

雪崩とは

What is a Snow Avalanche?

雪崩とは「斜面上にある雪や氷の全部、または一部が肉眼で識別できる速さで流れ落ちる現象」をいいます。ここでは、雪崩のおこり方、雪崩の分類について概説します。

A snow avalanche is defined as the descent of any or all snow or ice on a slope at a speed that is visible to the naked eye.

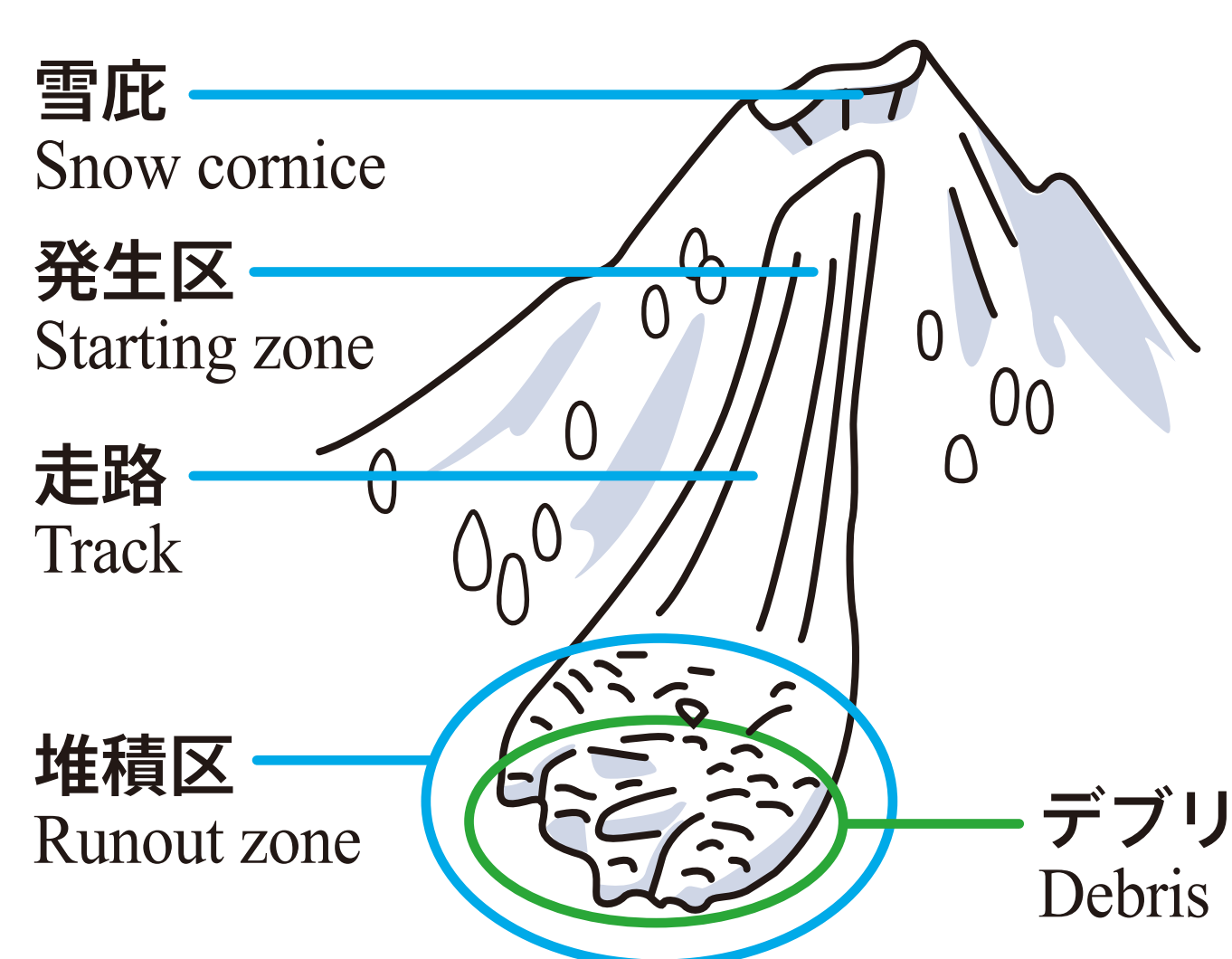
Here, avalanches are classified and their occurrence mechanisms are outlined.



雪崩とは？

What is a Snow Avalanche?

一般的に雪崩は積雪が崩れて動き始める「発生区」と、発生した雪崩が通る「走路」、なだれ落ちた雪が堆積する「堆積区」からなります。また雪崩によって堆積した雪を「デブリ」と呼びます。



Generally, an avalanche includes a starting zone, which is where the snow cover collapses and begins to move; a track, which is the path of the snow; and a deposition zone, which is where the snow settles. The settled snow is called debris.

雪崩のおこり方

Occurrence Mechanisms

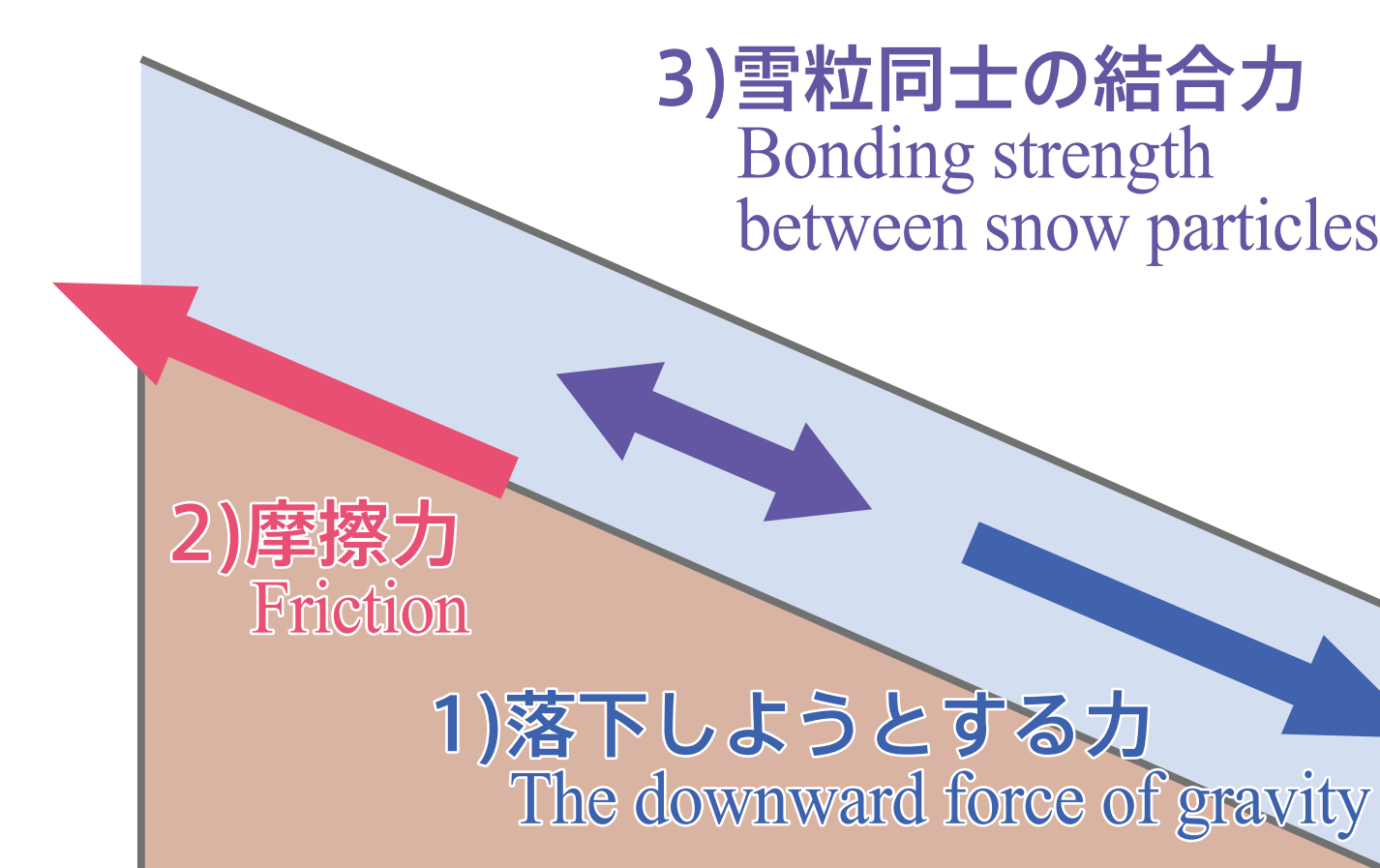
斜面上に積もった雪は、

- 1) 重力により落下しようとする力
- 2) 地面との摩擦力
- 3) 雪粒同士の結合力

がつり合って支えられています。

大雪によって積雪重量が増加し、落下しようとする力が大きくなったり、人や動物が斜面を横切って雪粒同士の結合力を弱めてしまったりすることで、つり合いが崩れて雪崩が発生します。

日射や気温の上昇や降雨で雪が融けた時にも、雪粒同士の結合力や地面との摩擦力が弱くなることで雪崩が発生します。



The snowpack on a slope remains stationary as long as the following forces are in balance:

- 1) gravity, which pulls things downward,
- 2) friction against the ground and
- 3) bonding strength of snow crystals.

Avalanches occur when the downward force of gravity upsets this balance as a result of increased snowpack weight by heavy snowfall or as a result of weakened bonding strength within the snow as a result of human or animal crossings of the slope.

They can also occur when solar radiation, air temperature increase or rainfall causes the snow to melt, because such factors weaken the bonding strength between snow crystals and the friction against the ground.

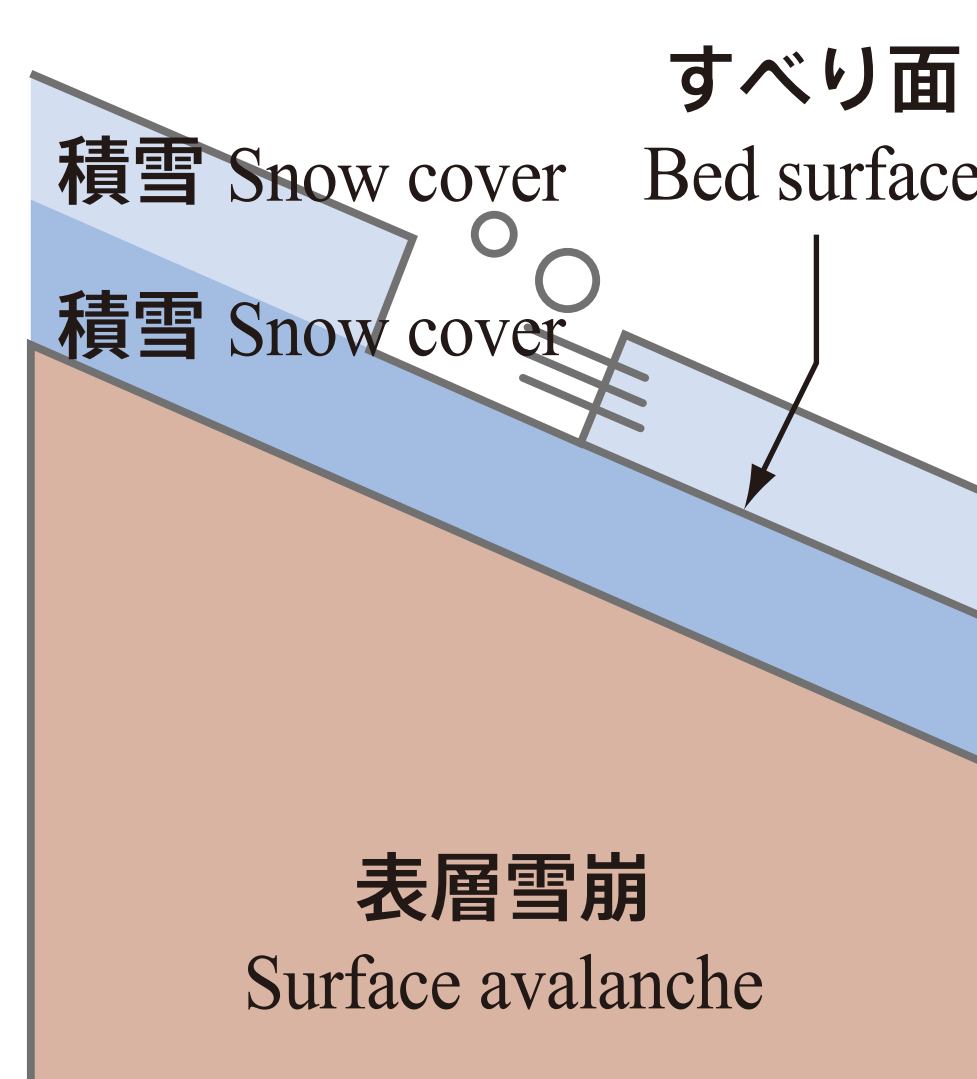
雪崩の分類

Avalanche classifications

雪崩は、滑り面の位置で表層雪崩と全層雪崩に分類されます。

表層雪崩

雪粒同士の結合力が弱い層（弱層）が形成されると、弱層の上に積もった雪が滑り落ちる表層雪崩が発生しやすくなります。はっきりとした弱層が見られなくても、滑り落ちる面が積雪の中にある場合は表層雪崩に分類されます。短時間に大量の降雪があった場合にも、新しく積もった雪が崩れて、表層雪崩が発生しやすくなります。



全層雪崩

融雪や降雨によって積雪と地面の間に水が入るなど、積雪と地面との間の摩擦力が弱まったときに、積雪が全て滑り落ちる全層雪崩が発生します。このほか、雪崩発生の際、雪崩層の雪質を要素として、以下のように分類され、たとえば点発生乾雪表層雪崩などと呼ばれます。

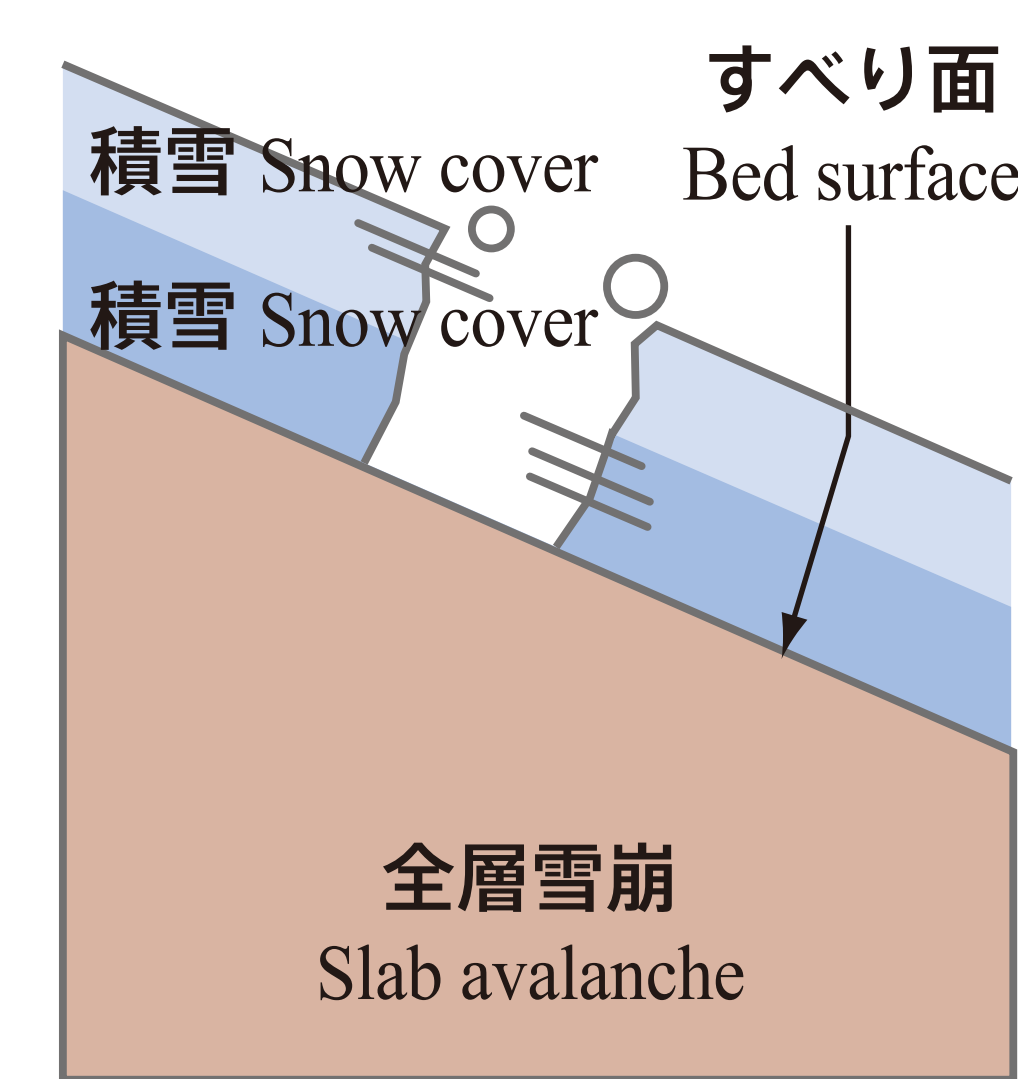


表 雪崩の分類

Table: Avalanche classifications

雪崩分類の要素 Criterion	区分 Classification	定義 Definition
雪崩発生の際 Form of release	点発生 Loose	一点からくさび状に動き出す。一般に小規模 The snow cover starts to move at a single point that gradually widens down the slope in the shape of a wedge. Typically small-scale
	面発生 Slab	かなり広い面積にわたり一斉に動き出す The snowpack starts to slide simultaneously in a large area.
雪崩層の雪質 Snow quality of the avalanche layer	乾雪 Dry snow	雪崩層が水気を含まない The avalanche layer has no water content.
	湿雪 Wet snow	雪崩層が水気を含む The avalanche layer has more than a little water content.
滑り面の位置 Position of the bed surface	表層 Surface	滑り面が積雪内部 The bed surface is within the snow cover.
	全層 Full-depth	滑り面が地面 The bed surface is the ground surface.

Avalanches are classified by the position of the bed surface as either surface avalanches or slab avalanches.

Surface avalanches:

When a weak layer forms in which the bonding strength between snow crystals is weak, snow that accumulates on that layer is likely to slide. This is a surface avalanche. Even without a weak layer, the avalanche is still classified as a surface avalanche as long as there is a sliding layer within the snow cover. Intense snowfall it is likely to cause a surface avalanche as a result of the collapse of the fresh snow cover.

Full-depth avalanches:

When the friction between the snowpack and the ground weakens from the presence of snowmelt water or rainwater between the snowpack and the ground, the whole snowpack descends the slope. This is a full-depth avalanche.

Avalanches are sub-classified by the form of release, the snow quality and the position of the slip surface. (Example: dry-point-release surface avalanche.)