)
61-65	2/(8)	3/(5)	5/(12)	2/(1)		12/(26)
66-70	3/(7)	5/(3)	8/(20)	3/(2)		19(32)
71-75	2/(7)	5/(10)	11(18)	2/(3)	1	21/(38)
76-80	2/(1)	7/(1)	5/(5)	1/(1)		15/(8)
81-85		(1)	(1)	1		1/(2)
86-90			2			2
総計	**13/(29)**	**25/(32)**	**40/(72)**	**12(9)**	**1**	**91/(142)**

Male/(female)
Numbers are applicable numbers

Table 8 Degree of disability by gender and generation for new registrants

2 . Activity and Cause of accident

Table 9 shows activity of the accident person in 2022. Since multiple answers are allowed, the majority of respondents answered multiple times.
As a result, the proportion of Mountaineering among the total was 84 %. The mountain group's data is slightly higher than the police statistics (78 %). In addition, among non-mountaineer, picking wild vegetables was extremely rare.

Next, Table 10 shows the circumstances of the accident victims. Compared to the previous year, the number of falls and falls has remained almost unchanged, but the number of cases of illness and fatigue has increased. Comparing the causes of accidents for men and women, more women are involved in falls and more men are involved in slips, and this is reflected in the difference in the degree of disability in IIC.

Multiple answers possible

	項　　目	該当数
Mountaineering	Mountain ski	15
	Canyoning	25
	Alpine climbing	12
	Ice Climbing	6
	Free climbing	14
	Walking	156
	Hiking	88
Non-Mountaineering	Sightseeing	26
	Sightseeing landscape	0
	Sightseeing flowers	0
	Sightseeing autumn leaves	0
	Wild vegetable picking	3
	Plant picking	0
	Mushroom picking	0
	Fishing	5
	Phot	12
	Mountain worship	0
	Hunting	0
	Camping	4
	Working	0
	Job,cleaning forest	0
	Job, Mowig	1
	Job, research	0
	Other	7

Table 9 Activity

				Factor ratio within mail and female		
Items	Number	Female	Male	Femail	Mail	Previous
Sliding down	**43**	19	24	13.1	24.5	45
Tumble	**127**	86	41	59.3	41.8	123
Fall down	**6**	2	4	1.4	4.1	17
Lost	**3**	2	1	1.4	1.0	4
Fatigue	**16**	10	6	6.9	6.1	11
Disease	**6**	2	4	1.4	4.1	1
Falling rocks	**7**	3	4	2.1	4.1	9
Avalanche	**1**	1	0	0.7	0.0	0
Lighhting	**0**	0	0	0.0	0.0	0
Bad weather	**0**	0	0	0.0	0.0	2
Volcanic gass	**0**	0	0	0.0	0.0	0
Flood	**0**	0	0	0.0	0.0	0
Fight	**0**	0	0	0.0	0.0	1
Wild life attack	**4**	2	2	1.4	2.0	9
Not clear	**2**	2	0	1.4	0.0	1
Others	**28**	16	12	11.0	12.2	23
	243	145	98	100	100	246

Table 10 Cause of accidents

3. Mountain areas where accidents occur (clusters)

Table 11 shows the mountain areas (top 10-12) with the highest number of accidents over the four- year period (2019-2022). In addition, the accident locations were plotted on a topographic map (Figure

From the table, assuming that ``accident data reflects the number of mountaineers,'' and estimating the movements of mountaineers, we can see that in 2020, when the number of mountaineers was the most affected by the coronavirus and the number of mountaineers decreased, the number of accidents also decreased sharply . After that, the number of accidents will gradually increase as the number of mountaineers recovers while changing the mountain range, but if we refer to data on mountaineers in Gifu Prefecture, etc., it will not return to the state of 2019 , when the Northern Alps was prominent. . This same trend is seen in Figure 9-10 of police statistics by prefecture.

People moved from Japan Alps area ● to urban mountains● by COVID19.

Year most affected by coronavirus

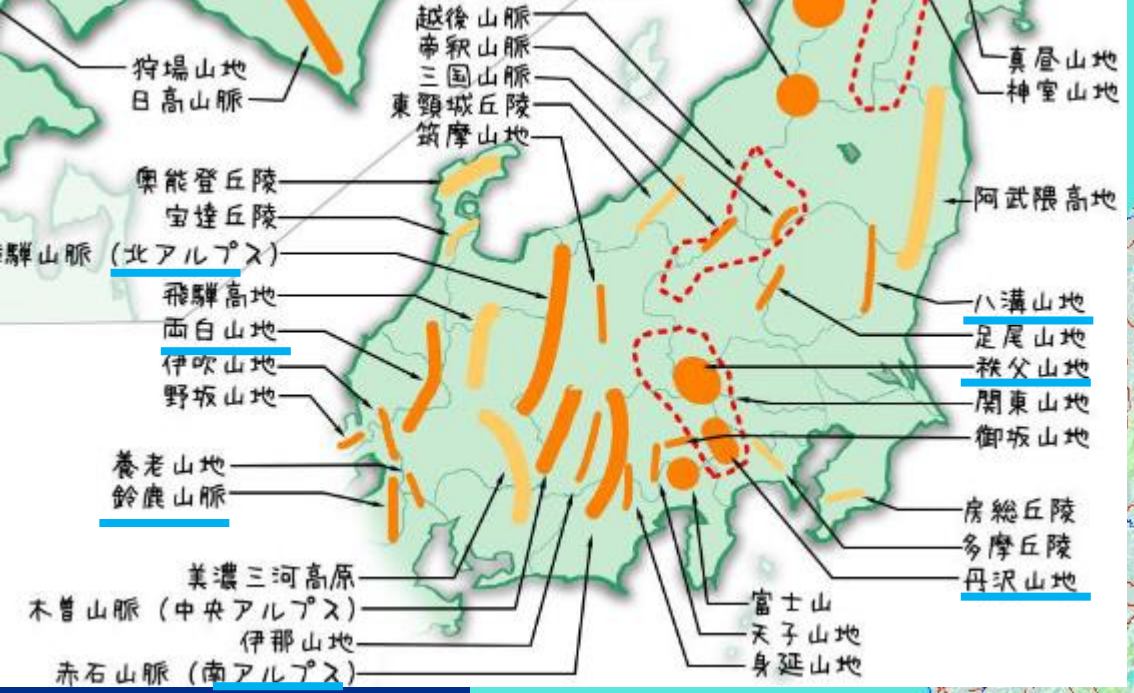
2022	
cordillera,mountains、	mountain ra
Chichibu mountains ●	23
Northern Alps ●	22
independent peak	11
Tanzawa Mountains ●	8
Yatsugatake Mountains ●	6
Southern Alps ●	6
Rokko Mountains ●	5
Mikuni Mountains	5
Yamizo Mountains	4
Ryohaku Mountains	4
Suzuka Mountains ●	4

2021	
山系、山地、山脈	
Chichibu mountains ●	28
Northern Alps ●	19
奥羽山脈	8
Mikuni Mountains	7
丹沢山地 ●	4
比良山地 ●	4
Rokko Mountains ●	4
Suzuka Mountains ●	4
飯豊山地	3
北山山系	3
大山山系	3
中央アルプス ●	3

2020	
山系、山地、山脈	
Northern Alps ●	21
Chichibu mountains ●	20
八ヶ岳連峰 ●	14
Rokko Mountains ●	11
Mikuni Mountains	8
奥羽山脈	7
石狩山地	5
両白山地	4
大山山系	4
大雪山系	4
Suzuka Mountains ●	4

2019	
山系、山地、山脈	
Northern Alps ●	47
八ヶ岳連峰 ●	18
Chichibu mountain ●	17
奥羽山脈	11
Mikuni Mountains	11
独立峰	8
Southern Alps ●	8
後立山連峰 ●	5
御坂山地	5
Rokko Mountains ●	5
Suzuka Mountains ●	5
両白山地	4

Table 11 Changes in mountain areas where accidents occurred over 4 years



2022	
山系、山地、山脈	
秩父山地	23
北アルプス	22
独立峰	11
丹沢山地	8
八ヶ岳連峰	6
南アルプス	6
六甲山地	5
三国山脈	5
八溝山地	4
両白山地	4
鈴鹿山脈	4

Figure 25 Accident distribution from East Jap to West Jap in 2022.

20th report

Mountain accident database information summary from 2003 to 2022

Numerical information corresponding to the main items is summarized in ⓪ to ⑫ regarding the basics of accident victims, disability information, risk response, before the accident, at the time of the accident, and after the accident . We would be happy if it could serve as an index for searching the vast amount of mountain accident information.

Position and overview of mountain accident information

Mountain accident information is considered basic information necessary for the activities of many mountaineering-related committees, as it ensures safe mountaineering activities.

In 2023 , the International Mountaineering Federation UIAA started an Accident Reporting Working Group for the above purpose. It is made up of representatives from the Training Commission, Safety Commission, Mountaineering Commission, Medical Commission, and Management Commission . This Accident Information Report (No. 1-20) and database are recognized by the UIAA as internationally important mountain accident reports.

This time, we will introduce an overview of the mountain accident database that is the basis of the 20th mountain accident report.

Already introduced the features of the database in the form of the ``Accident Information Handbook'' (2,791 people registered) in the 13th report. This time, we will introduce the accident information directory (4,669 people registered) in a similar format.

As with the 13th report, we plan to provide accident information to those involved in the accident, accident researchers, and various mountaineering committees. We will provide more detailed information based on the items in the "Handbook" to the extent that it does not conflict with personal information.
Please contact Aoyama.

If question, to Aoyama

aoyamachiaki@gmail.com

⓪ Three-dimensional distribution and mountain range of accident locations

Plotting the 4,669 accident locations on the latitude and longitude axes in Figure 26 depicts a shape that follows mountain ranges and also has low mountain areas, so it becomes roughly the shape of the Japanese archipelago . This shows that the recorded data is not concentrated in a specific mountain area but is dispersed.

Additionally, Figure 27 shows the altitude at which the accident occurred by four types of activity purpose (mountaineering, climbing, canyoning, and non-mountaineering) . Furthermore, most of the non- mountaineering activities also involved Mountaineering, and there were almost no non- mountaineering activities (68). Finally, Table 12 , which divides the classification into mountain ranges/mountainous areas and others, has not yet been fully categorized because the definitions for classification differ depending on the references .

Figure 26 Accident locations scattered across the archipelago

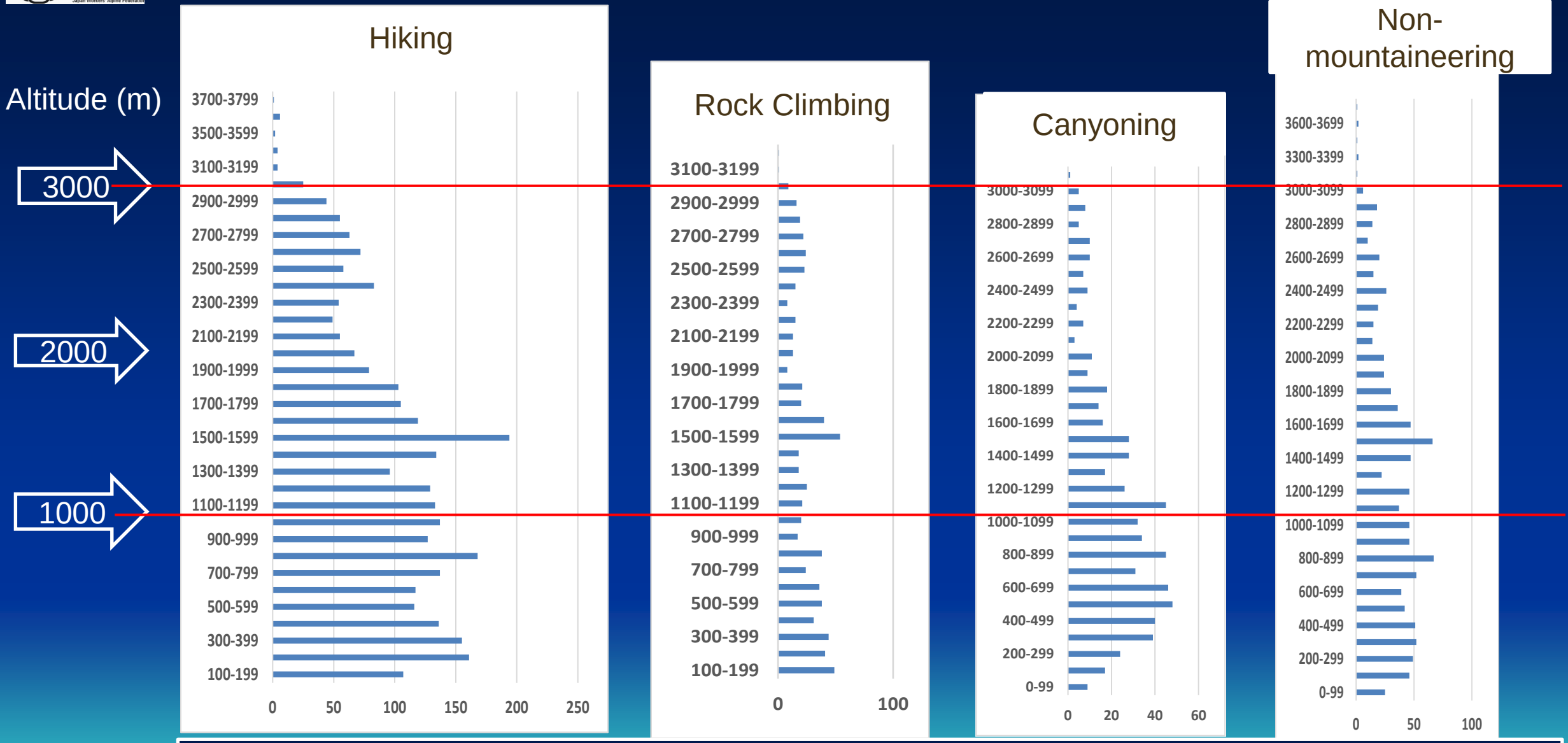


Figure 27 Activity altitude of mountaineering, climbing,non-mountaineering accidents

Top 50

Northern Alps	710
Chichibu Mountains	355
Yatsugatake Mountains	180
Rokko Mountains	175
Southern Alps	154
independent peak	133
Mikuni Mountains	120
Ou Mountains	106
Echigo Mountains	100
Tanzawa Mountains	97
Suzuka Mountains	82
Ushiro Tateyama Mountain Range	73
Central Alps	72
Hira Mountains	58
Ryohaku Mountains	46
Kitayama Mountains	44
Stratovolcano/Independent volcano	45
Ishikari Mountains	44
Nikko volcano mountain range	43
Omine Mountains	41
Misaka Mountains	40
Kyushu Mountains	36
Daisen Mountains	35
Hidaka Mountains	34
Chugoku Mountains	33

Shiretoko Peninsula	30
Tateyama Mountain Range	29
Kuju Mountains	28
Iide Mountains	27
Daisetsu Mountains	25
Ibuki Mountains	24
Kubiki Moujntains	23
Yamizo Mountains	22
Adatara Mountains	20
Shikoku Mountains	20
Chikushi Mountains	18
Daiko Mountains	15
Kirishima Mountains	14
Asama Mountains	13
Hakkoda Mountains	13
Togakushi Mountains	13
Asahi Mountains	12
Yakushima Mountains	11
Hakone Mountains	11
Izumi Mountains	11
Kongo Mountains	11
Nosaka Mountains	11
Izu Peninsula	10
Dewa Mountains	10
Yubari Mountains	10

Table 12 Accident occurrence mountain range, mountain range, mountain range, mountain system, mountain group, independent peak, volcano, peninsula

①Injury/Illness

Disabilities (injuries, diseases, environmental factors) are categorized in Tables

Most of the injuries are falls and slips , so as shown in Table 13 , fractures, bruises, and lacerations stand out . Diseases (Table 14) are most noticeable in the respiratory and circulatory systems. Regarding environmental factors, there are few high mountains in Japan, so there are few common cases of altitude sickness (Table 15). On the other hand, hypothermia and frostbite were common, with 16 deaths out of 31 cases of hypothermia .

The injury site (Figures 28 to 31) is shown in four diagrams with different coordinate scales. Ankle and wrist accidents are the most common. The important parts of the head are the frontal part and the forehead, probably because there is a lot of forward rotation, which puts strain on the neck. This head injury has a large impact on mortality rates. (Reference 19th Accident Report)

Injury (Table 13)

contusion	1154
laceration	894
massive bleeding	112
neurological disorder	87
dislocation	272
fracture	2574
sprain	128

Disease (Table 1 4)

respiratory system	38
circulatory system	34
digestive system	14
urinary system	9
sensory system	14
nervous system	30
infectious disease	6
allergy	15

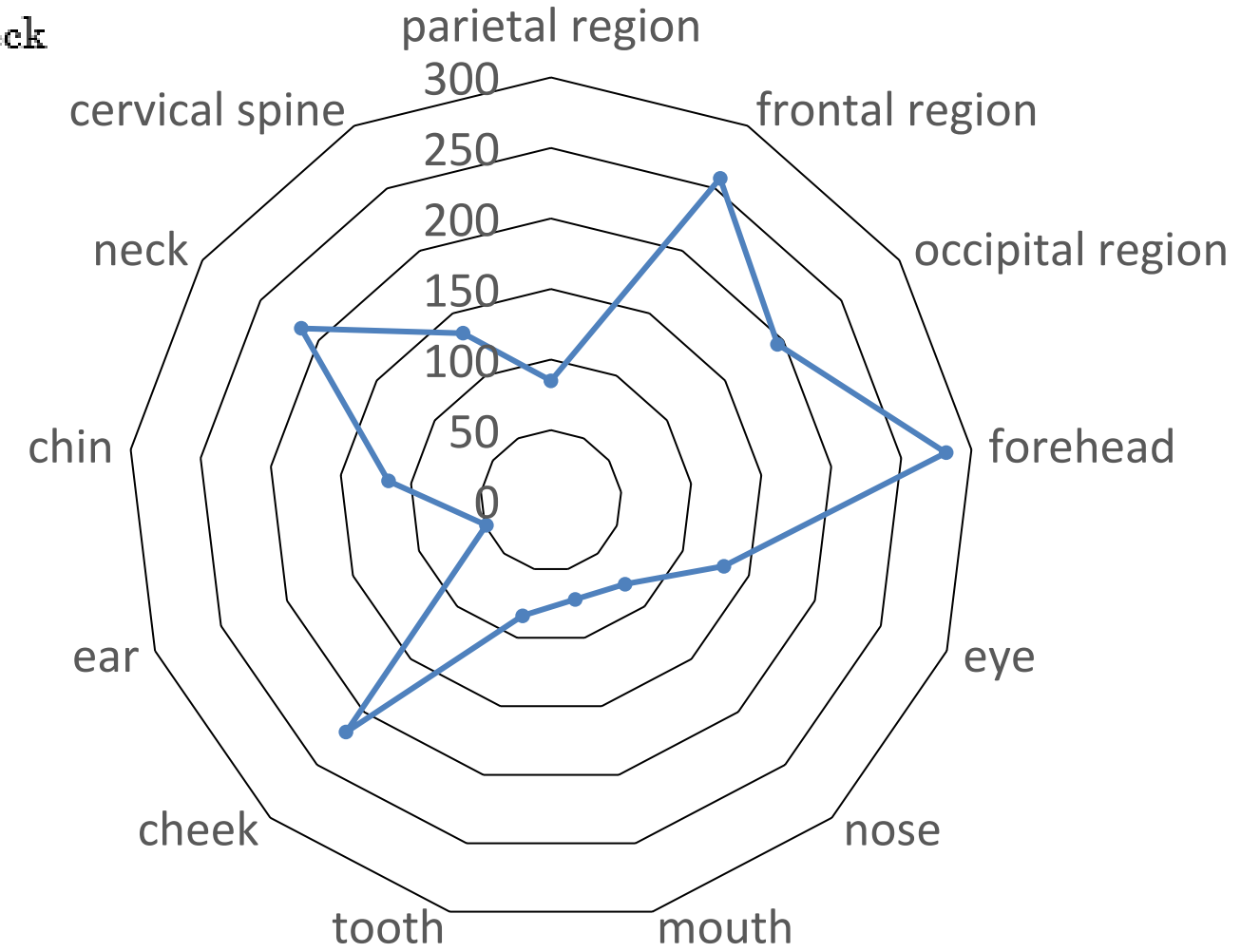
Environmental factors (Table 1 5)

acute mountain sickness	13
(High altitude) pulmonary edema	7
(High altitude) cerebral edema	2
hypothermia	31
frostbite	97
sunstroke (heatstroke)	7
Other	53

Injury site

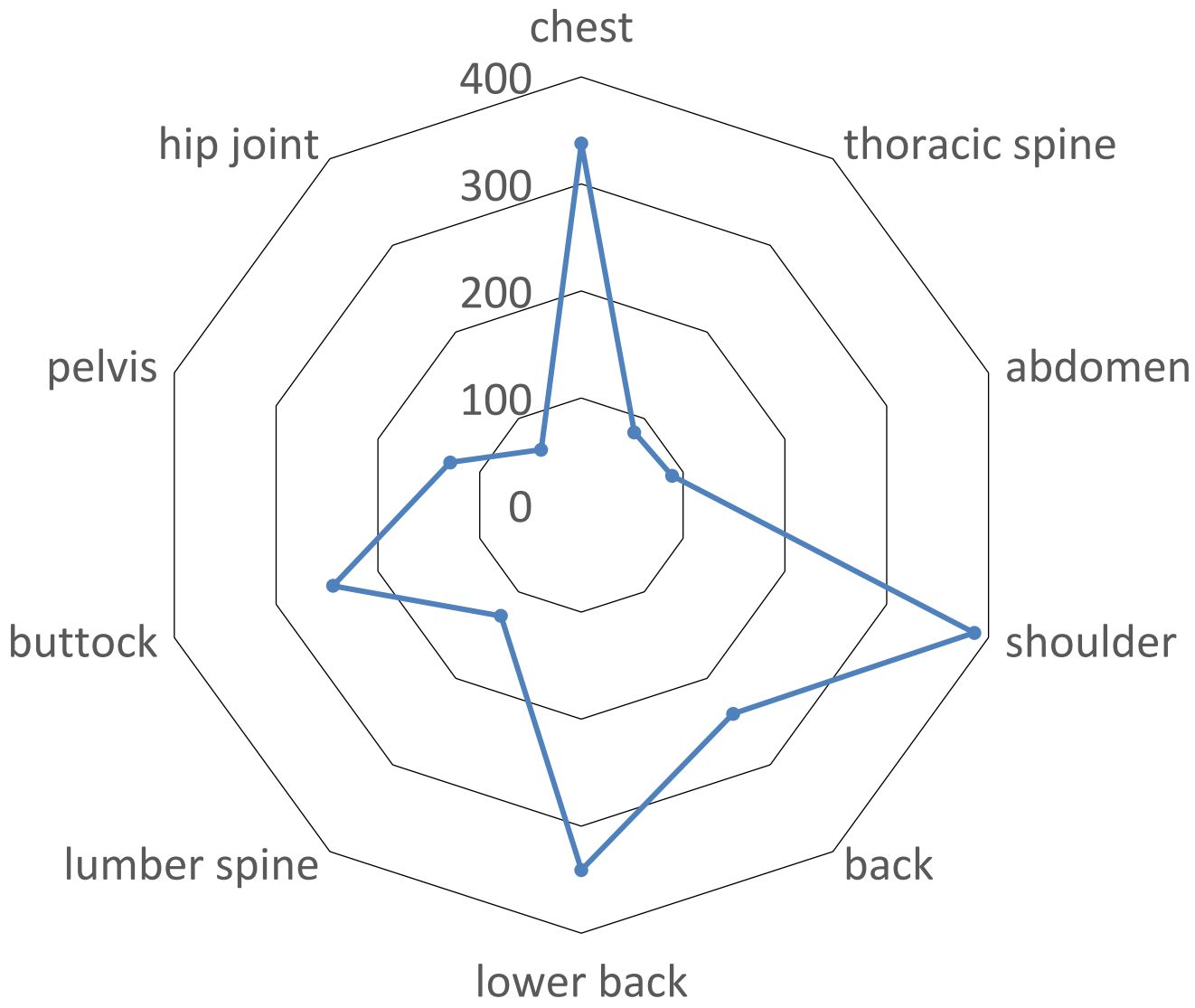
Fig.28 Head

Head and Neck



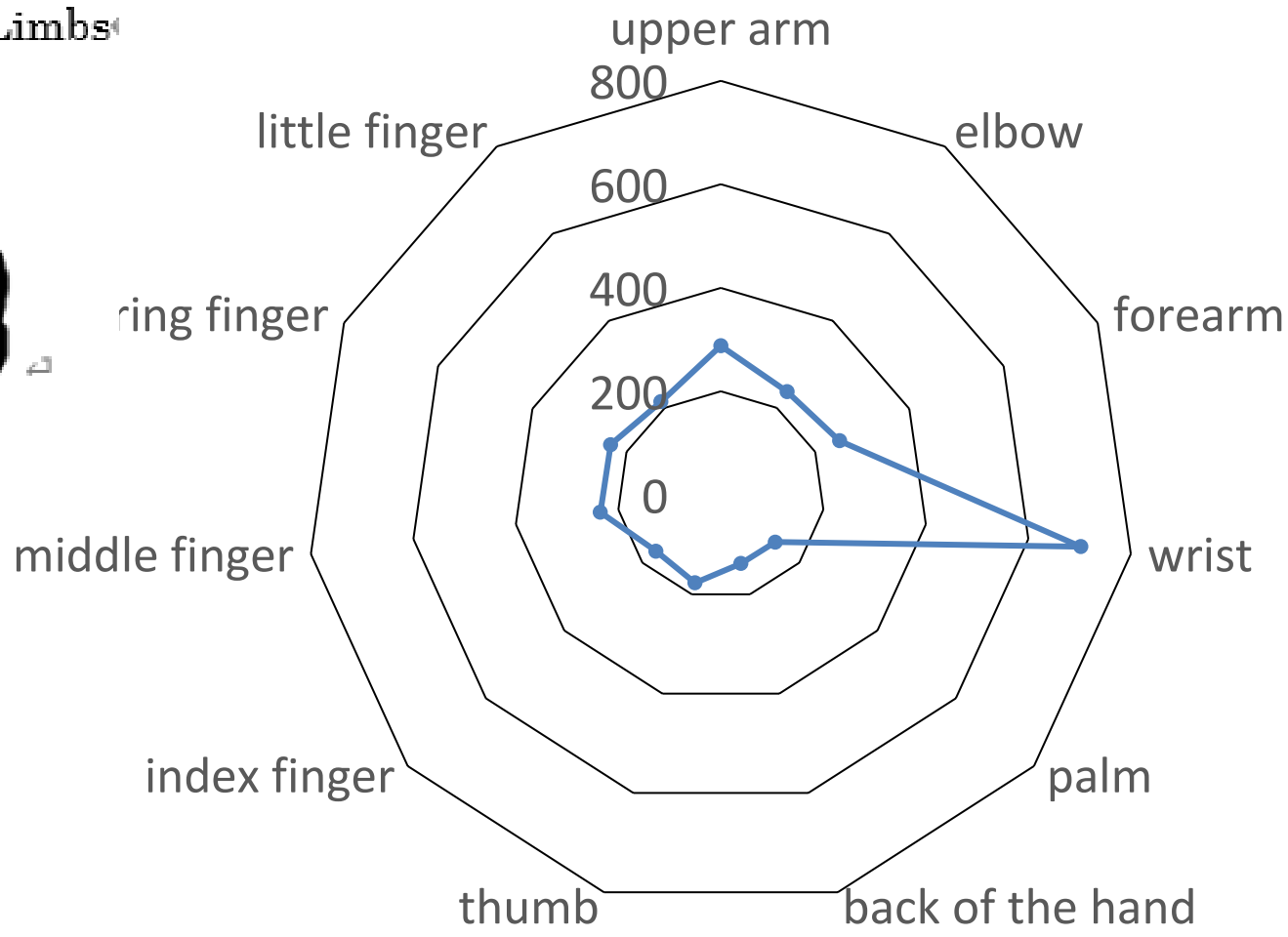
Injury site

Fig. 29
Trunk



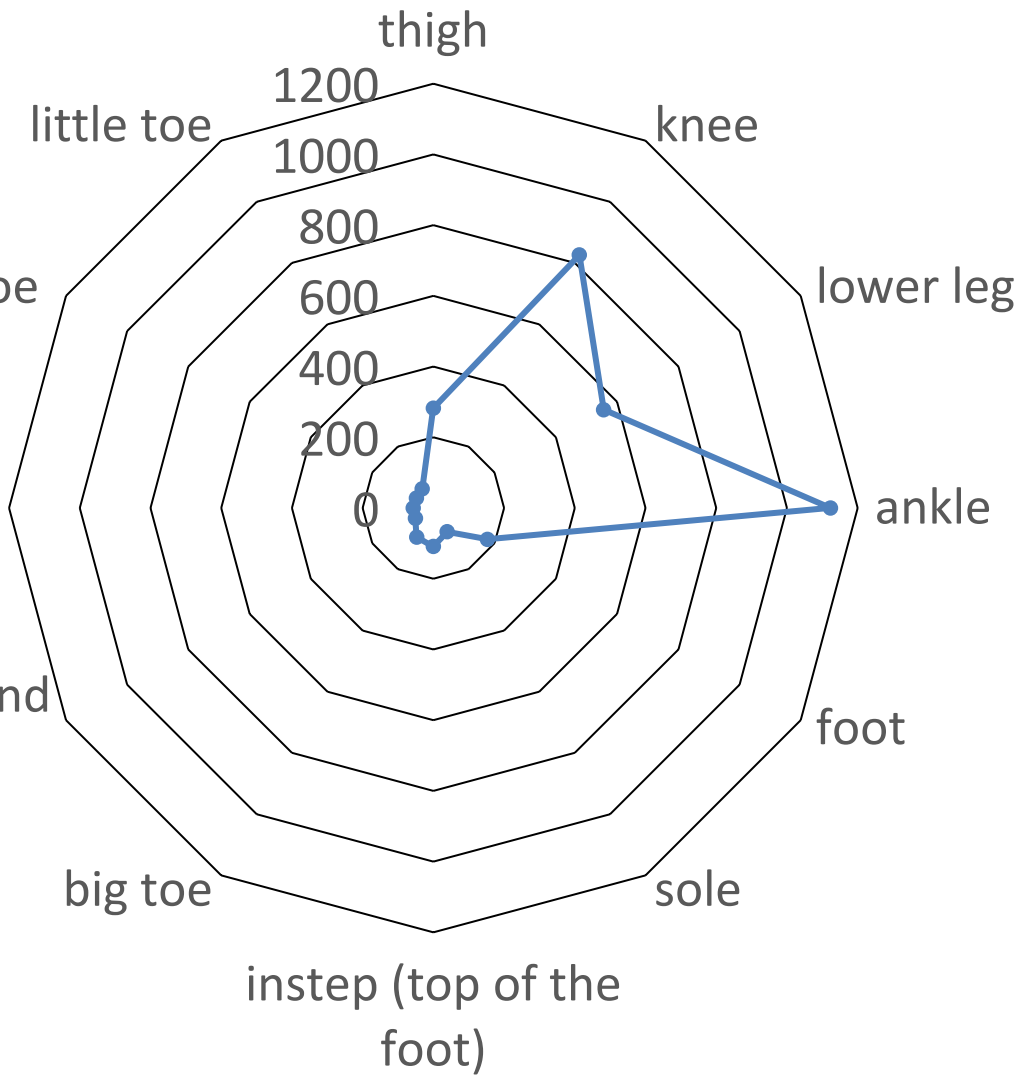
Injury site

Fig.30 Upper limbs



Injury site

Fig.31 Lower limbs

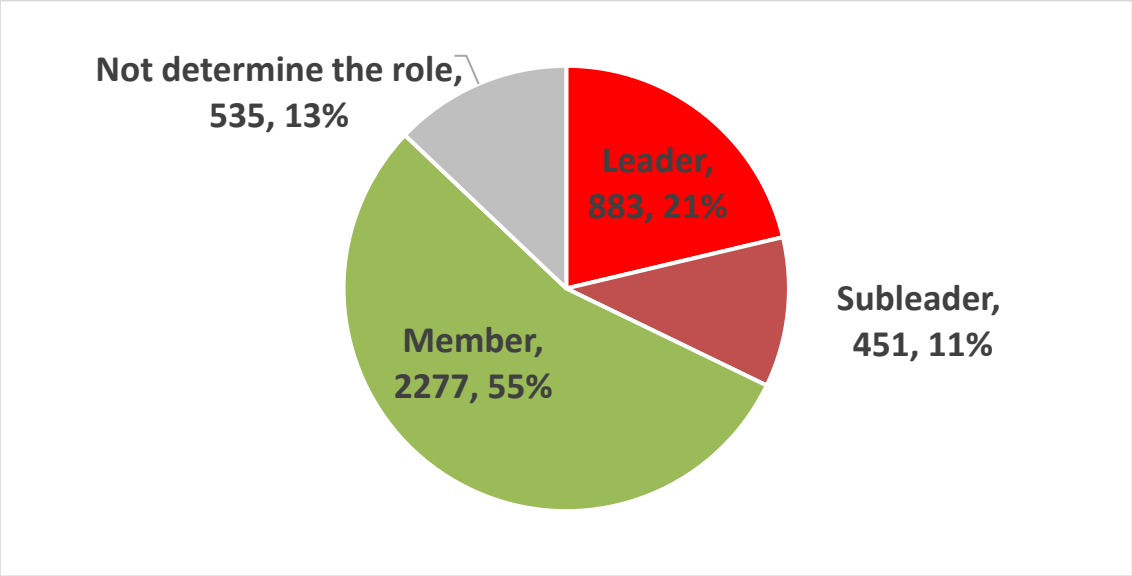


② Role, Basic physical strength, Activity

In Figure 32 , 1,334 people (32 %) were leaders (including subs) at the time of the accident . Currently , JMSCA offers a summer mountaineering leader training system (basic and advanced). Therefore, we would like to analyze the mechanism of leader accidents and reaffirm the issue of safety for leaders themselves.

Since we are now in the age of elderly Mountaineering, many people have problems with their eyesight (Table 19) and hearing (Table 20). Contour lines on topographic maps are difficult to read, and warnings about falling rocks are difficult to hear. Since the purpose of Activity (Table 18) is to be a member of a mountaineering organization, the ratio of mountaineers to non- mountaineers is 8 : 2 , which is higher than the 7 : 3 according to police statistics .

Figure 32 Role at the time of accident



eyesight

Table 16

Easy to read	2117
Visible by straining one's eyes	2019
Unable to read at all	119

hearing

Table 17

Hear clearly	3979
A bit hard to hear	425
Unable to read at all	17

Table 18 Activity

multiple answers

	backcountry ski	355
Mountaineering	alpine climbing	547
	canyoning	679
	ice climbing	173
	free climbing	396
	walking	2721
	hiking	1697
Non-mountaineering	sightseeing	416
	landscape of mountain	79
	sightseeing, grasses and flowers	130
	, viewing autumn leaves	101
	gathering edible wild plants	157
	gathering edible wild grasses	15
	gathering edible mushrooms	10
	fishing in a mountain stream	67
	picture taking	275
	mountain worship	17
	hunting	4
	cammping	64
	walking	12
	working, clearing of forest	2
	working, mowing	4
	working, investigation research	4
	others	266

③ Risk response

Submit rates a hiking plan to the police before have been greatly improved through the use of app software, compasses, etc. In addition, compared to general mountaineers, organized mountaineers have an organizational habit of communicating their Mountaineering plans, so most organized mountaineers also communicate their plans in the event of an accident, as shown in Figure 34 .

However, 34 % of respondents did not discuss their accident with their family members (Figure 33) . I can understand why people don't want to touch on this topic, but when an accident occurs, it's often difficult to know how to deal with the impact on the family and how to deal with it afterwards. I think we should talk a little bit about it.

Judging only from the rate of submission of Mountaineering plans, I have become able to deal with risks considerably, but the reason why there are many cases in which people do not consider the escape routes shown in Tables 20-21 is due to confidence or arrogance, but they have carefully considered their planned route. I can't say. .

Table 19 Usually cconsidering an escape route

Checked	2068
things will work out	326
no checked at all	857

Table 20
Considering an escape route when taking a route for the first time

Checked	936
things will work out	148
no checked at all	376

Figure 33 Have you talked specifically about the accident with your family?

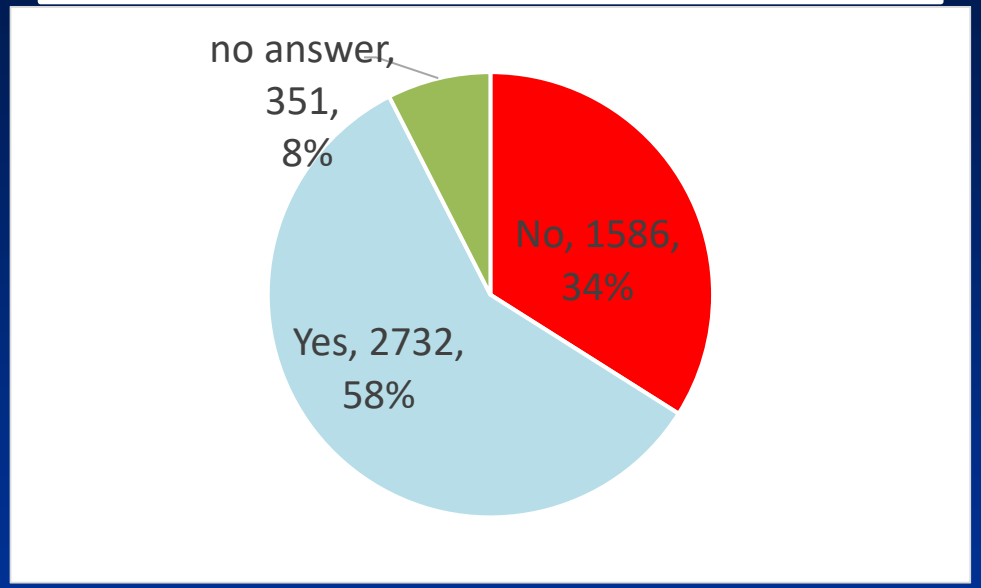
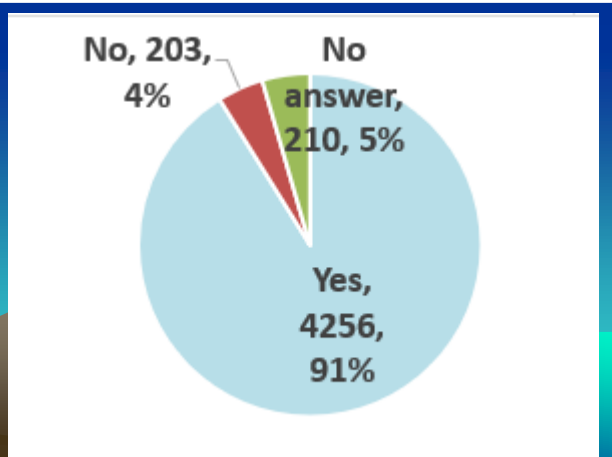


Figure 34 Did you inform your family about your mountain climbing/hiking plans in advance?



④ Issues immediately before the accident

Mountaineering accidents occur as a chain of accidents caused by multiple factors (environmental, human, and temporal), as typified by the Swiss cheese model.
Usually, the terminology used to describe the cause/manner of a mountain accident describes the movement of the body from the moment of occurrence (the second half of the chain). From a slip, fall, or fall, it is not possible to determine whether the person was stumbling, slipping, losing balance, fatigue, or human error before the moment of occurrence.

To deal with the first half of the chain, Tables 21 to 23 show the questions immediately before the accident. It mainly deals with last-minute conditions, bad weather, mountain trail problems, member problems, and schedule changes, but there are 808 other cases that form various chains. We are currently considering quantitative visualization.

Table 21 Contributed cause immediately before the accident

bad weather	567
bad weather, dense fog	126
bad weather, snowfall	129
bad weather, wind and rain	245
losing the way	161
trail problem	278
deteriorated trail	120
disappeared trail	19
equipment problem	36
damaged equipment	18
not carrying the equipment	3
traffic problem	17
member problem including oneself	204
disagreement among member including oneself	8
injury of member including oneself	38
illness of member including oneself	88
role switching of member including oneself	11
change of plans	218
change of plans, rerouting	116
change of plans, changing of the purpose	24
others	808

Table 22 Sleep condition before accident

enough sleep	1669
ordinary sleep	2508
lack of sleep	327
uncertain	165

Table 23 Fatigue status

not tired at all	671
a little tired	630
moderately tired	3054
exhausted	52
uncertain	262

In the other section, 808 cases are freely written.

2 other examples of answers
①I wanted to get out of the river by at least 3:00 pm, but it was getting late and I might have been getting impatient.

②There was more snow than expected and I was worried about going down the mountain alone.

⑤ Cause of accident, environment (weather) / ⑥ Characteristics of the accident location

A characteristic of mountaineering group accidents is that ``falls'' and ``slips'' are prominent, while ``getting lost,'' which ranks first in police statistics, is extremely rare (Table 24) . The reason for this is believed to be that mountain insurance claims are not filed in the event of a minor loss such as delaying descent. However, there are many serious cases where the vehicle is delivered as a result of being lost, leading to or causing serious accidents.

Regarding the weather at the time of the accident (Table 25) and location (Tables 26 to 29), as we have already reported, most accidents rarely occur in the bad weather and dangerous locations that people imagine. Climbing-related accidents also occur less frequently in dangerous areas because people are careful in high-risk areas.

⑤ Cause of accident, environment (weather)

multiple answers N=4669

Table 24 Cause of accident

sliding down	969
tumbling	2372
falling	273
losing the way	148
fatigue	239
falling ill	57
falling rocks	115
avalanche	25
thunderbolt	7
bad weather	67
poisonous gas	1
flash flood	5
quarrel	2
attack by wild animals and insects	74
uncertain	51
others	515

Table 25 Weather

fine weather	730
sunny	2209
cloudy	1087
rainy	447
thunderstorm	29
hail	2
(small) hail	6
sleet	27
snow	114
snoestorm	94
fog	438

breeze	2230
a little strong wind	275
strong wind	124
storm	79

rain shower	272
a little (bit) heavy rain	159
pretty heavy rain	42
heavy rain	7

shower snow	117
pretty heavy snowfall	58
heavy snow	19

slight fog	269
pretty poor visible fog	145
zero-zero fog	24

⑥ Place in the Mountain Accident

Table 26 On the mountain trail

path through the slope	1037
ridgeway	671
summit	88
path along with the canyon	235
flat road	298
path through rocky mountains	221
path paved by cultivating valley	59
forest zone	467
wetland	49
riverbed	48
snowy valley	119
snow field	24
wasteland	70
form of landslide	87
stairs	107
plank-floored bridge	32
suspension bridge	2
log bridge	13
operation path	10
woodland path	95
roadway	1
stone pavement	28
railroad	0
dam	3
dike	1
ski resort	32

Table 27 Outside the mountain trail

cliff	42
wall of rock	360
ice wall	21
wall of snow	56
icefall	29
glacier	3
slope of ice and snow	168
rocky slope	171
slope of earth and sand	64
scree-covered slop	50
snow cornice	16
bush	51
canyon	207
waterfall	101
wetland	7
riverbed	79
others	137

Table 28 Slope angle

nearly horizontal	510
slope (from 0 to 9 degree)	1226
a bit steep slope(from 10 to 29 degree)	1296
steep slope(from 30 to 59 degree)	595
wall (equal more than 60)	532

T28.1 ascent/descent

ascent	1106
descent	2674

Table 29 Site surface condition

A. Vegetation

grasses	345
dead leaves	348
roots	337
mosses	131
bamboo grasses	116
creeping pines	52
bush	127
forest	446

B.Soil

mud	302
general soil	789
gravel	292
pebble	289
scree-covered slope	217
leaf mold	118

C. Rock freshness

fresh rock	898
weathered rock	182

D. Rock shape

slavic	198
face	253
crack	73

E.Snow and ice

snow road	401
freeze road	106
freezing soil	41
crevasse	13

F.Water _

dry riverbed	51
riverbed	58
the path where the water flows	16

G.Artifacts

chain	26
ladder	9
fixed rope	57

⑦ Accident occurrence process, triggers for slips and falls

The planned route is divided into four equal parts , accidents will occur frequently in the 3/4 route as shown in Figure 35 . I think there may be a connection with the magical times of 11:00 and 2:00 p.m., but I don't know if it's because I'm more likely to lose concentration or because I'm tired. Although this information is simple, we believe it is useful information for alerting climbers/hikers.

Table 31 , "slip" and "loss of balance" are the most prominent causes of falls and tumbles . Furthermore, there are many "catch points". There were also 409 ``Other'' issues , and more than half of them were related to climbing,

⑦ Accident occurrence process, triggers for slips and falls

Fig.35 How far along the journey did the accident occur?

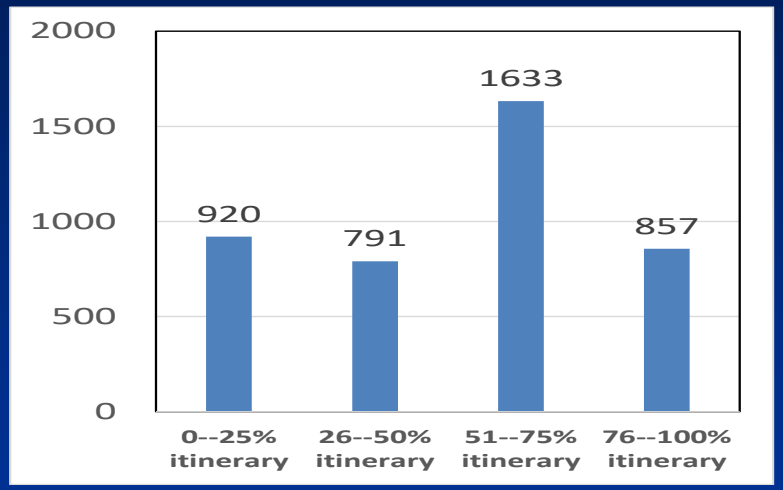


Table 30 Physical conditions immediately before the accident

so tired and unable to move	64
feel weak at the knees	46
knee hurts	85
lumbago	44
shoulder hurts	35
gasp	29
unable to think of anything	62
same as usual	3050
very good condition	433
others	4

Table 31 Operating factors for slips and falls

slide	1898
lose balance	1387
disorders of the legs and hips	92
mistake of checking one's feet	813
unable to see one's feet	117
dizziness	20
sickness	14
fatigue	106
the scaffolding collapsed	128
hold	132
hold, root of a tree	169
hold, edge of a rock	105
hold, protrusion	60
hold, others	90
collision	16
collision, person	20
collision, rock surface	38
collision, tree	38
collision, others	22
pulled by the rope	25
the crampons come off	4
pressed	7
others	409

409 cases that caused slips and falls , half of them were related to climbing.
Other causes include attacks by animals and insects, stock accidents, floating rocks coming off, riding on stone carts, skiing accidents, dead headlamp batteries, and contact with people.

⑧ Accident factors (Tools, Human Error)

As shown in Table 33 , there are few reports of damage to Mountaineering equipment that leads to accidents , but most cases include deterioration of Mountaineering shoes and backpacks, and damage to poles or incorrect usage. Climbing-related Harken problems have been reported, such as damage or falling out of the remaining Harken.

Human error HE is thought to account for over 80 % of Mountaineering accidents, but there are almost no quantitative analysis methods and it remains at the level of descriptive statements based on experience, making it difficult to quantify. Here (Table 33), Tanimura's analytical method was used. The results showed that the types of accidents that led to accidents were ``not noticing'' during the input process, ``thought it was okay'' during the thinking stage, and ``losing balance'' during the output process. It's no different from the simple mistakes we make in our daily lives.

Table 32 Accidents involving damage to tools

backpack	30
climbing boots	44
stick	36
cooking stove	2
gas cartridge	3
lamp	9
crampon	8
carabiner	8
rope	9
harness	5
sling	5
piton	19
descender	4
belay device	4
helmet	9
others	0

Table 33 Human error

1) Understanding the scene (input process)

invisible (unable to hear)	81
did not notice	337
forget	20

2) Integration of thoughts

did not know	18
did not think deeply	232
thought it was okay	701

3) Functions of emotions and emotions

hurry	134
irritated	34
tired	208

4) Function to turn work behavior into action (output)

one's hands moved unconsciously	89
it was hard to do	48
lost the balance of the body	992

Tomio Tanimura's analysis method

Table 34 Attacks by animals and insects

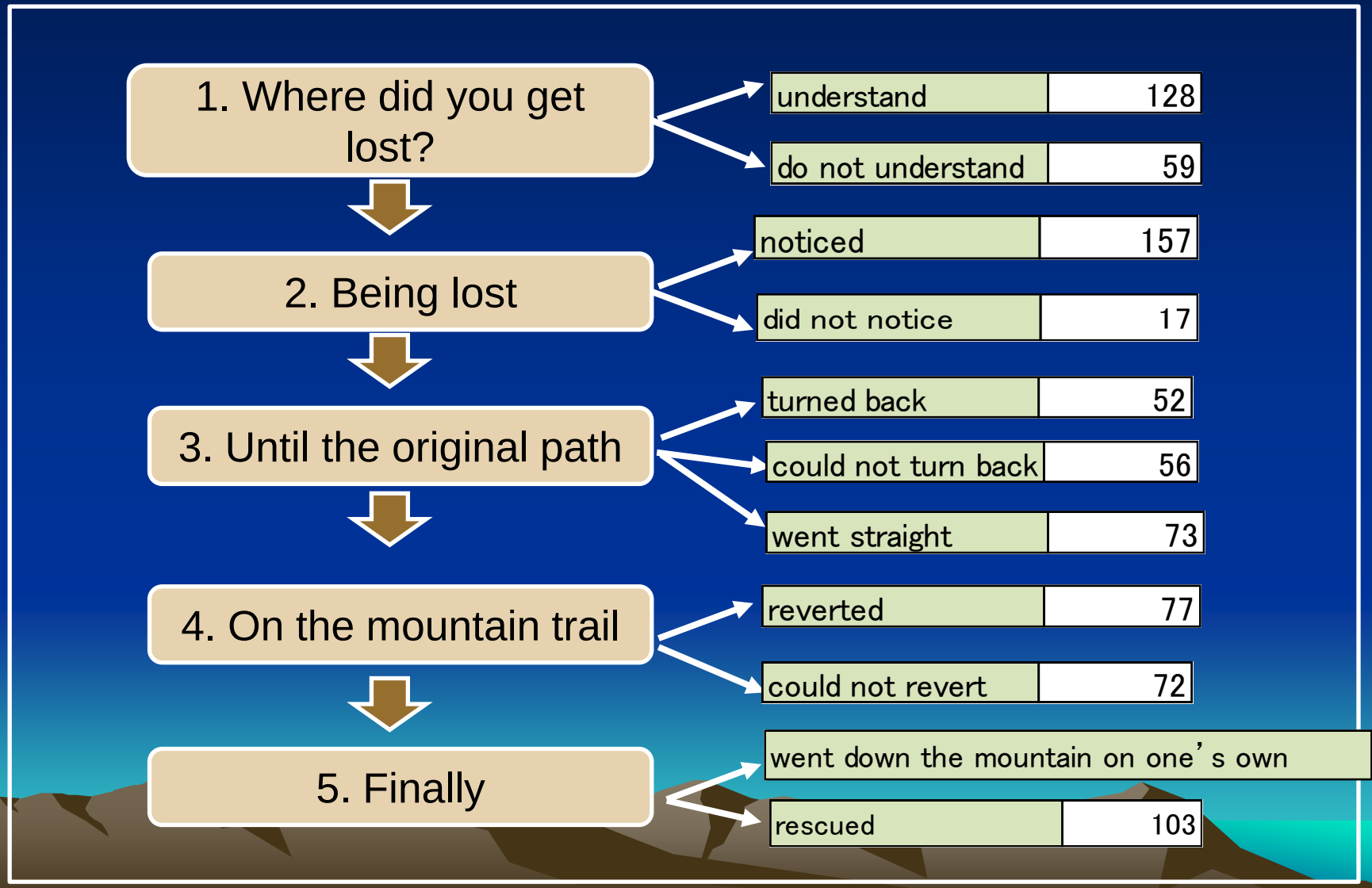
bear	8
wild boar	5
snake	8
stray dog	0
monkey	0
bee	29
poisonous insect	40

⑨ Accident cause: Getting lost

Mountaineering members have more opportunities to learn navigation technology (including GPS and apps) than general mountaineers, and are less likely to get lost, but many have poor map reading skills and have not mastered compass skills, so the conditions Depending on the route, there is a high possibility of getting lost.

Figure 36 summarizes in a flowchart how a person who got lost thinks and deals with the situation at the time of getting lost. One point to note is that 128 people answered ``I know'' when asked, ``What kind of place did you get lost?'' but interviews show that this is not very reliable. Regarding the important ``return to the original path,'' only less than 30 % of respondents turned back . Naturally, you will not be able to return to the mountain trail. Depending on the terrain and weather, it is likely that serious accidents and accidents due to getting lost will continue.

Figure 36 Decision-making and results during the process of getting lost



⑩ Post-accident condition and accident discovery notification

According to the UIAA disability classification IIC , 150 people died and 525 people were in critical condition (Table 42). The severe conditions in Table 35 probably reflect the conditions of these people after the accident. Regarding consciousness immediately after the accident (Table 35), 209 people (5.7%) were ``able to respond somehow'' and 350 people ( 8.6% ) were ``unable to move at all'' due to movement disorders .

Movement restraints after accidents (Table 36), it can be seen that people are placed in situations on the edge of life or death, such as being buried alive, suspended in the air, and restrained. In addition, 935 cases were reported under ``Other'' (case = a patient was worried about his left leg and was unable to move by himself because his upper body fell on a slope). Many of these examples can be applied to various risk response trainings (self-rescue, fall arrest training, etc.), and we would like to consider this as future work.

⑩ Post-accident condition, accident discovery notification

Table 35 Conditions immediately after the accident

instant death	74
death (not instant death)	77

Consciousness immediately after the accident

complete loss of consciousness	122
call and answer	87
conscious	3446

Movement disorders

cannot move at all	350
able to move a little bit	334
one can manage to move with other's help	412
able to walk somehow	1698
able to walk without problem	1259

Table 36 Movement restraint after accident

falling into a dangerous place and not being able to move	138
be dangling on a rope from a ledge	127
be buried alive in an avalanche/a landslide	17
restrained by falling objects	12
caught in gaps, etc.	59
Others	935

A wide variety of restraint conditions have been reported.

⑩-1 accident discovery notification

Table 37 Accident discoverer

accompanying family	163
party buddies	2385
rescue	78
general mountaineers	133
local folks	28
an application for a search from family/friends left at home	64

Table 38 Accident communication means

mobile phone	1391
wireless	104
landline	111
on foot	341
on foot, family	81
on foot, party buddies	441
on foot, general mountaineers	57

Table 39 Rescue methods

helicopter	732
carried on someone's back	291
supported by the armpits	178
walk on one's own	1743

⑪ Treatment after the accident and IIC

(Age at the time of the accident)

As shown in Table 40, about half of the people who provide first aid after an accident are colleagues, followed by the person themselves. On the other hand, there were 578 cases without any treatment . The treatment method is to use splints, and about 8 cases have been reported not only for the limbs but also for the neck , but considering the high number of injuries to the neck / cervical vertebrae (Figure 29), this number is not convincing, but it is necessary to use splints. Probably not ready.

The main treatments reported (Table 41) include cooling, hemostasis, and disinfection. Because there are a wide variety of treatments, there are 1036 reports under "Others". IIC is a seven -level disability classification system proposed by the UIAA Medical Science Committee (Table 42). The age of the accident person is the age at the time of the accident. As shown in the table, the majority of cases were moderate to severe.

⑪ Treatment after the accident and IIC (Age at the time of the accident)

Table 40 First aid

accident person	968
party buddies	2046
family	82
general mountaineers	135
rescue	270
medical personnel	244
local folks	36
no treatment	578

Table 41 Treatment method

hemostasis	534
disinfection	305
splint	101
splint an arm	287
splint a leg	314
splint the neck	8
splint the chest	4
resuscitation	29
resuscitation, artificial respiration	11
resuscitation, cardiac massage	14
postural change	114
washing	93
Taking mobile medicine	299
injection	21
cool	822
warm	196
oxygen inhalation	18
others	1036

Table 42 IIC and age at the time of accident

	0: no symptoms	1: mild symptoms	2: moderate symptoms	3: severe symptoms	4: critical condition	5death	6instant death
6-15		1	1				
16-25		1	9	10	9		1
26-35		26	32	78	22	6	7
36-45	1	72	71	162	37	6	9
46-55	7	108	179	358	85	17	19
56-65	4	255	334	787	187	24	18
66-75	2	288	329	648	157	17	16
76-85		49	69	84	27	4	3
86-95		1	1	2			
総計	14	821	1025	2130	525	77	73

IIC; Injury and Illness Classification <UIAA>

⑫ Devil time

We believe that it is useful for hikers and climbers to know simple mottos for safe mountaineering, even when they are unconscious. “Devil Time" in Table 43 is an easy-to-understand slogan.

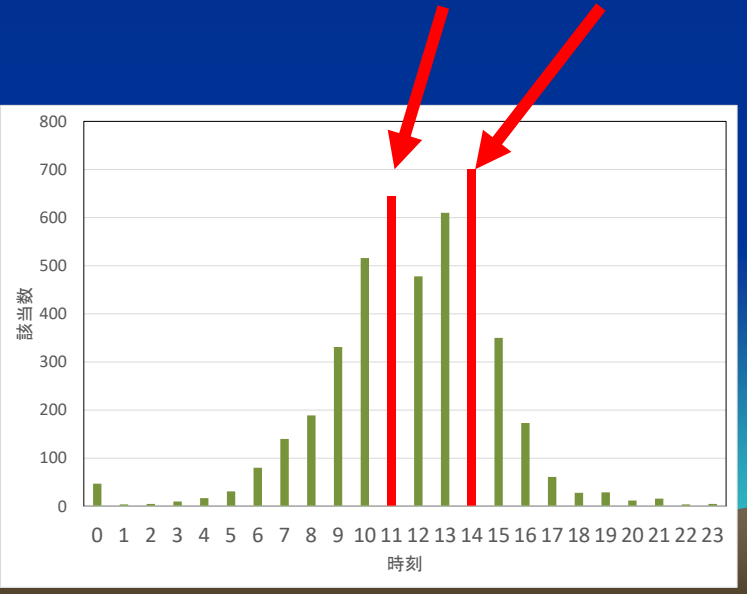
From the data of N=4669 , which has been improved in reliability , it has been found that the devil time can be divided into three groups (Table 43). The "devil 14 o'clock" group includes "falling," "getting lost," and "fatigue," and the “devil 11 o'clock" group includes slips and falls, and falls fall into both categories. On the other hand, natural phenomena such as ``bad weather, rockfalls, avalanches, and disease outbreaks'' tend to peak in the second half of the morning, although their peaks are vague. The 11 o'clock group had more accidents in high mountain areas, but there were no clear group differences.

Table 43 Devil's time（11o'clock & 14 o'clock）

<Yellow in the table is the peak>

	← 14 o'clock group →				11 o'clock group	natural system			
時刻	tumbling	losing the way	fatigue	falling	sliding down	falling ill	avalanche	bad weather	falling rocks
0	9	2	6	3	12	1		4	1
1	3		0	0	0				
2	3		0	1	0				
3	4	1	1	2	2	1			
4	9	3	3	0	2			1	
5	15		1	1	7	1		3	3
6	48	4	5	1	20		1	1	4
7	74	7	8	4	39	2	1	1	4
8	93	5	4	10	51	3	4		7
9	159	7	10	20	90	5	1	5	8
10	248	7	17	35	129	5		3	22
11	308	9	15	40	155	9	3	4	16
12	242	10	24	36	106	9	5	2	7
13	364	7	24	25	119	2	4	3	10
14	419	21	40	45	110	4	1	4	5
15	189	10	20	29	51	5	1	4	12
16	80	13	16	11	27	1	1	8	6
17	19	9	10	2	17	1	1	6	2
18	9	3	7	2	2	3		4	1
19	7	7	6	3	3			3	
20	3	4	2		1	1		1	1
21	4	5	4	1	1	1		1	1
22	0	1	2		1			1	
23	1	1			0		1	1	

Figure 37
Devil's time(11 & 14)



END

With the mission of ``never letting the same accident happen again,'' this year marks the 20th time the Mountaineering accident report has been submitted, with the help of 4,669 people providing information. During this time, I believe that the information necessary for safe Mountaineering has permeated many mountaineers and supported their activities.

As part of its application, we were able to incorporate accident information necessary for leaders and how to deal with them into the text and textbook for advanced summer mountain leaders, which has been approved by the International Mountaineering Federation UIAA

Here, I would like to pray for the repose of the souls of those who lost their lives, and I would like to inherit the wishes of those involved in the accident and aim to write a report that aims for even safer Mountaineering.