

切土道路における吹きだまり予測モデル開発に関する研究

Study on the Development of a Model for Forecasting Snowdrift at a Cut Road Section

積雪寒冷地の冬期道路では、吹雪に伴って発生した吹きだまりにより、多くの車両が立ち往生する災害がしばしば発生します。寒地土木研究所では、暴風雪時の吹雪災害の軽減に向け切土道路における吹きだまり予測技術の開発に向けた研究に取り組んでいます。

On winter roads in cold, snowy regions, snowdrifts often form at times of blowing snow, and disasters that involve many stranded vehicles frequently occur. Towards mitigating blowing snow-related disasters during snowstorms, the Civil Engineering Research Institute for Cold Region has been conducting research for the development of a technology for forecasting snowdrift formation at cut sections of roads.



吹きだまりで動けなくなった車両
Vehicles trapped in snowdrifts

吹きだまり災害の近年の事例について

Cases of snowdrift-related disasters in recent years

近年、急激に発達した低気圧により、多くの車両が立ち往生する吹きだまり災害が発生しています。

例えば、2013年3月2日から3日には、北海道全域で大荒れの天候となり、道東地方を中心に9名の死者を出す惨事となりました。また、2010年1月にはえりも町内の切土道路で車両50台が吹きだまりにより立ち往生する等、吹きだまり災害の防止が喫緊の課題となっております。

In recent years, snowdrift-related disasters in which many vehicles were stranded in snowdrifts have occurred because of rapidly developing low-pressure systems. For example, on March 2 and 3, 2013, all areas of Hokkaido had severely stormy weather. The severity of the snowstorm disaster was such that 9 people died, mainly in Eastern Hokkaido. In January 2010, 50 vehicles were stranded on a cut section of a road in Erimo Town. The prevention of snowdrift-related disasters has become an urgent task for us.

吹きだまりによる車両の立ち往生
Vehicles trapped in snowdrifts



国道 336 号えりも町 (H22.1.5-6)
(室蘭開発建設部提供)
National Highway 336 in Erimo Town
(January 5 - 6, 2010)
Source: Muroran Development and Construction Department

切土道路の吹きだまり発達過程に関する調査

Survey on the process of snowdrift development at cut sections of roads

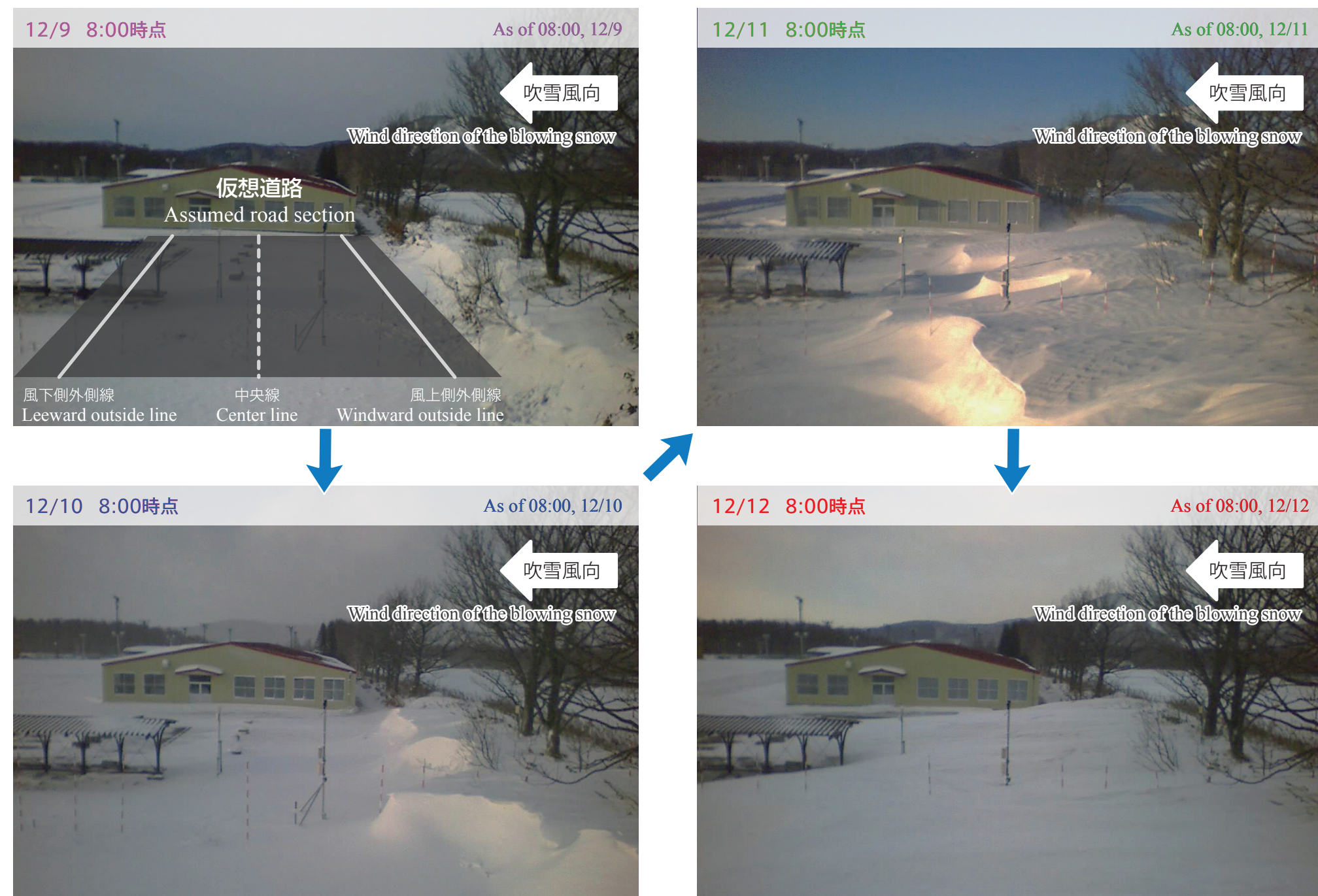
北海道弟子屈町内の高さ2mの片切土で吹きだまりの発達過程について調査を行いました。

その結果、吹きだまりは風上側の切土法面上から風下側に想定した道路に向かって発達し、風上側の車線中心に相当する位置においては深さ113cmの吹きだまりが概ね13時間で急激に発達することなどを明らかにしました。

A survey was done to investigate the development process of snowdrifts at a cut section with a height of 2m in Teshikaga Town, Hokkaido. The survey found that a snowdrift started to develop on the windward slope of the assumed road section and developed toward the assumed road section in the leeward direction. The depth of the snowdrift that formed at the center of the windward lane was found to be 113cm. The snowdrift was found to have taken about 13 hours to develop, which was very quick.

片切土の吹きだまり発達状況 (2016/12/9-12/12)

Development of a snowdrift on a road section with a cut on one side (2016/12/9-12/12)



吹きだまり予測モデル開発に向けた研究概要

Outline of the study toward the development of a snowdrift forecasting model

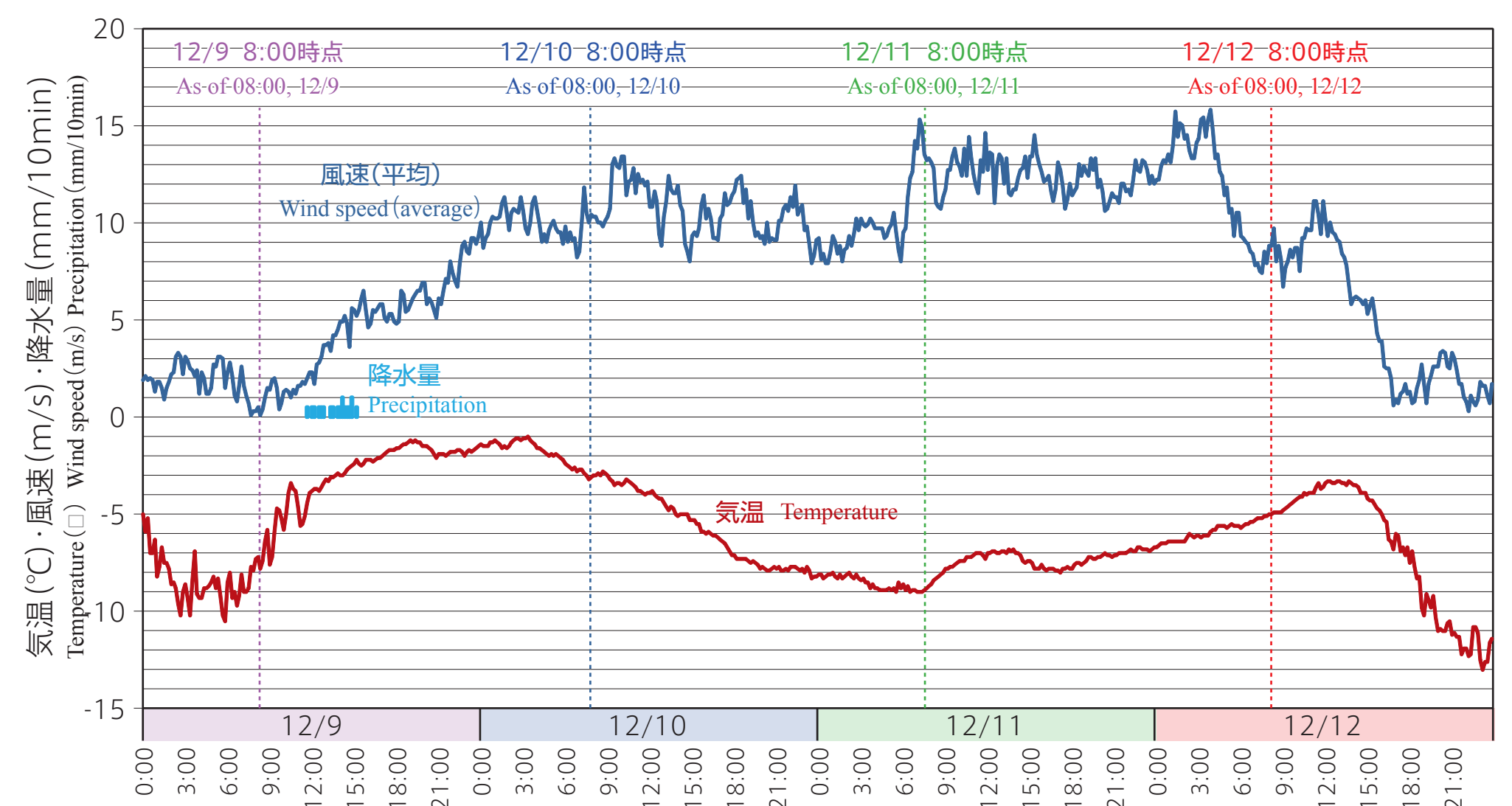
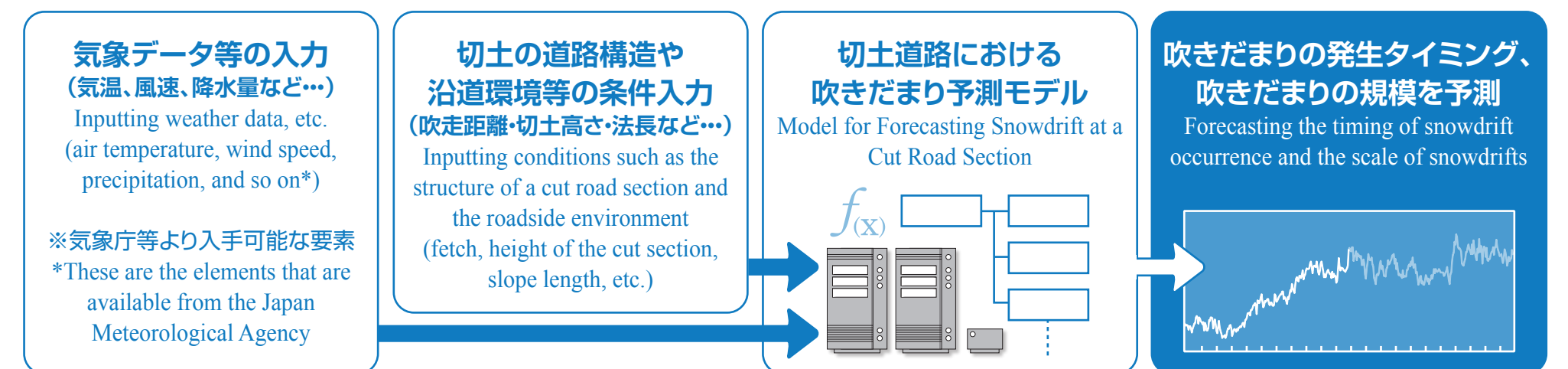
吹きだまり災害の軽減には、より適切な道路の通行止めや除雪の実施が重要と考えられ、このためには道路管理の判断支援に資する吹きだまり予測技術の開発が求められています。

そこで本研究では、切土構造(両切土・片切土)や気象条件(風速、気温、吹雪量など)と道路上に発達する吹きだまりとの関係を解明することによって、切土道路における吹きだまり予測モデルの開発を目指しています。

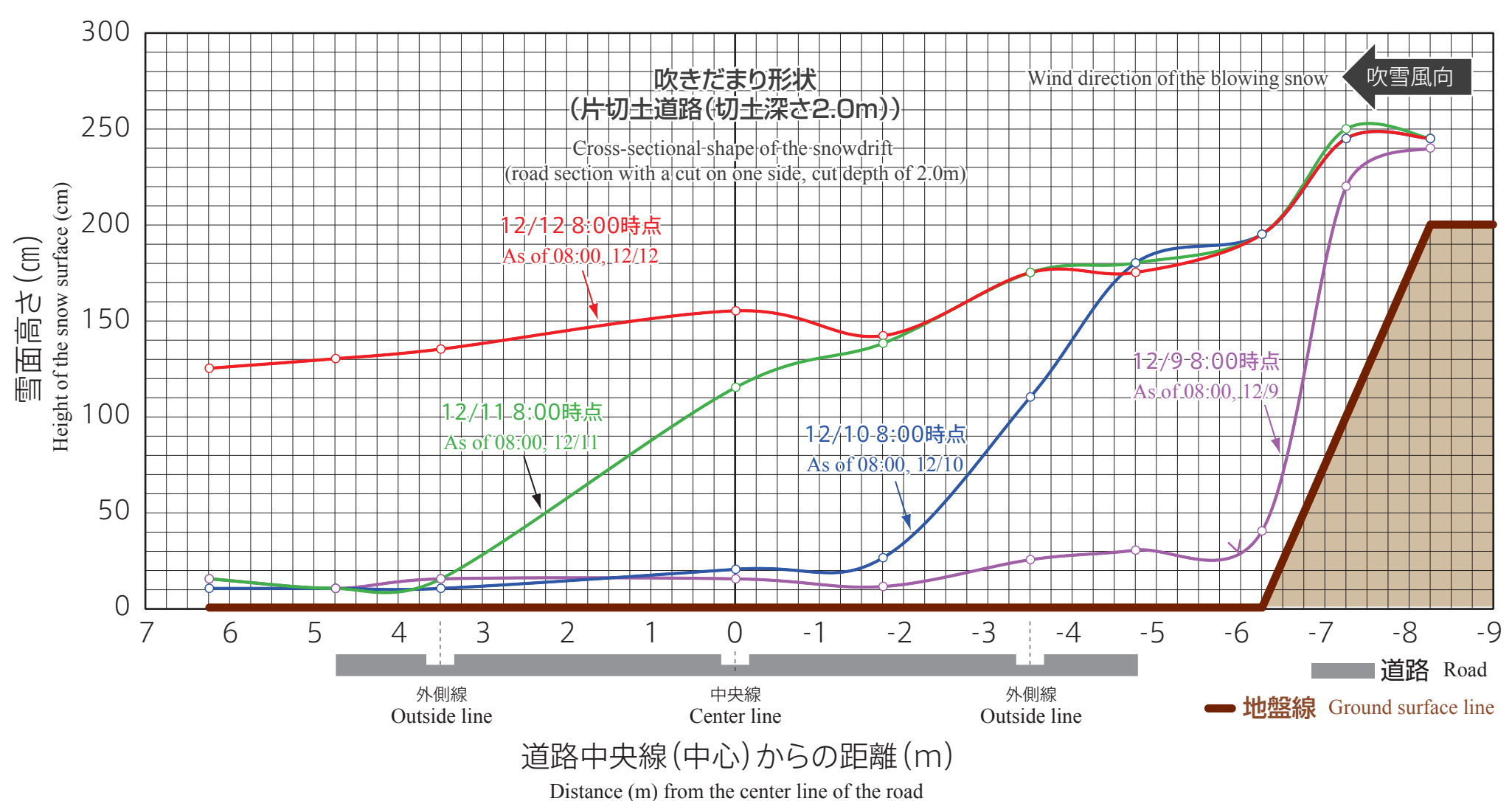
In mitigating snowdrift-related disasters, timely and appropriate road closure and snow removal are considered important. To conduct timely road closure and snow removal, the development of a snowdrift formation forecasting technology that can supporting decision-making by road administrators has been called for.

In this study, we have been aiming to develop a model for forecasting snowdrift formation on a road by clarifying the relationship between snowdrift formation on the road and the structure of the cut road section (i.e., with a cut slope on both sides of the road, or with a cut slope on only one side of the road) and weather conditions (wind speed, temperature, snow transport, etc.).

吹きだまり予測モデルによる切土道路での予測イメージ
Conceptual schematic for using the model to forecast snowdrift formation



▲観測時の気象条件(弟子屈アメダス)
Weather conditions at observation (Amedas: Teshikaga)



▲片切土における吹きだまり形状の変化 (2016/12/9-12/12)
Change in the shape of a snowdrift on a cut section of a road (2016/12/9-12/12)