

極端気象がもたらす雪氷災害の被害軽減のための技術開発

Development of Technologies for Mitigating Damage from Snow- and Ice-related Disasters Caused by Extreme Climatic Events

近年、気候変動の影響による異常な吹雪、降雪、雪崩に伴い、多数の車両の立ち往生や長時間に亘る通行止め、集落の孤立などの障害が発生しています。極端気象がもたらす、雪氷災害の発生地域や発生形態、災害規模は変化しており、多発化・複雑化がみられることから、その対策は喫緊の課題であります。

そのため、近年の気候変動などにより激甚化する多量降雪や吹雪、気温の変動により多発化する湿雪雪崩などの災害に対応し、国民生活や社会経済活動への影響を緩和するため、以下の研究に取り組んでいます。

In recent years, extreme snowstorms, snowfalls and snow avalanches have resulted in many cases of vehicles being stranded in blowing snow, long hours of road closures, and the isolation of communities. The areas of disaster caused by snow and ice and the conditions and scales of such disasters have been changing with increases in the number of extreme weather events. The development of measures against such disasters is an urgent task for us, because disasters caused by extreme weather events have been increasing and their conditions have become complicated. We have been pursuing the following studies in order to mitigate the influence of snow- and ice-related disasters on the socioeconomic activities of our nation. The technologies being developed are for responding to extremely heavy snowfalls and snowstorms, which have become increasingly severe because of climatic changes in recent years, and to increases in wet-snow avalanches, which occur because of temperature changes.



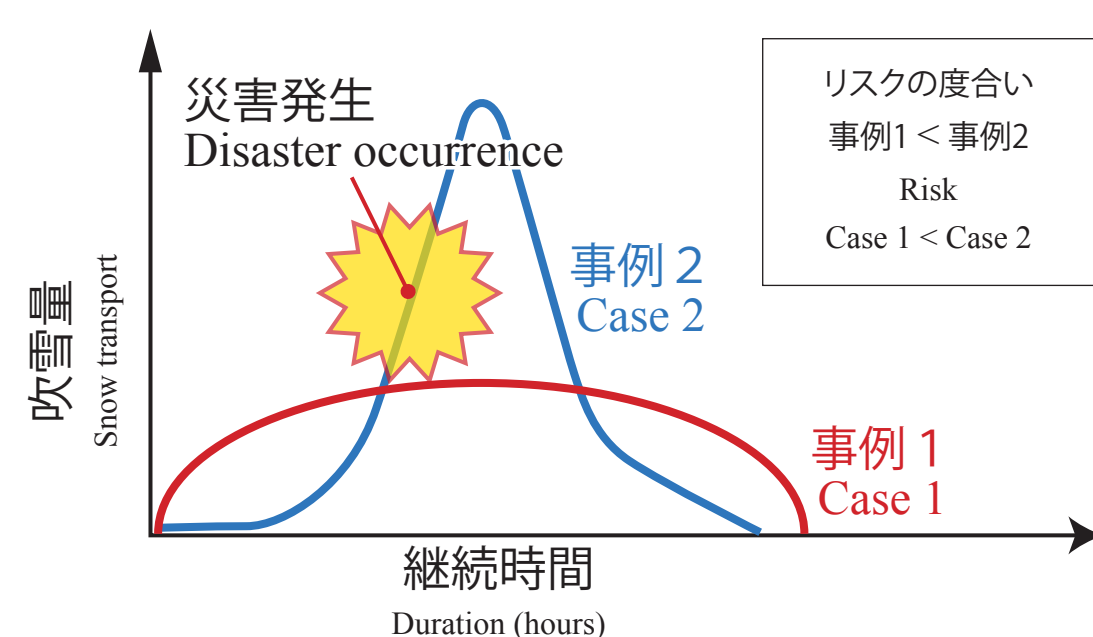
激甚化する雪氷災害(2010.1 えりも町)
Snow- and ice-related disasters have intensified.
(Jan. 2010, Erimo)

極端な暴風雪等の評価技術に関する研究

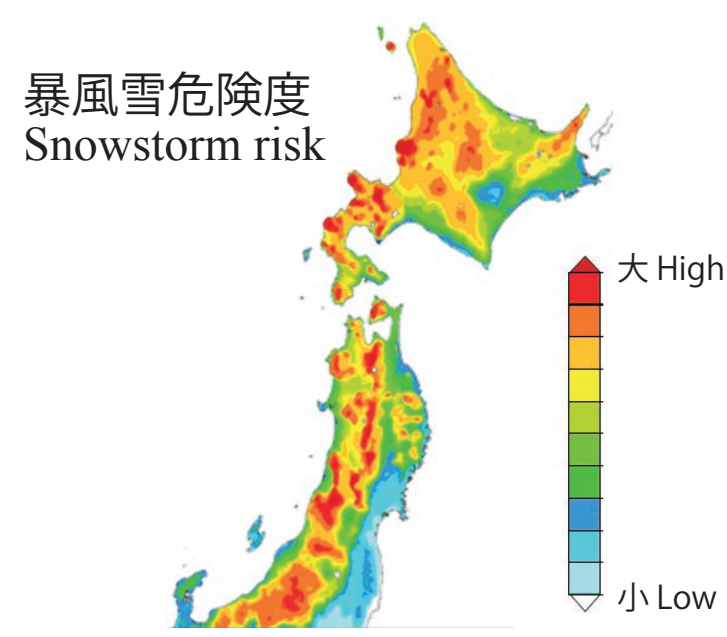
Studies on technologies for assessing the intensity of extremely severe snowstorms

気象変動に伴い増大する極端気象による暴風雪等の実態を解明し、一回の暴風雪・大雪の厳しさを適切に評価する指標の提案や、暴風雪および大雪に関するハザードマップの開発を行います。

By clarifying the actual conditions of snowstorms and other extreme-weather-related snow and ice disasters, which have been increasing with climatic changes, an index will be proposed that can be used to appropriately evaluate the severity of any given snowstorm or heavy snowfall. A hazard map exclusively for snowstorms and heavy snowfalls will be developed.



▲吹雪量、継続時間、災害発生との関係(イメージ)
Relationship among snow transport, snowstorm duration, and disaster occurrence (schematic)



▲暴風雪の分布図(イメージ)
Distribution map of snowstorms (schematic example)

短時間の多量降雪による雪崩危険度評価に関する研究

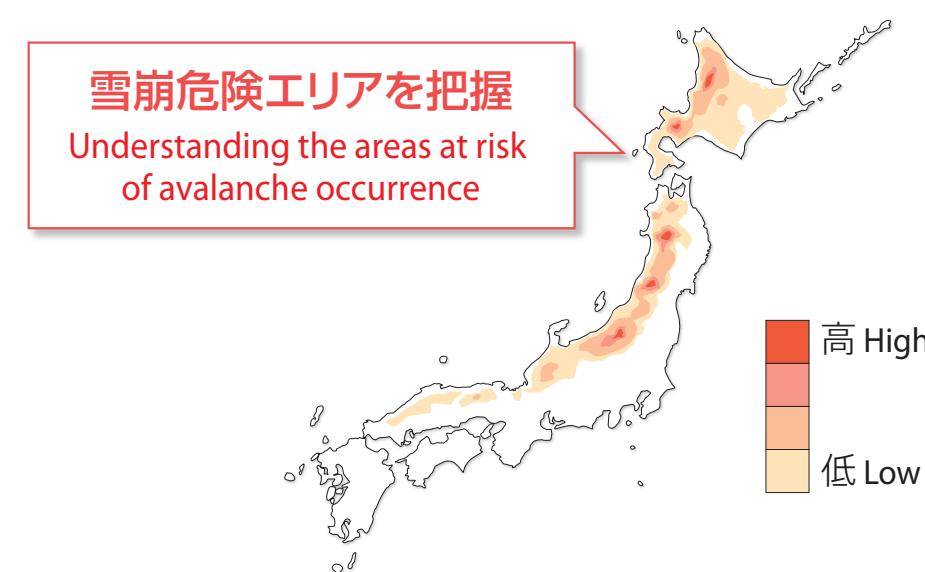
Hazard assessment for avalanches caused by intense heavy snowfall

短時間の多量降雪により発生する雪崩に関して、雪崩発生の条件を明らかにし、雪崩発生の危険度評価手法を提案します。

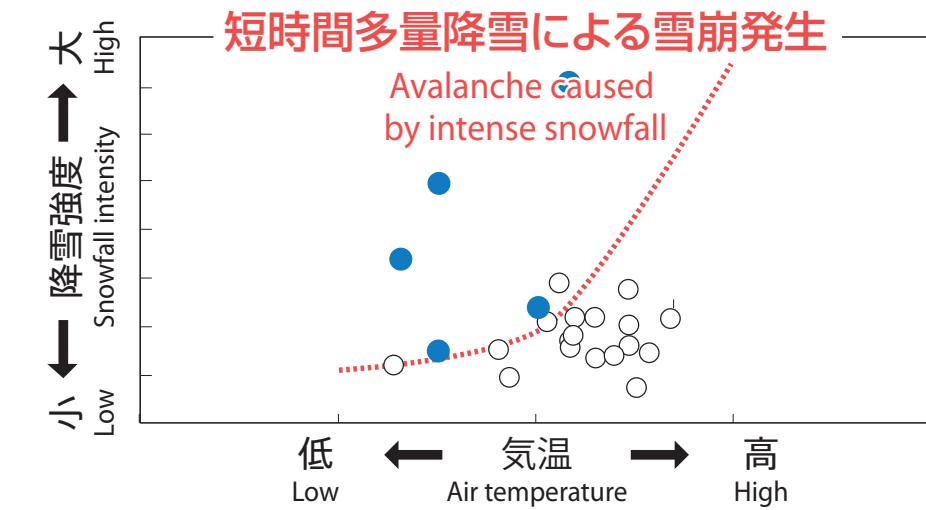
With regard to snow avalanches caused by intense heavy snowfalls, a method for evaluating the risk of snow avalanche occurrence will be proposed based on a study for clarifying the conditions under which such avalanches occur.



山梨での雪崩発生状況
An avalanche site in Yamanashi Prefecture



▲短時間多量降雪による雪崩発生頻度分布(イメージ)
Distribution of avalanches caused by intense snowfall (conceptual diagram)



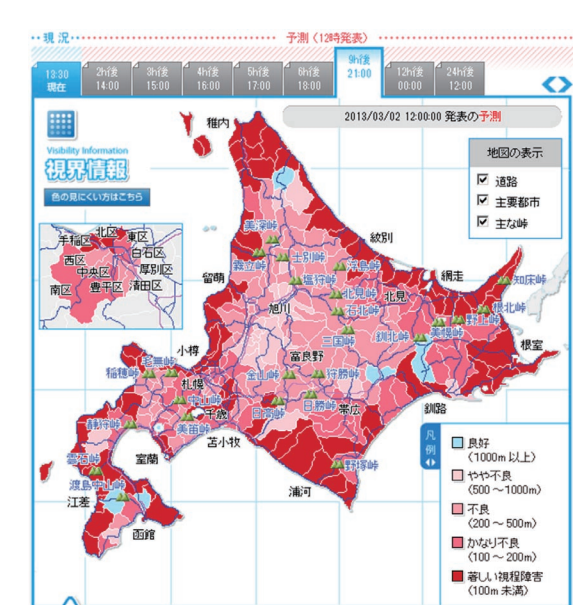
▲降雪強度と気温を指標にした雪崩発生条件(イメージ)
Avalanche occurrence conditions when the snowfall intensity and temperature are used as indexes (conceptual diagram)

広域的な吹雪視程障害予測技術の開発に関する研究

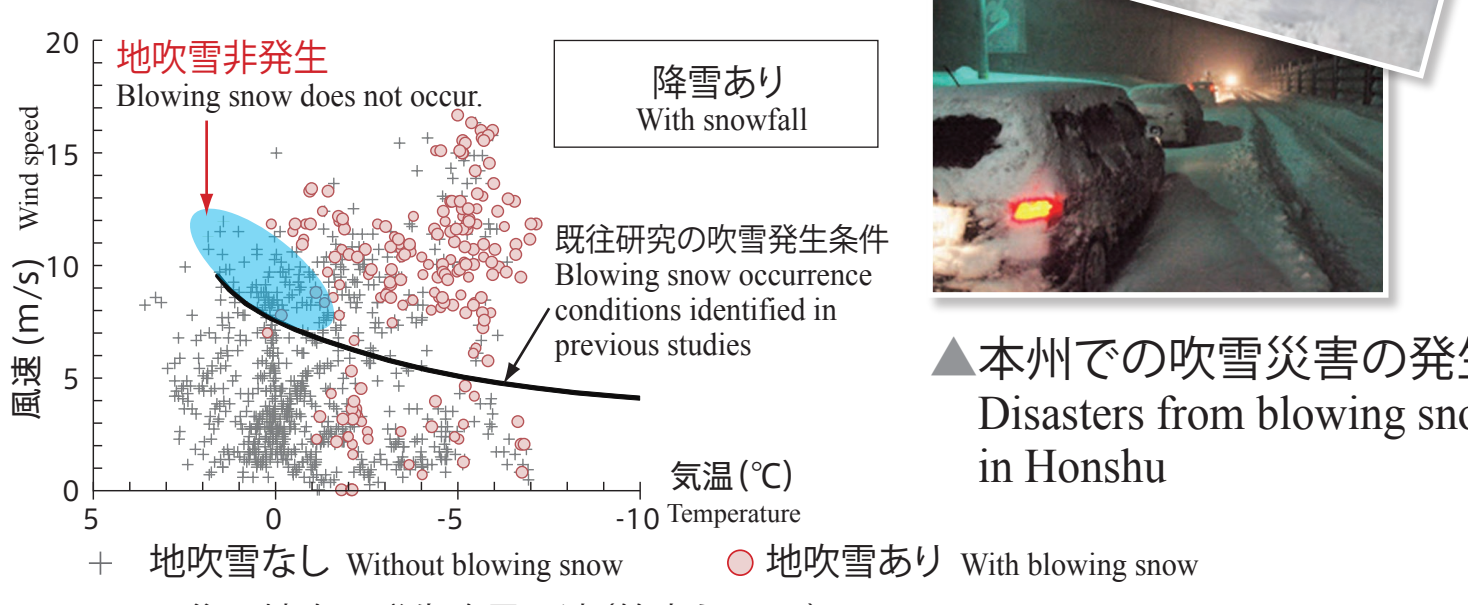
Research on Technologies for assessing snowstorm-induced poor visibility in a wide area

多様な気象環境下における吹雪視程障害の予測技術を開発し、吹雪時にドライバーや道路管理者にリアルタイムに情報提供をすることで、吹雪時の安全性を高めます。

We will develop a forecasting technology for snowstorm-induced poor visibility under various weather conditions and will contribute to traffic safety improvements during blowing snow by providing real-time information to drivers and road administrators.



▲「吹雪の視界情報」(現状)
Snowstorm Visibility Information System (current)



▲地吹雪発生有無と気象条件
With and without blowing snow and related weather conditions



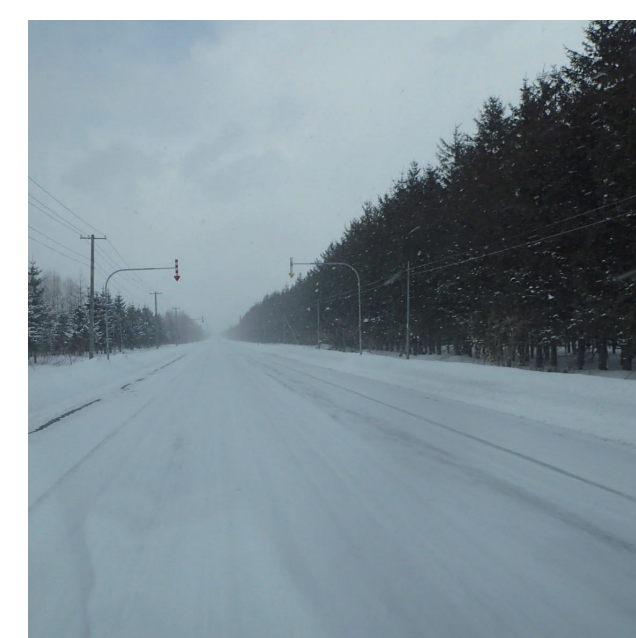
▲本州での吹雪災害の発生
Disasters from blowing snow in Honshu

防雪林の安定的な防雪性能確保に関する研究

A study on securing stable snowbreak performance for snowbreak woods

吹雪対策として高い効果が期待できる防雪林の安定的な防雪性能確保に向け、下枝の枯れ上がりの見られる防雪林の補助対策や管理手法を提案します。

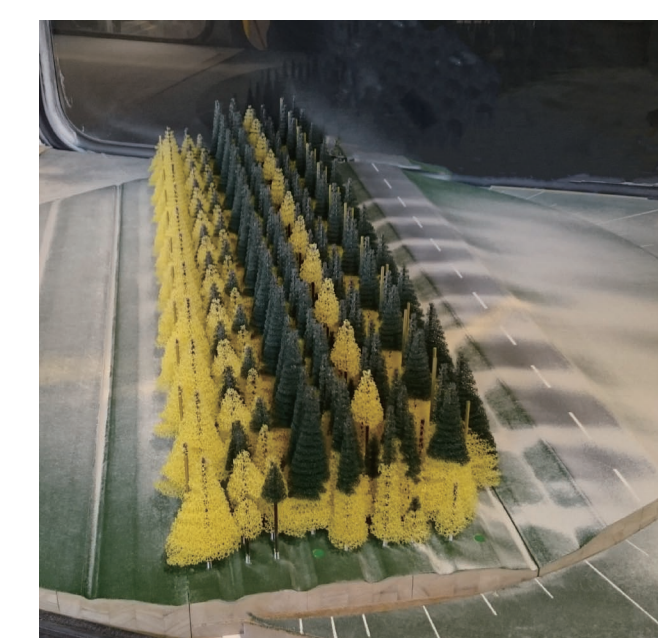
Towards securing stable snowbreak performance for snowbreak woods from which highly effective blowing-snow control can be expected, we will propose an improvement measure and management techniques for snowbreak woods with withered lower branches.



▲吹雪対策として高い効果が期待される防雪林
Snowbreak woods from which highly effective blowing-snow control can be expected



▲間引き遅れにより下枝が枯れ上がった林帯
Wood zone where the lower branches are withered because of a lack of insulation



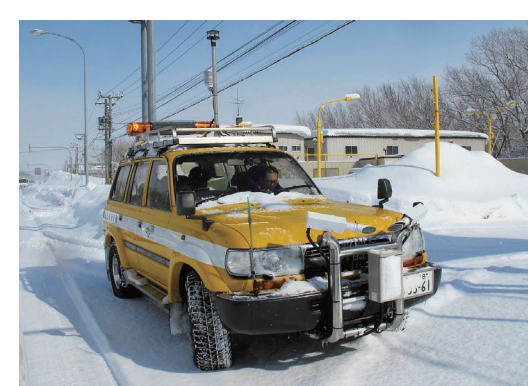
▲縮小模型による防雪林の風洞実験
A wind tunnel experiment using a miniature model of snowbreak woods

防雪柵の端部・開口部対策に関する研究

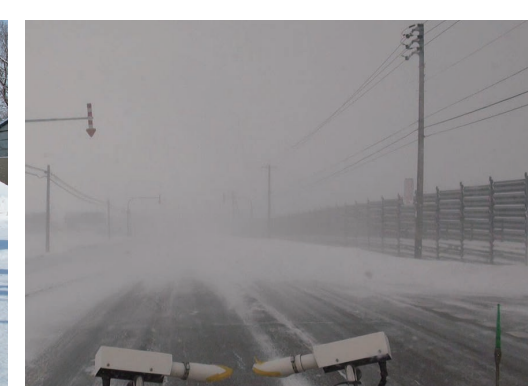
A study on measures for the end and apertures of snow fences

防雪柵の整備において課題として残っている端部や開口部のように視程が急変する箇所について、視程急変メカニズムを解明や緩和対策効果を定量的に示すことで、条件に応じた対策の選定方法を提案します。

The mechanism of drastic visibility changes at the ends and openings in snow fences has not been clarified. In developing snow fences, we will clarify the mechanism of drastic visibility change at the ends and openings of snow fences, quantitatively show the visibility reduction mitigation effects of some countermeasures, and propose how to select a countermeasure that suits a location with certain conditions.



▲気象観測車と防雪柵開口部の状況
A weather observation vehicle and the visibility conditions near the open parts of a snow fence



▲防雪柵の端部対策例
Examples of treatments for snow fence end parts

