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

近年、急速に発達した低気圧によって極めて激しい暴風雪や大雪がしばしば発生しています。このような雪氷災害への対策を検討するうえで、災害をもたらす極端な暴風雪や大雪の激しさを示すハザードマップが必要です。本研究では、ハザードマップの作成に向け、一回の暴風雪や大雪の激しさを適切に評価するための指標作りを行います。

In recent years, low-pressure systems that develop quickly have been bringing frequent severe snowstorms and heavy snowfalls. In conducting examinations for the development of measures against such snow- and ice-related disasters, a hazard map that shows the severity of extreme snowstorms and heavy snowfalls that result in disasters is necessary. In this study, we will create an index for appropriately assessing the severity of a given snowstorm or heavy snowfall event, to enable the creation of hazard maps.

吹雪による激しい視程障害
Severe visibility reduction caused by blowing snow

気象条件と吹雪量の関係解明

Clarification of the relationship between weather conditions and snow transport

一回の暴風雪や大雪の激しさを評価するためには、まず吹雪の激しさについて定量的に示すことが必要です。一般的に、吹雪の激しさを示す指標として「吹雪量」が用いられます。これは、風によって飛んでくる雪粒子の量を示すものです。（「吹雪量」の定義は、風に直交する1m幅を1秒間に通過する雪の質量）

本研究では、気象観測データや吹雪量観測データを解析し、降雪量や風速、気温等の気象条件と吹雪量の関係について検討し、吹雪量推定式を作成します。

To assess the severity of a given snowstorm or heavy snowfall event, it is necessary to quantitatively determine the severity of blowing snow. Generally, snow transport is used as an index of blowing snow severity. Snow transport gives the amount of windborne particles. (Snow transport is defined as the mass of snow that passes a width of 1m perpendicular to the wind direction in one second.)
This study analyzes the weather observation data and observed snow transport data to investigate the relationship between weather conditions (e.g., snowfall, wind speed and temperature) and snow transport. An equation for estimating snow transport is created.

暴風雪や大雪の評価指標の検討

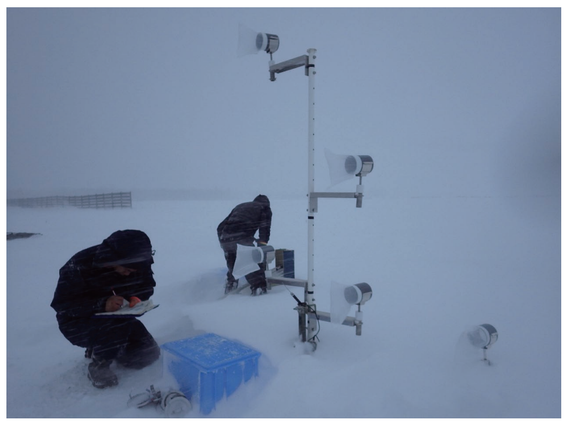
Examination of an index for assessing the severity of snowstorms and heavy snowfalls

本研究の目標は、暴風雪と大雪のハザードマップを開発することです。そこで、過去の雪氷災害記録や気象データの履歴から、雪害による被害状況について整理します。

一方、本研究により検討した吹雪量推定式を用い、過去の気象条件から暴風雪や大雪のイベントを抽出します。これらのデータをもとにして、暴風雪および大雪の評価指標について提案し、暴風雪や大雪イベントの発生頻度やその地域性について明らかにします。

The purpose of this study is to develop a hazard map for snowstorms and heavy snowfalls. We will examine the records of snow- and ice-related disasters and weather data, in order to investigate snow- and ice-related disasters and their damage. By using the snow transport estimation equation that is developed in this study, we will extract snowstorm and heavy snowfall events from the weather conditions in the past. We will propose an index for snowstorms and heavy snowfall severity based on the above data and results. The occurrence frequencies of snowstorm and heavy snowfall events and the regional characteristics of snowstorm and heavy snowfall events will also be clarified.

▲各種気象観測
Weather observation using a variety of equipment



▲吹雪量観測の様子
Researchers conducting snow transport observation

風速計や温湿度計、視程計、日射計などによる気象観測を実施している
We have been conducting weather observation by using anemometers, thermo-hygrometers, visibility meters, and actinometers.

▲温湿度計
Thermo-hygrometers

▲視程計
Visibility meters

▲風速計
Anemometers

▲CCTVカメラ
CCTV camera

本研究の検討フロー

Flow of examinations in this study

暴風雪・大雪の災害記録の収集
Collection of records on snowstorm and heavy snowfall disasters

冬期気象データの収集
Collection of past winter weather data

吹雪量などの推定式の検討
Examination for the creation of an estimation equation for snow transport

暴風雪および大雪災害時の被害状況の抽出
Extraction of damage conditions at snowstorm and heavy snowfall events

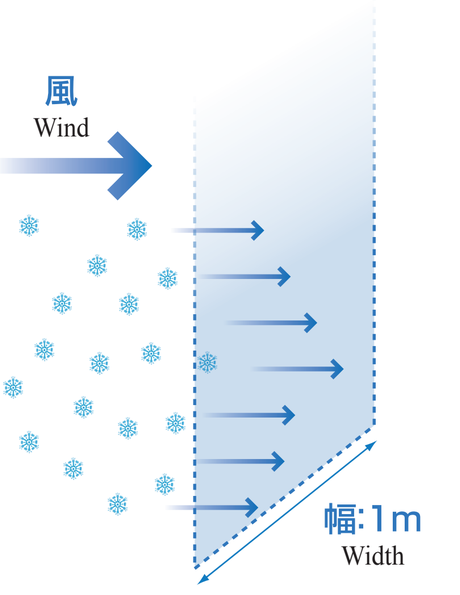
データベース化
Database creation

気象条件から暴風雪・大雪イベントの抽出
Extraction of snowstorm and heavy snowfall events from past weather conditions

一回の暴風雪や大雪の厳しさを適切に評価する指標の検討
Examination of an index for appropriately assessing the severity of a snowstorm or heavy snowfall event

暴風雪および大雪の発生頻度と地域性について変化傾向の解明
Clarification of tendencies in the changes of occurrence frequency and regional characteristics of snowstorms and heavy snowfalls

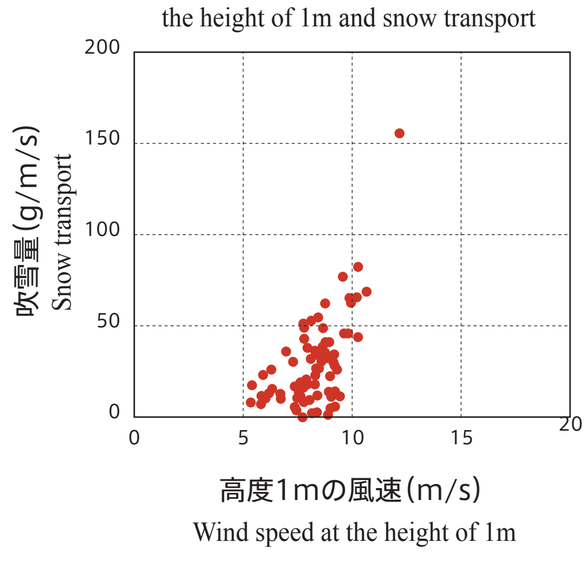
暴風雪および大雪に関するハザードマップを開発
Development of a hazard map on snowstorms and heavy snowfalls



▲吹雪量のイメージ
Concept of snow transport measurement

高度1mの風速と吹雪量の関係

Relationship between wind speed at the height of 1m and snow transport



▲観測結果の一例
Example of an observation result

暴風雪ハザードマップ（イメージ）

Conceptual rendering of a snowstorm hazard map