

気象変動の影響による雪氷環境の変化に関する研究

Changes in Snow and Ice Environments Associated with Climate Change

地球規模の温暖化の影響により、日本国内の降積雪や気温の変動が予測されています。積雪寒冷地では、暖冬による少雪傾向、降雪の少ないとされてきた地域への大雪、局地的な豪雪など、今までとは異なった姿が想定されます。本研究では、近年の雪氷環境の変化傾向について調査を行っています。

Global warming is forecasted to drastically alter snowfall and temperature trends in Japan. The cold, snowy regions of this country are expected to have winters with unprecedented changes, such as warm winters with little snowfall, heavy snowfall in areas that have typically had little snowfall, and localized intense snowfall. This study surveys the trends in the snow and ice environments for recent years.



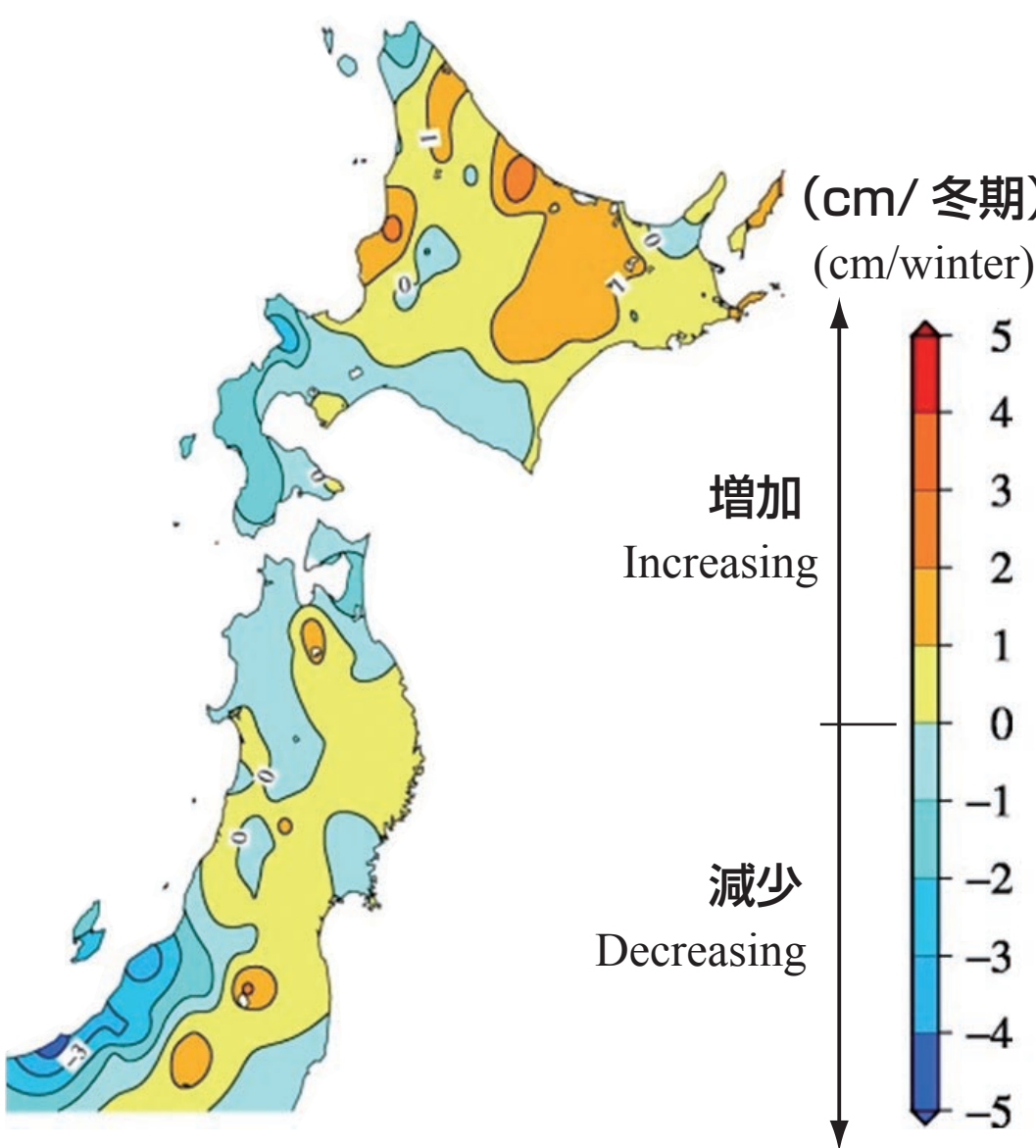
2008年4月1～2日に発生した北海道東部での災害
Snow disaster in Eastern Hokkaido on April 1 and 2, 2008

近年の降雪・積雪の変動傾向

Changes in snowfall and snow cover in recent years

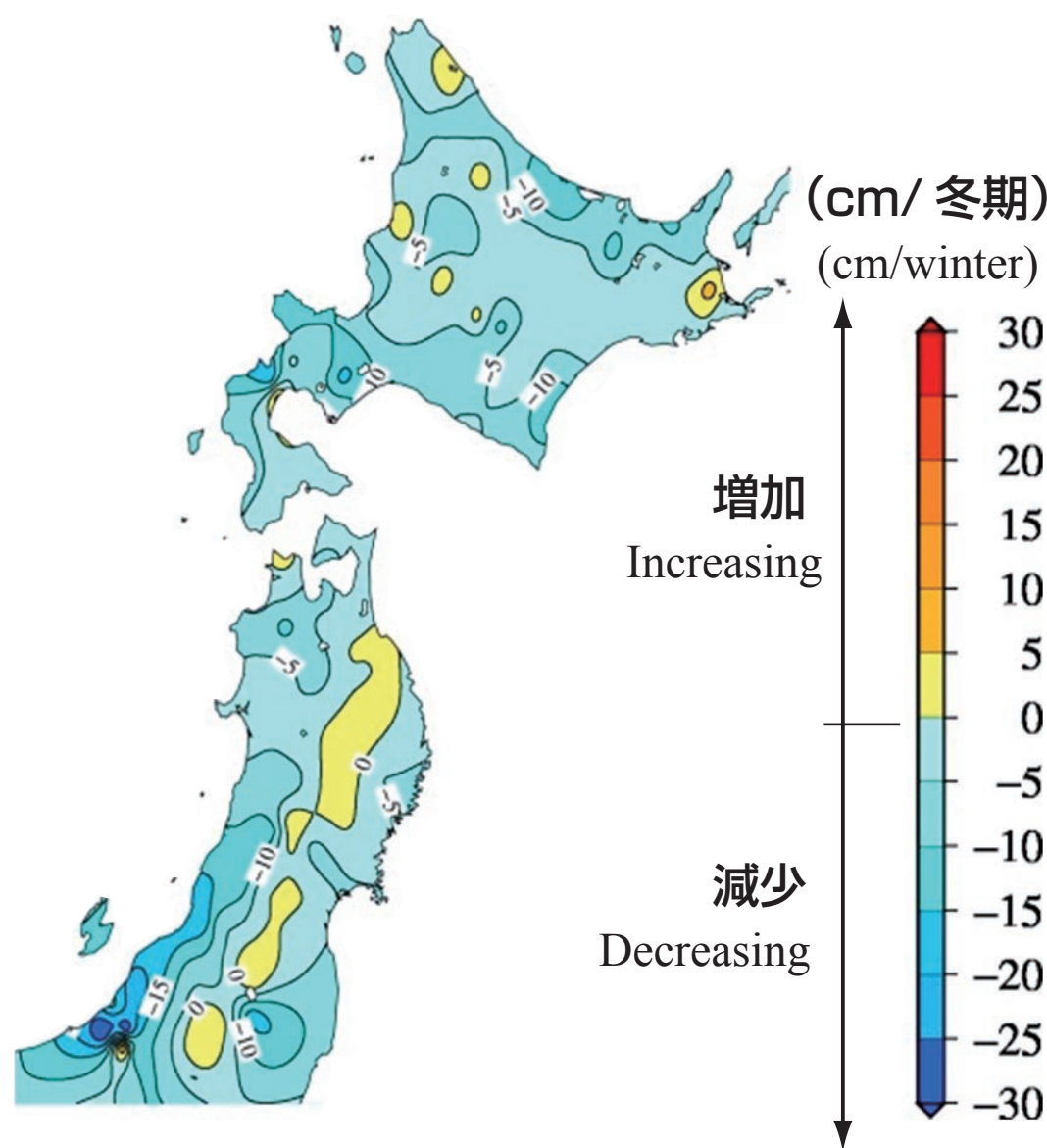
新潟県以北のアメダス141箇所を対象に、調査期間(1983～2008年度、11月～4月)における各冬期の最深積雪や累積降雪量の変化傾向を調べました。冬期の最深積雪は、北海道では日本海側の小樽以北、内陸部、オホーツク海側および太平洋側東部で、本州では北部太平洋側で増加傾向にあります。冬期累積降雪量は、対象地域の大部分で減少傾向にあります。

The trends of change in the seasonal maximum snow depth and the seasonal snowfall from November to April in the years 1983 to 2008 were surveyed using the data from 141 AMeDAS stations in Northern Japan, including stations in Niigata Prefecture. Areas with increasing seasonal maximum snow depth are found in Hokkaido and Honshu: Those in Hokkaido include the northern part of the Japan Sea coast, including Otaru; the inland areas; areas on the Okhotsk coast; and the Pacific east coast areas. The areas in Honshu are on the Pacific northern coast. The seasonal snowfall has tended to decrease in most of the surveyed areas.



▲最深積雪の変化傾向

Trends of change in seasonal maximum snow depth



▲冬期累積降雪量の変化傾向

Trends of change in seasonal snowfall

近年の雪氷気候値の分布図の作成

Mapping the distributions of snowy climate indicators in recent years

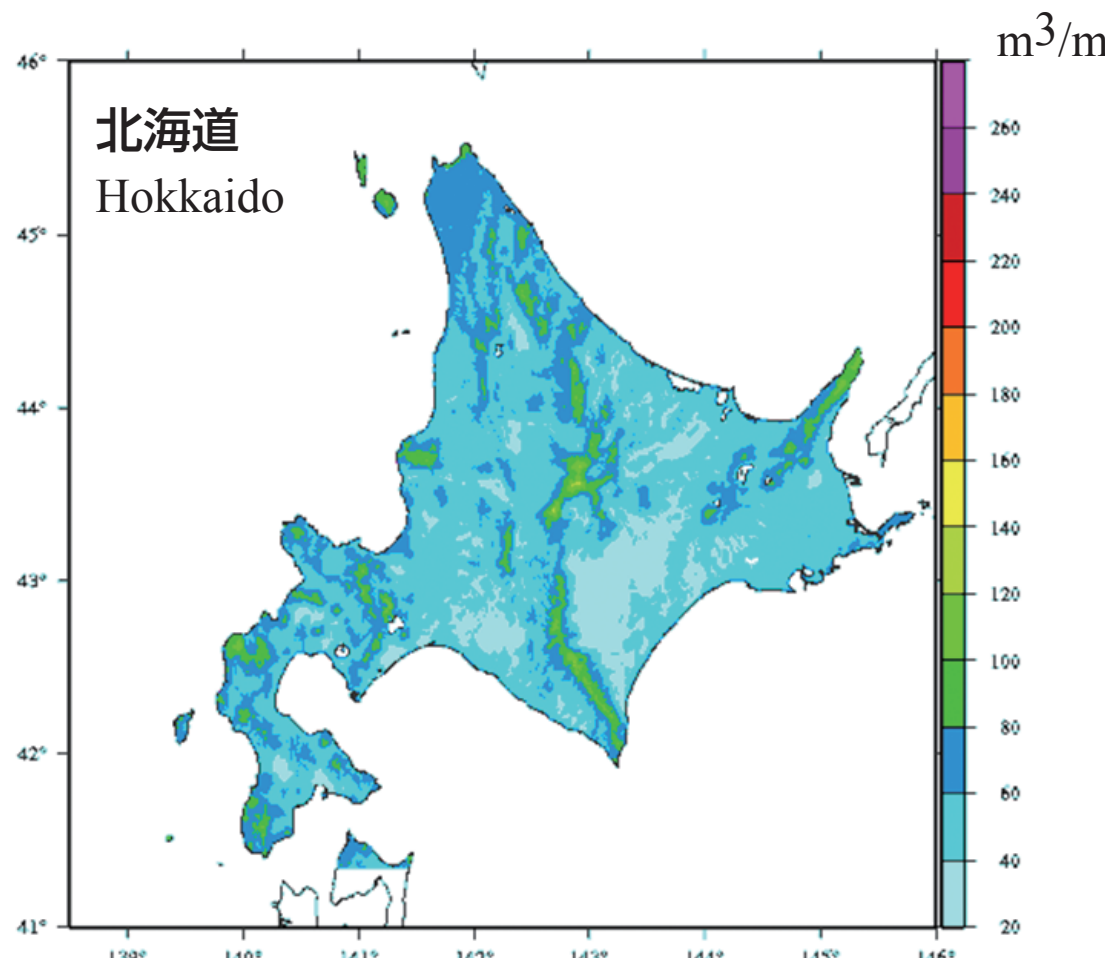
はじめに、雪氷気候値(1冬期吹雪量や視程障害頻度)を目的変数、基本的な気象値を説明変数とする重回帰式を地域ごとに作成します。つぎに、地域ごとの重回帰式と、気象庁のメッシュ気候値などを用いて分布図を作成しました。

First, a multiple regression formula was created for each area, with values representing the snow and ice environments (i.e., snowdrift transport rate and poor visibility for each winter) as the response variable and basic meteorological values as the explanatory variable. Next, a distribution map was created using multiple regression formulas and the mesh climate data from the Japan Meteorological Agency.

雪氷気候値の概要 Outline of snowy climate indicators	
雪氷気候値 Snowy climate indicators	概要 Outline
1) 1冬期吹雪量 (m^3/m)	単位時間に風向と直角な単位幅を通過する雪の質量で、吹雪量の冬期間の総計を1冬期吹雪量と定義します。
1) Snowdrift transport rate for each winter (m^3/m)	Snowdrift transport rate is defined as the mass of snow that passes a unit width that is perpendicular to the wind direction per unit time. The seasonal total of snowdrift transport rate is defined as the cumulative snowdrift transport rate per winter.
2) 視程障害頻度 (日)	1冬期のうち視程障害が発生する日数です。ここでは視程200mを下回る日を視程障害発生日とし、その冬期間の出現日数を視程障害発生頻度と定義します。
2) Frequency of poor visibility (days/winter)	This is defined as the number of days per winter on which poor visibility occurs. Poor visibility is defined as that shorter than 200m. The number of days with poor visibility occurrence in a winter is defined as the frequency of poor visibility.

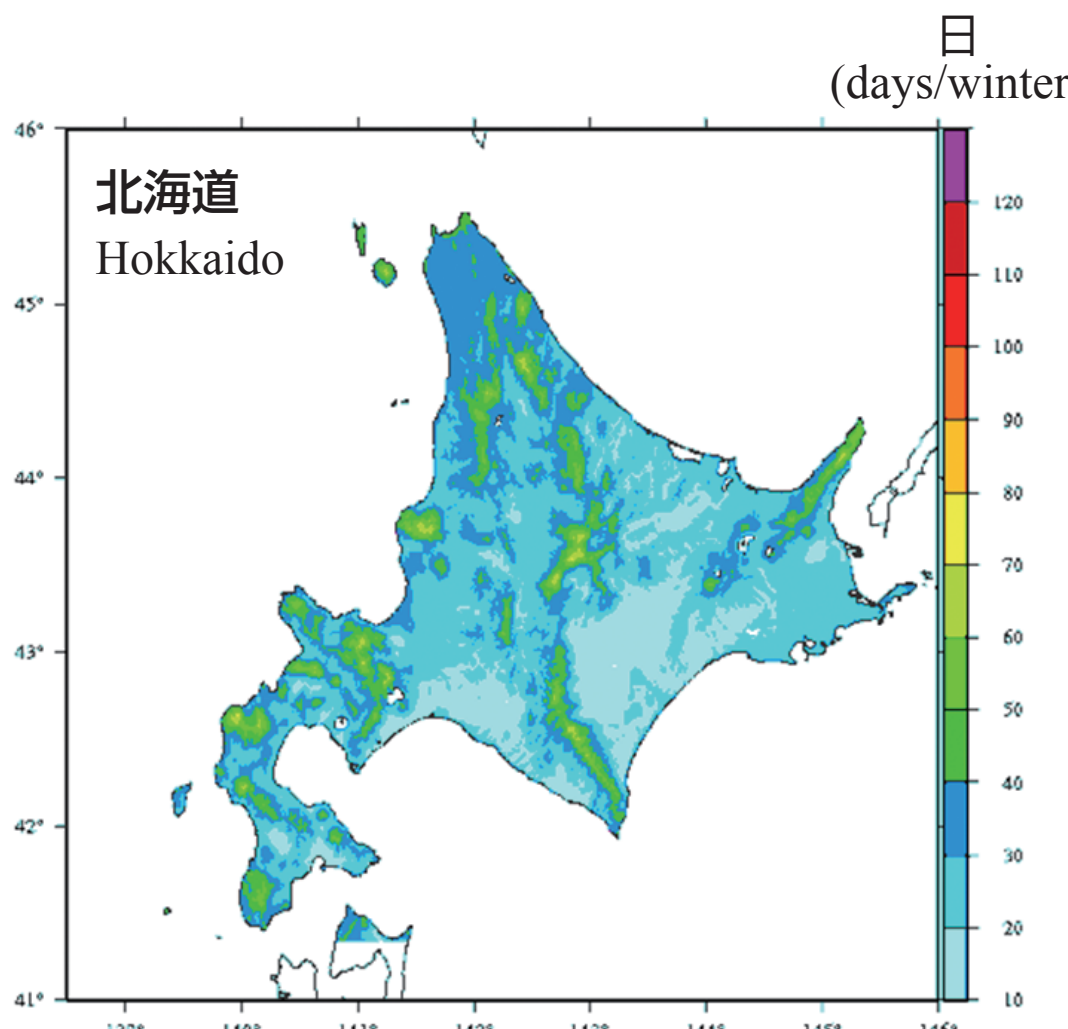
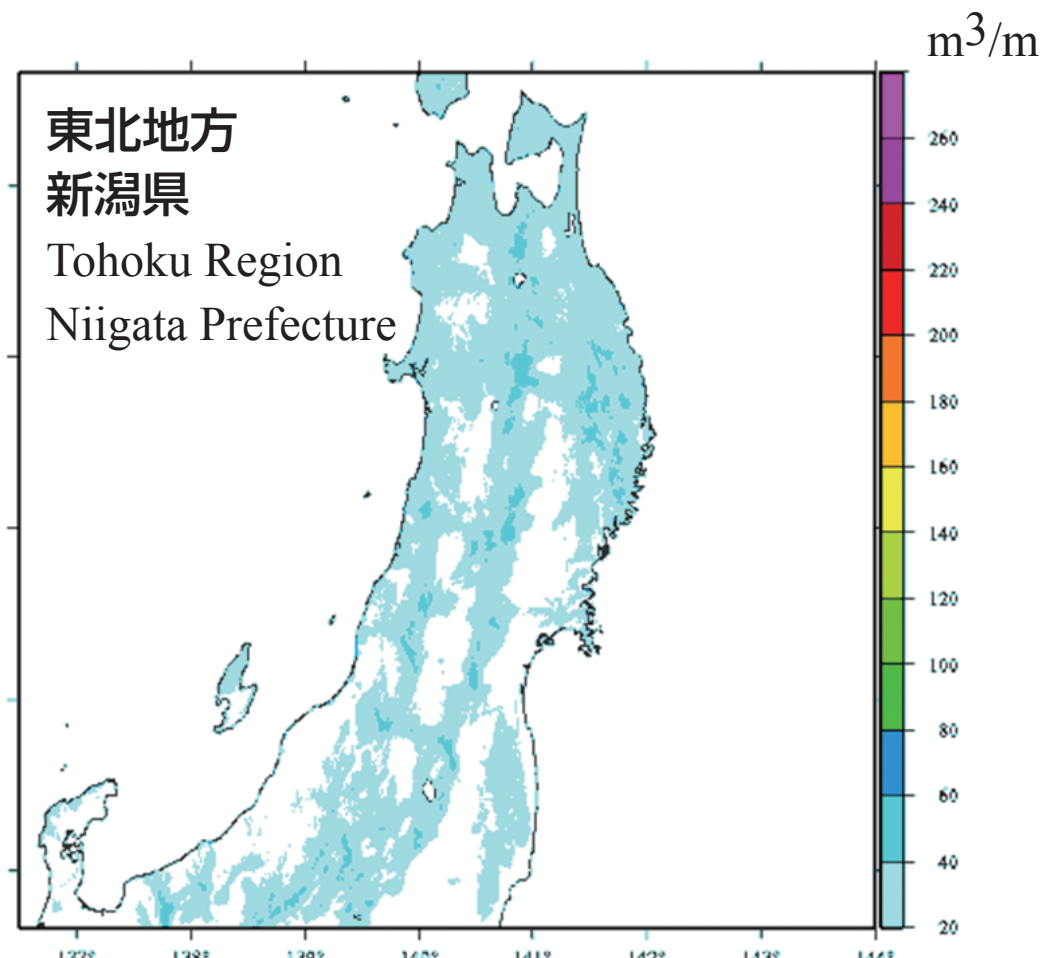
注：雪氷気候値は気象条件から推定した値です。

Note: The snowy climate indicators were estimated based on weather information.



▲1 冬期吹雪量の分布図 (平年値)

Distribution map of snowdrift transport rate for each winter (avg. year)



▲視程障害頻度の分布図 (平年値)

Distribution map of the frequency of poor visibility (avg. year)

