The Front line of avalanche Research begins at Niseko
—Research plan in this winter by NIED—

National Research Institute for Earth Science and Disaster Resilience (NIED)

Snow and Ice Research Center

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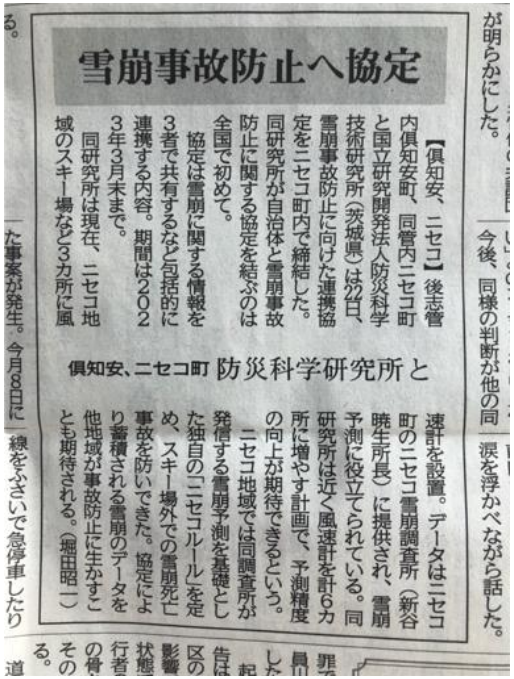
Agreement to mitigate avalanche accident between Niseko -town, Kuchan-town and NIED was singed in the last March

2019年3月に、ニセコ町、3 知安町、防災科研の39 0 で「**雪崩事故防止等の雪氷災害防止に向けての連携協力に関する協定書**」を締結



雪崩事故防止へ協定

倶知安、ニセコ町 防災科学研究所と

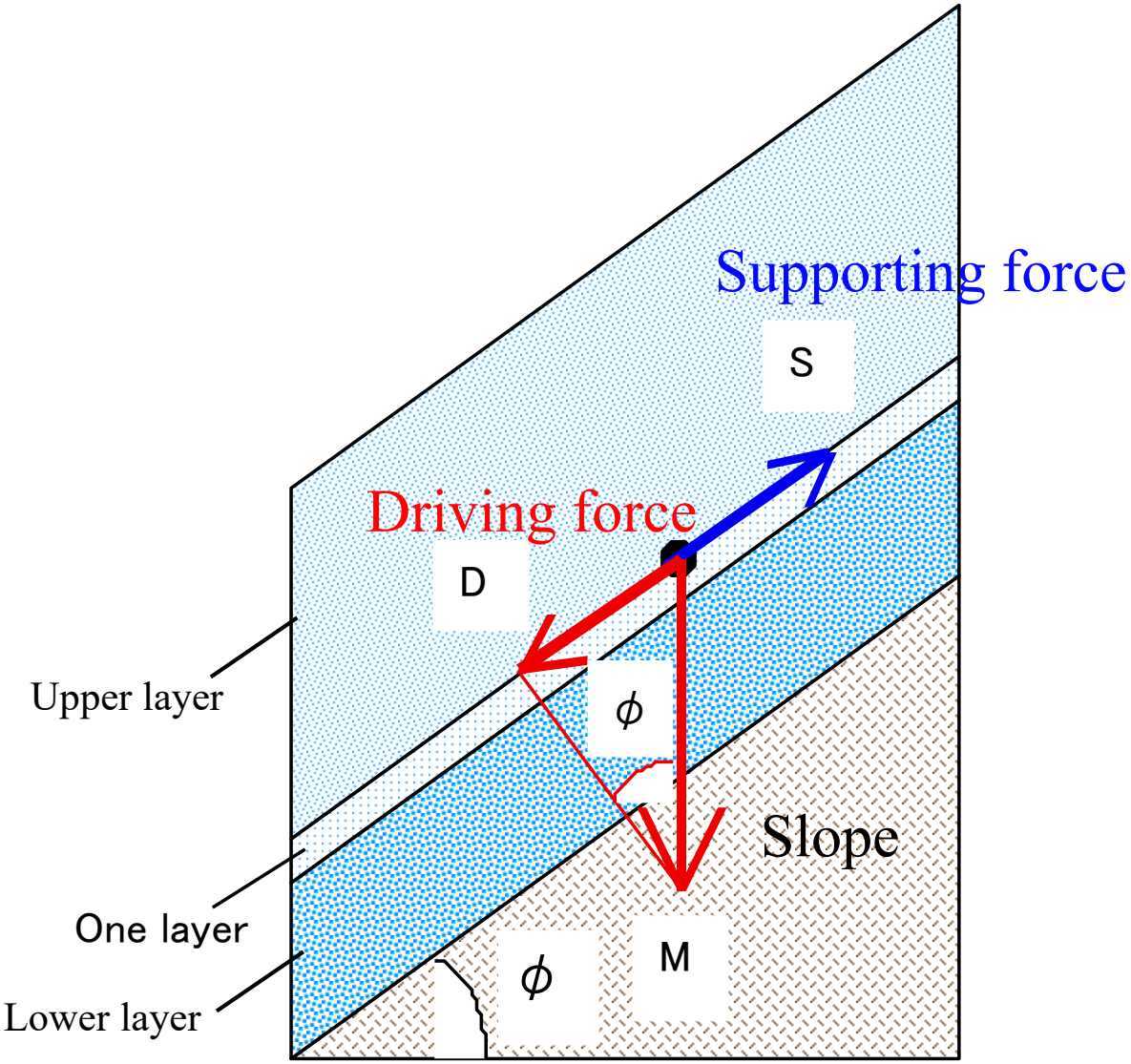
【倶知安、ニセコ】後志管内倶知安町、同管内ニセコ町と国立研究開発法人防災科学技術研究所（茨城県）は22日、雪崩事故防止に向けた連携協定をニセコ町内で締結した。同研究所が自治体と雪崩事故防止に関する協定を結ぶのは全国で初めて。

協定は雪崩に関する情報を3者で共有するなど包括的に連携する内容。期間は2023年3月末まで。

同研究所は現在、ニセコ地域のスキー場など3カ所に風速計を設置。データはニセコ町のニセコ雪崩調査所（新谷暁生所長）に提供され、雪崩予測に役立てられている。同研究所は近く風速計を計6カ所に増やす計画で、予測精度の向上が期待できるという。

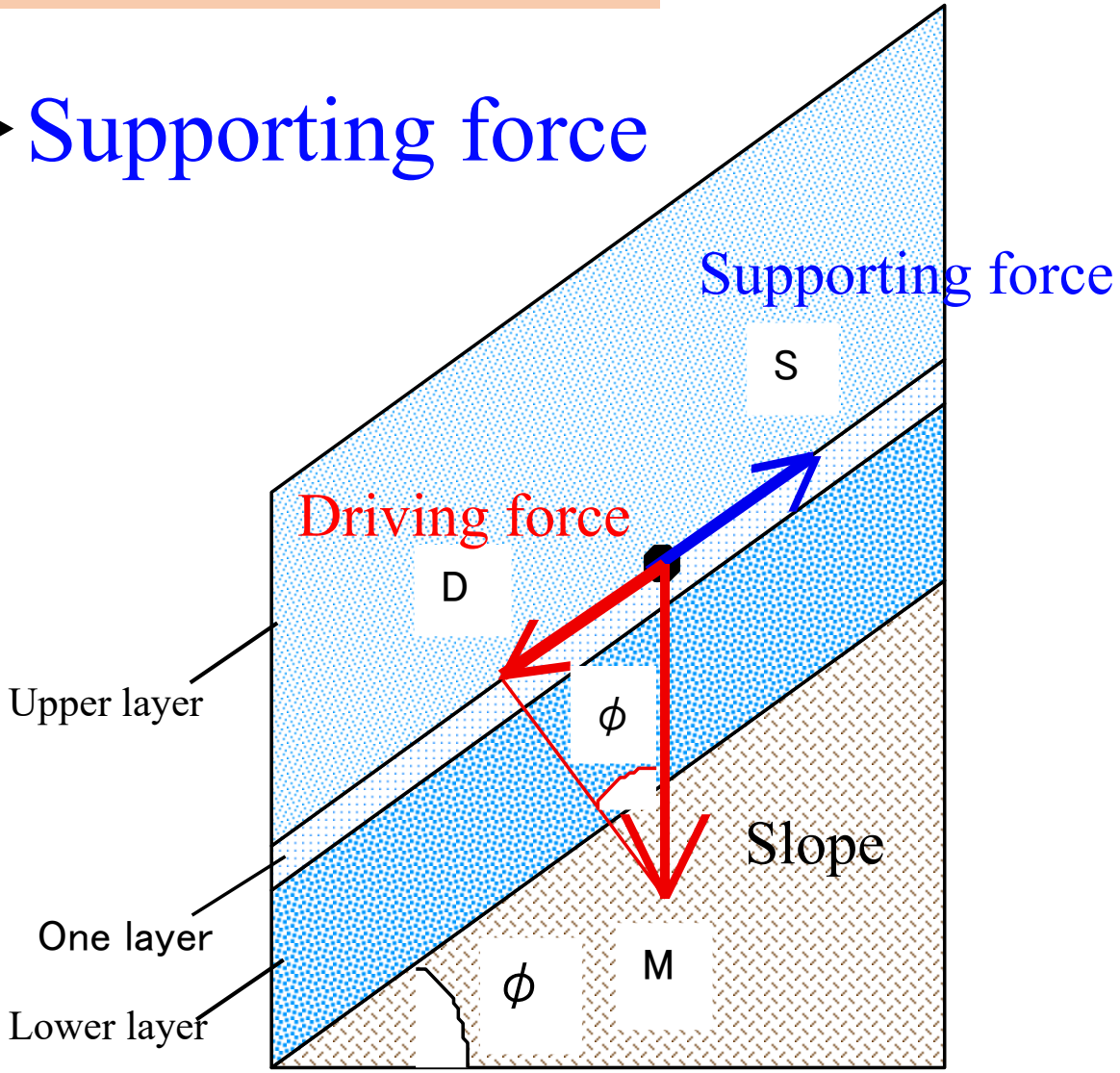
ニセコ地域では同調査所が発信する雪崩予測を基礎とした独自の「ニセコルール」を定め、スキー場外での雪崩死亡事故を防いできた。協定により蓄積される雪崩のデータを他地域が事故防止に生かすことも期待される。（堀田昭一）

Power balance in the snow on the slope

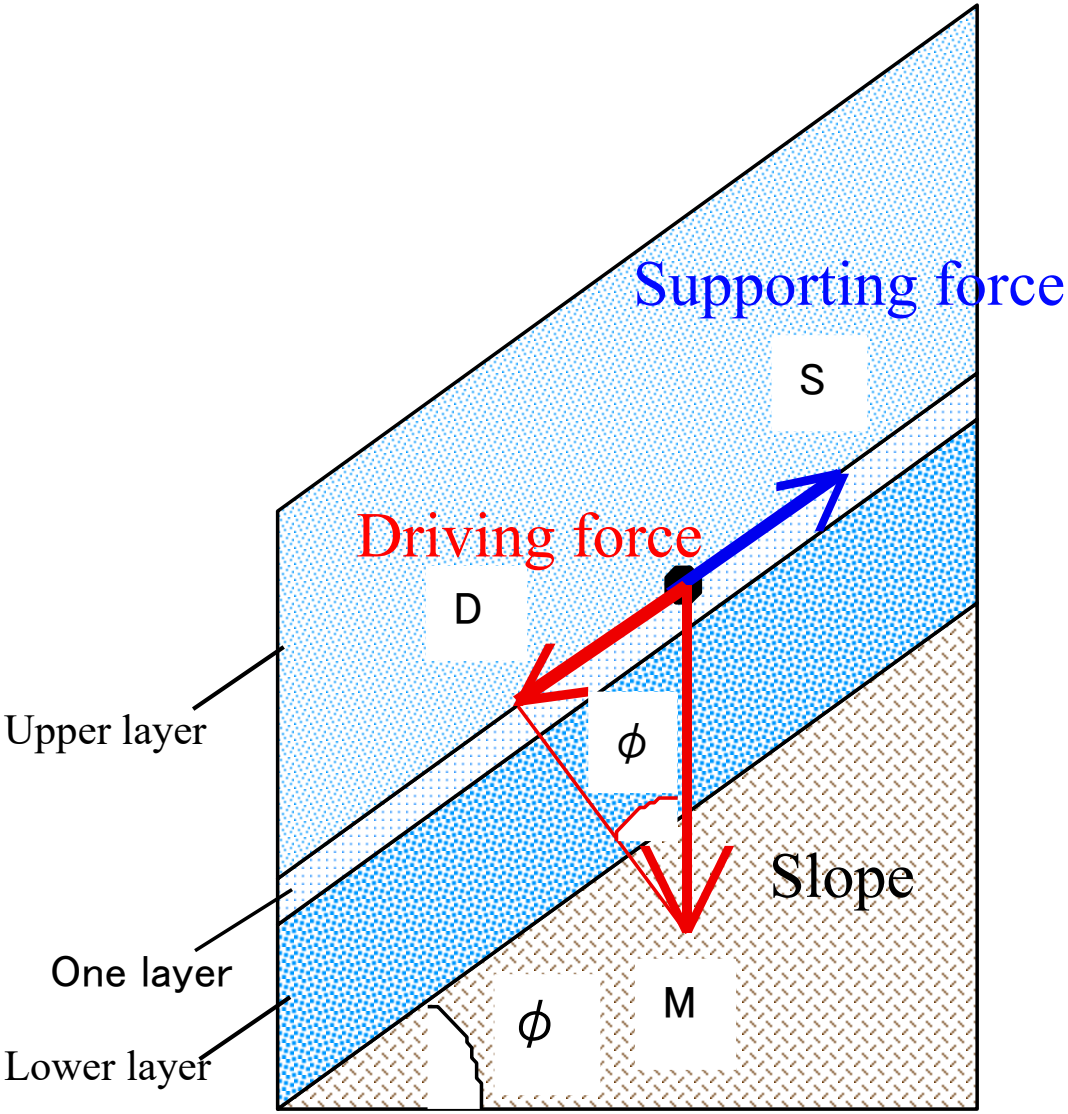


Condition of avalanche occurrence

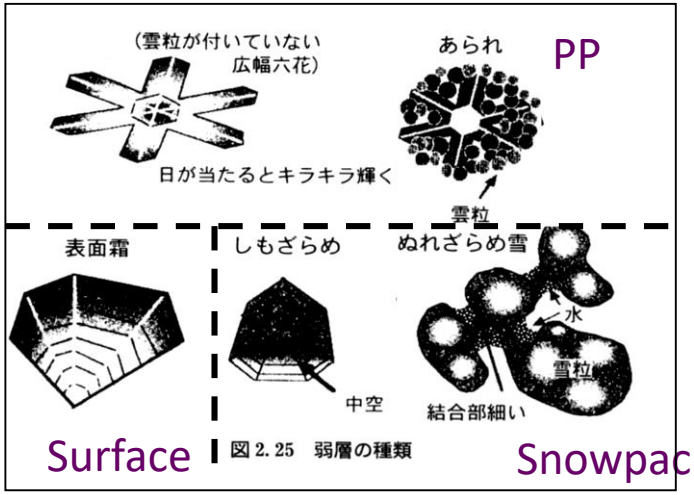
Driving force > Supporting force



Driving force > Supporting force



- **Driving force**
  - Snow depth
  - Slope angle
- **Supporting force**
  - Shear strength of snow
  - Basal



Driving force

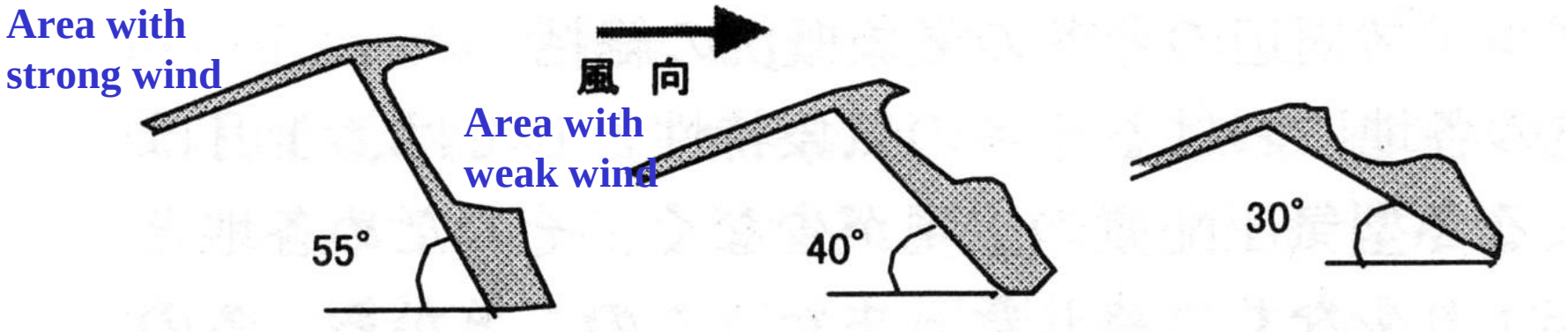
Snow depth

Problem: redistribution due to snow drift

Amount of drifting snow is a function with 3 power of wind speed

$$Q = \alpha U^3$$

（Wind become 2 times → Drifting snow become 8times）



In the area of top of the mountain, snow in the upwind side will be blown away. They will be deposited in the leeward area.

Driving force

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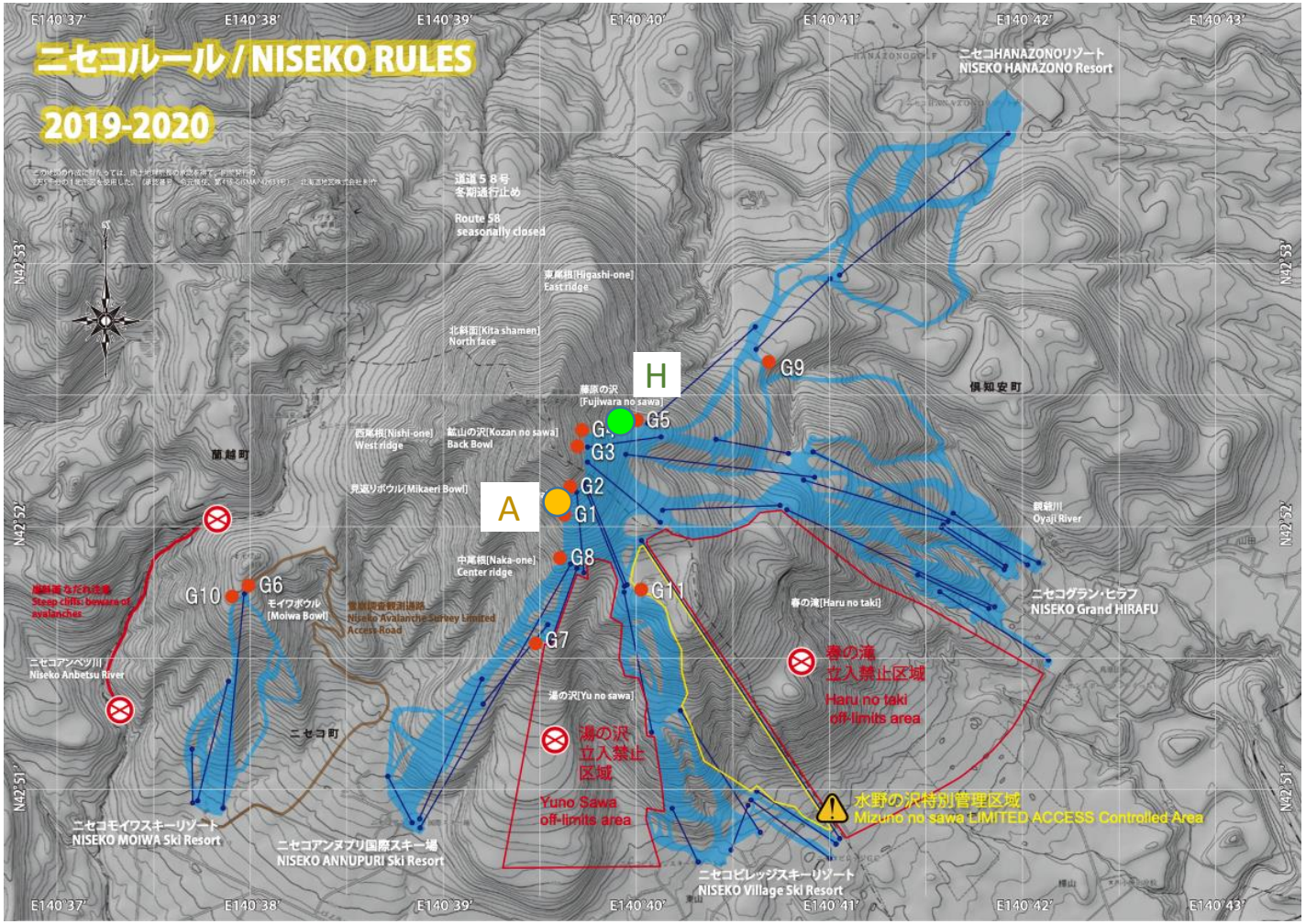
Condition of avalanche occurrence

Driving force＞Supporting force

In the area of top of the mountain, snow in the upwind side will be blown away. They will be deposited in the leeward area.

The cause of difficulty to forecast redistribution of snow is resulting from the difficulty of forecast distribution of wind condition



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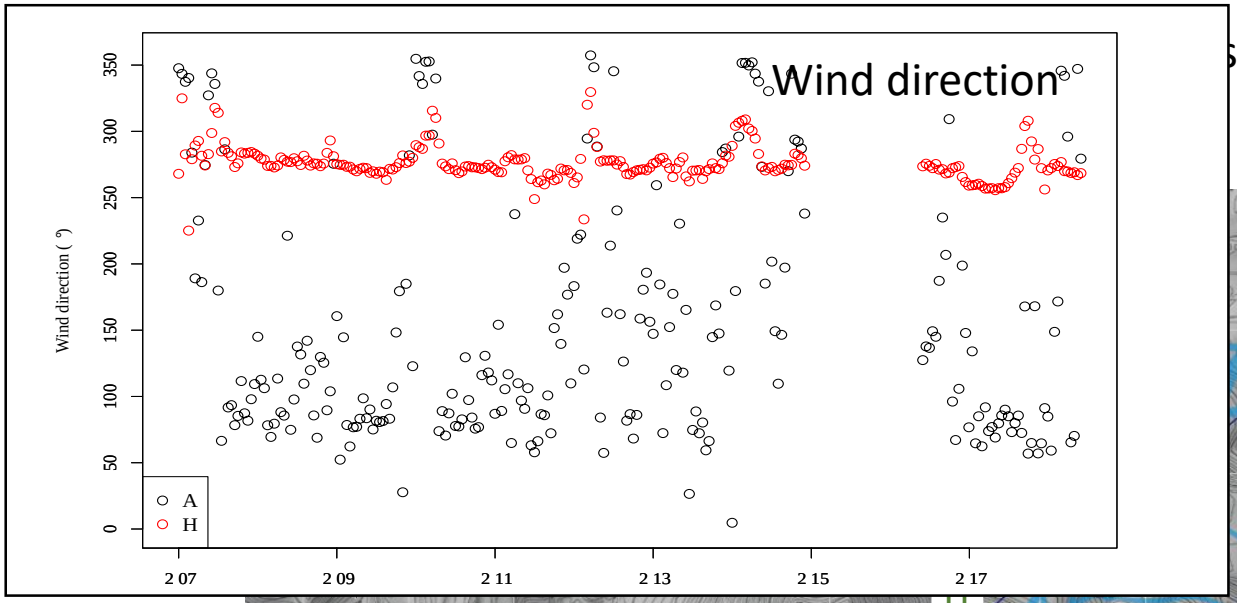

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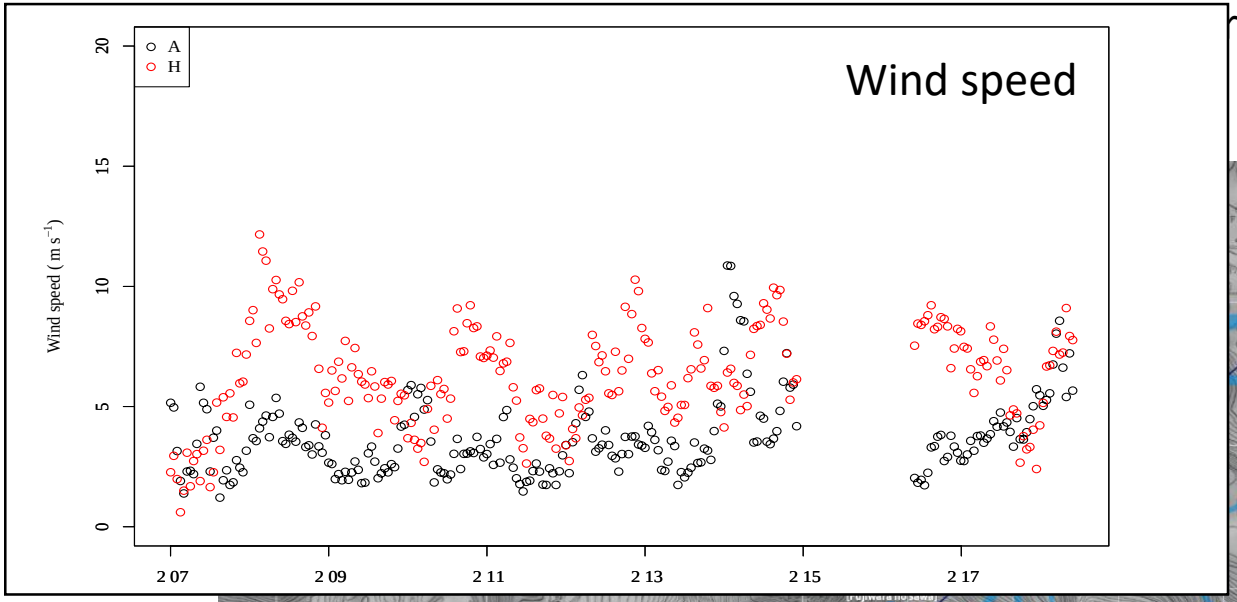
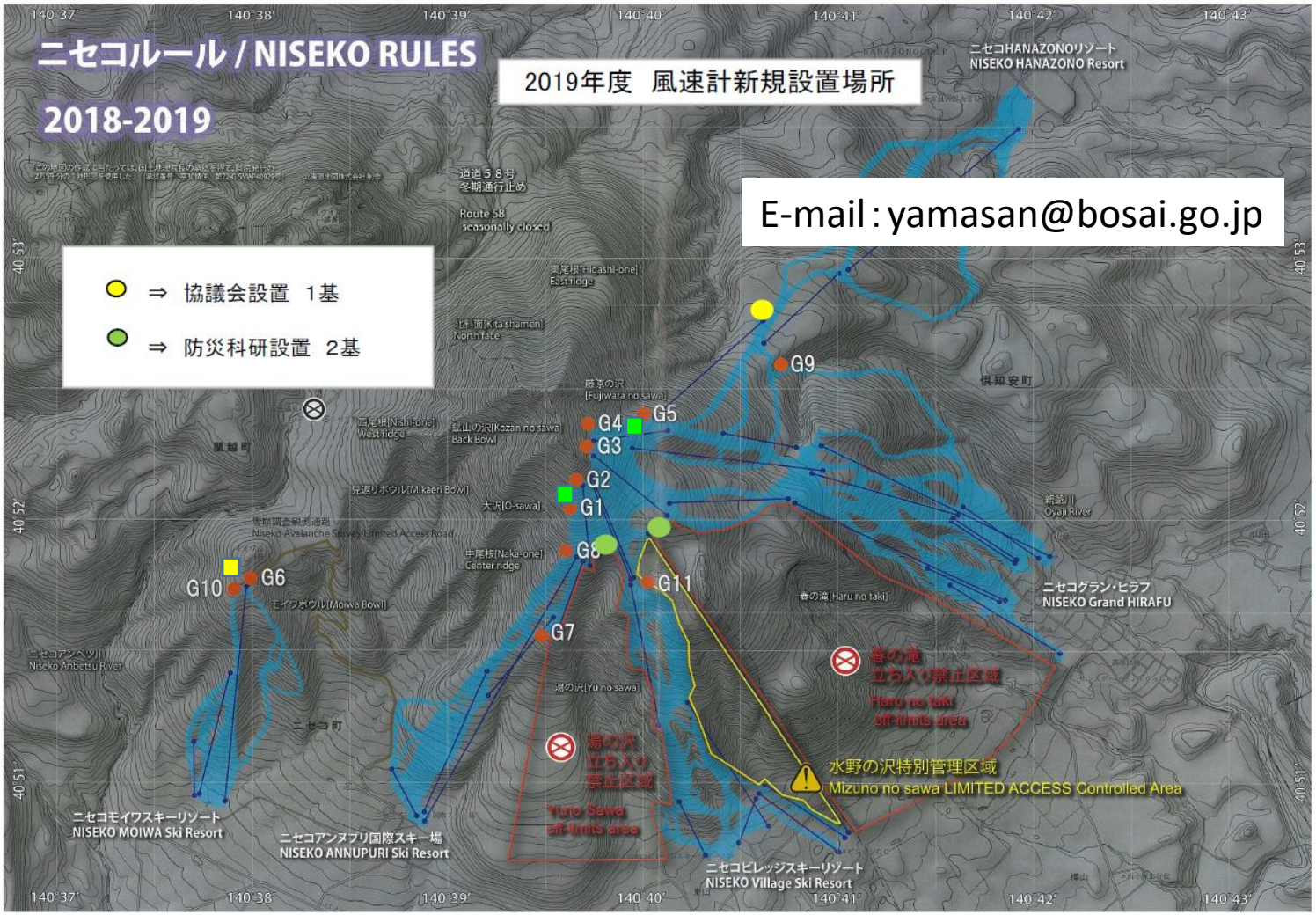


Study plan in this winter by NIED

Study to measure redistribution of snow in Mt. Niseko

Introduction of 6 automatic weather stations (AWS) in Mt. Niseko（3 AWS in the last winter）

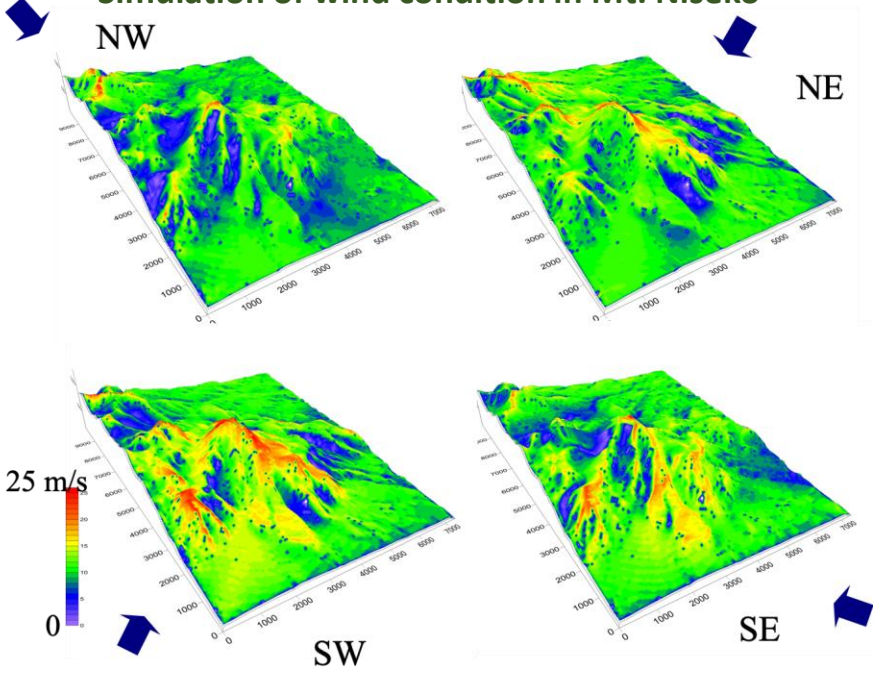
=>Obtain real-time data of distribution of wind condition



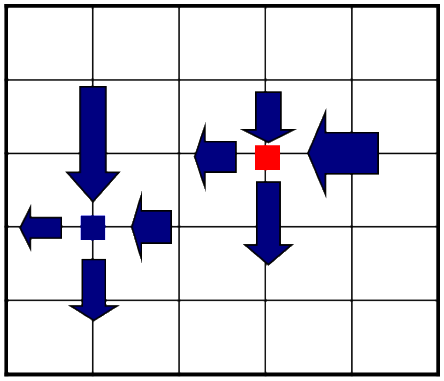
Study plan in this winter by NIED

Simulation of redistribution of snow

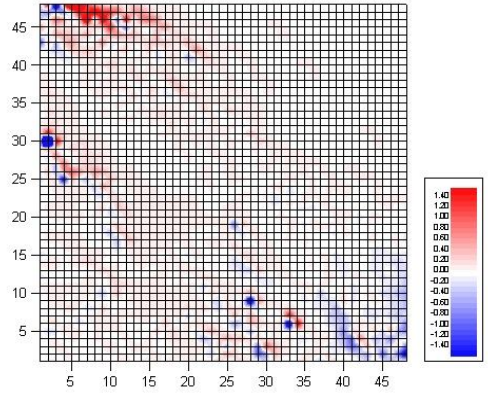
Simulation of wind condition in Mt. Niseko



Calculation of flux of snow due to drifting snow at each grid

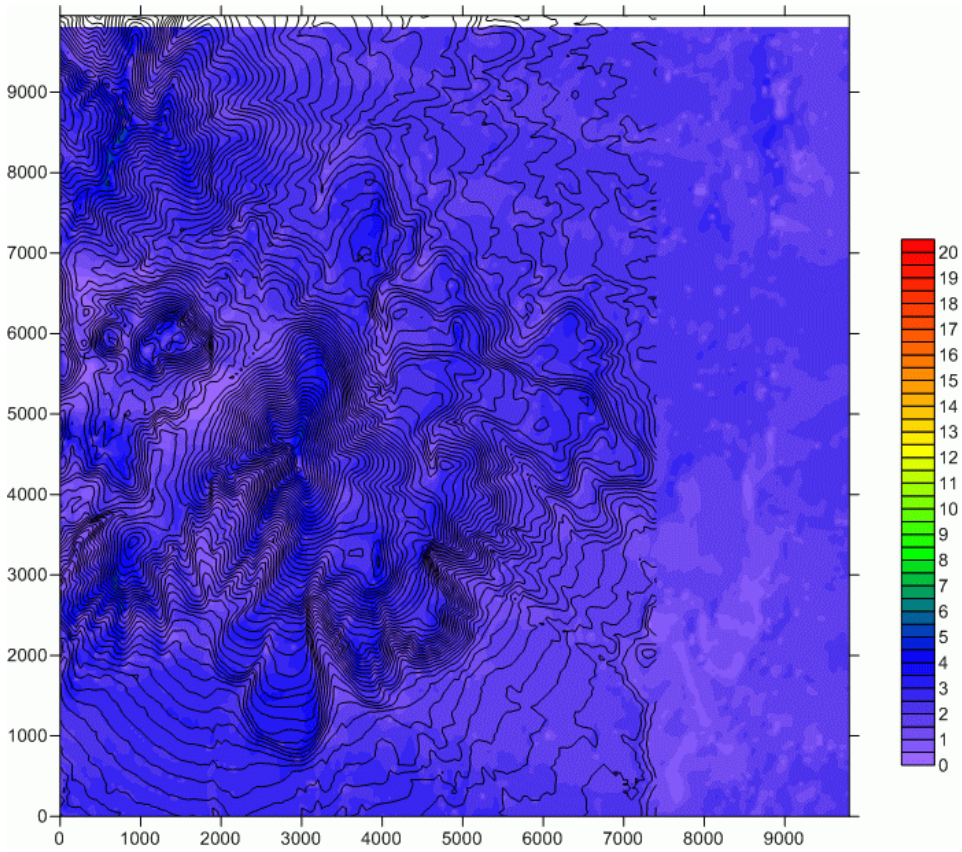


Simulation of redistribution of snow based on difference of flux between adjacent grid

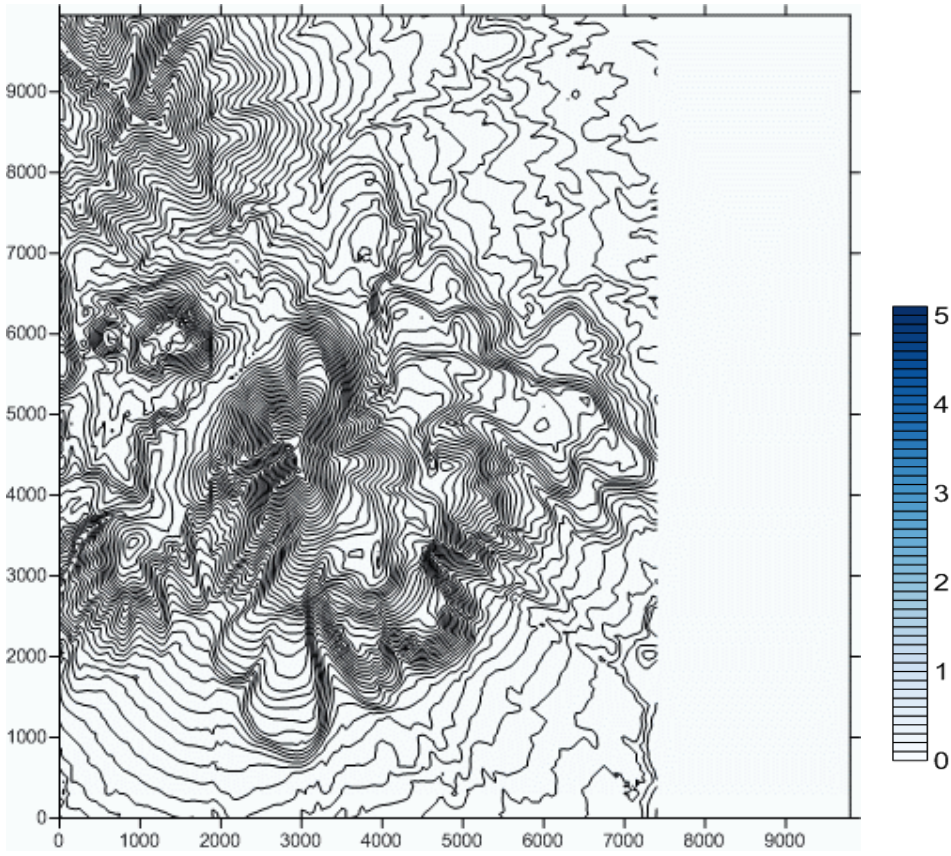


Study plan in this winter by NIED

Example of simulation of redistribution of snow



Wind speed

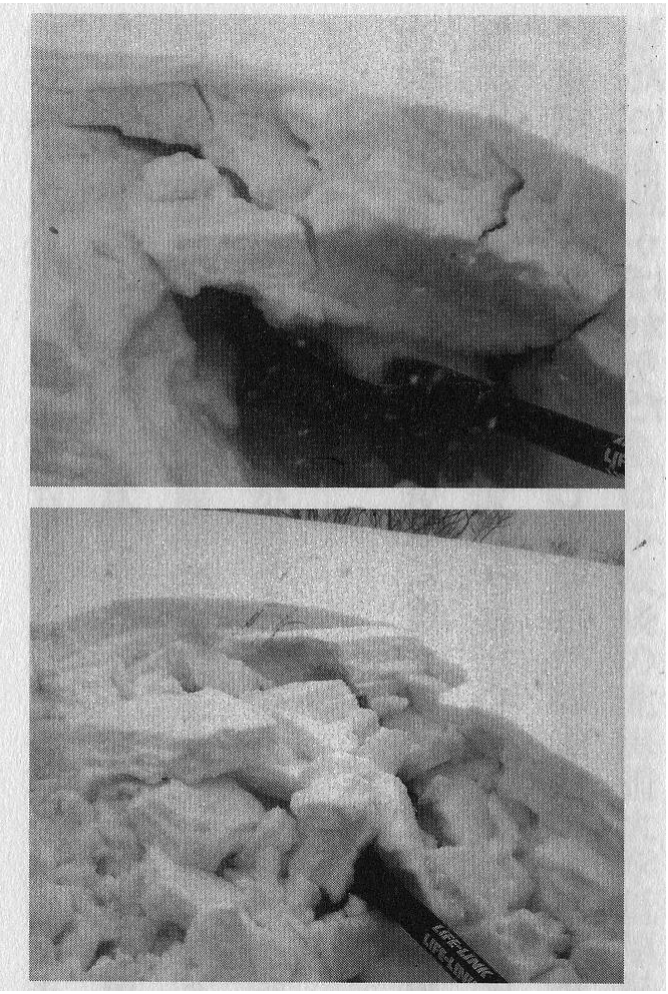


Snow depth

Improvement of the model based on comparisons between simulations and measurements

Study plan in this winter by NIED

Investigation of the structure of drifted snow

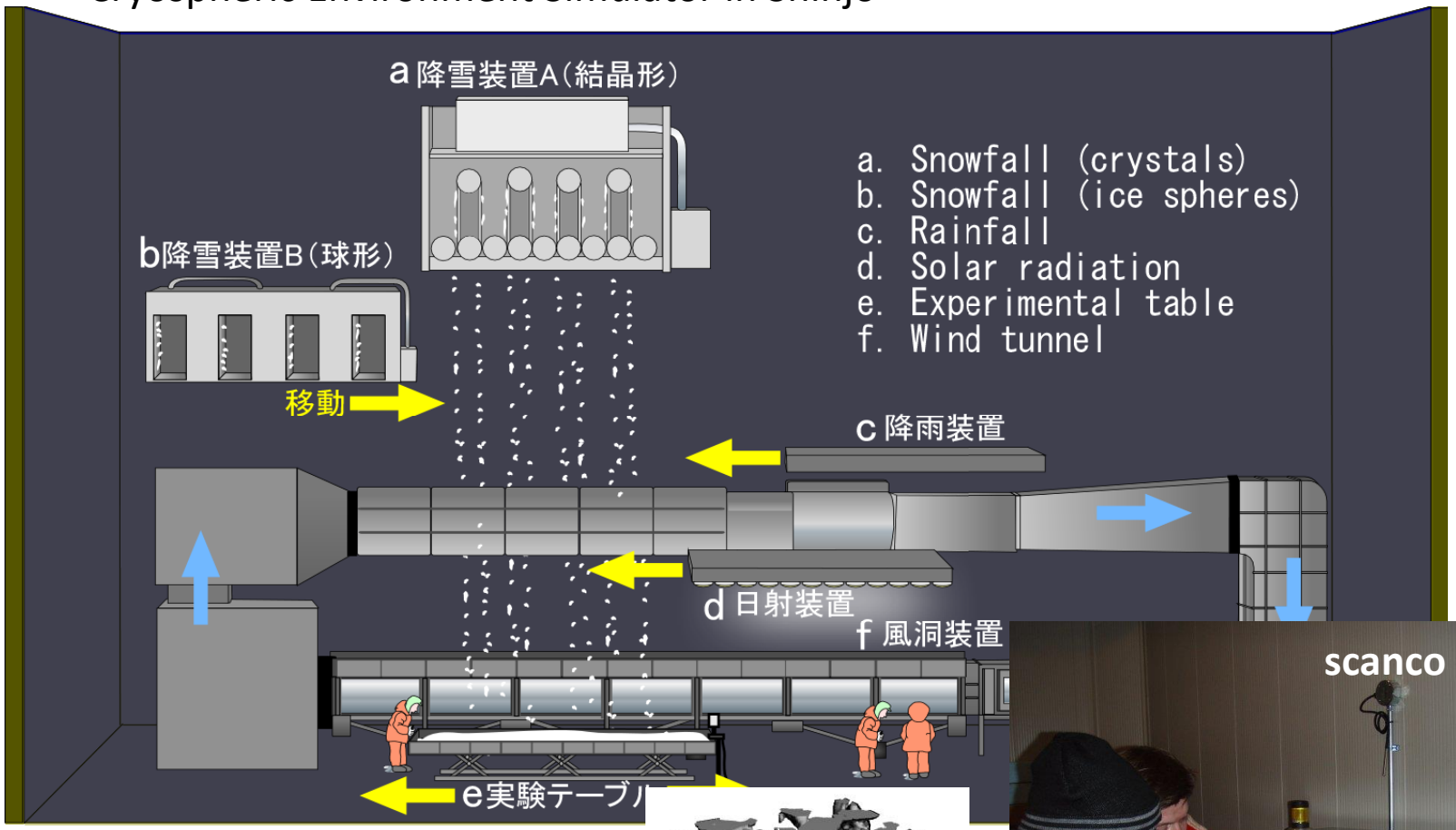


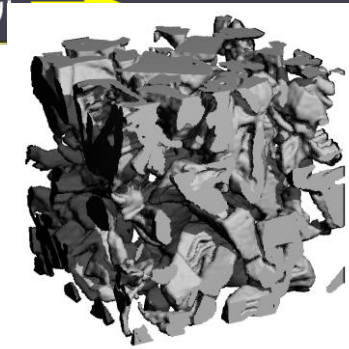
Just drifted snow is more fragile than normal snow.

To forecast avalanche in Niseko, it is important to understand the characteristics of drifted snow.

北の山河抄（新谷暁生著）より
撮影　太田稔（ニセコ雪崩調査所）

Cryospheric Environment Simulator in Shinjo





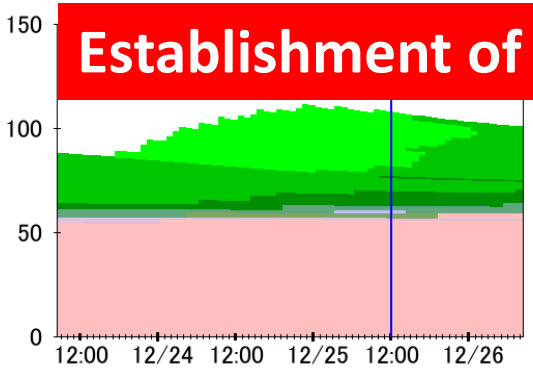
Collaboration with Niseko avalanche information

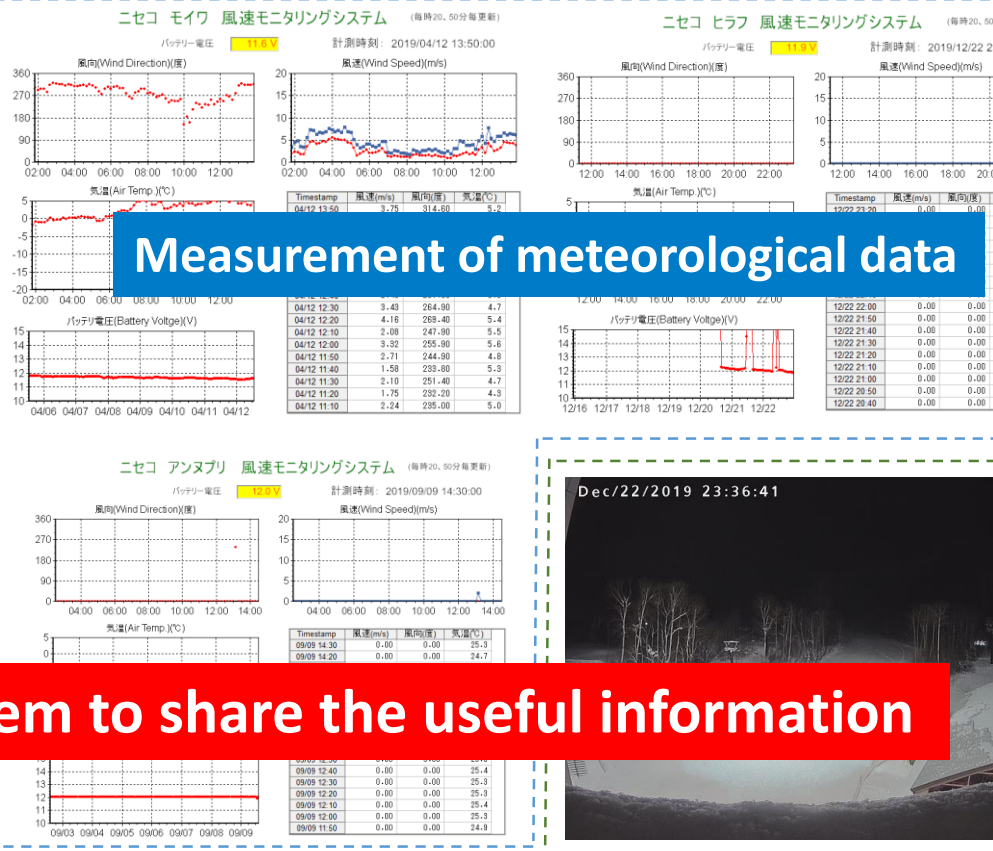
Attempt to provide the information relating avalanche risk

Simulation of redistribution of snow

Simulation

Simulation of snow condition





Measurement of meteorological data

Establishment of the system to share the useful information

Comment : ・・・・・・・・・

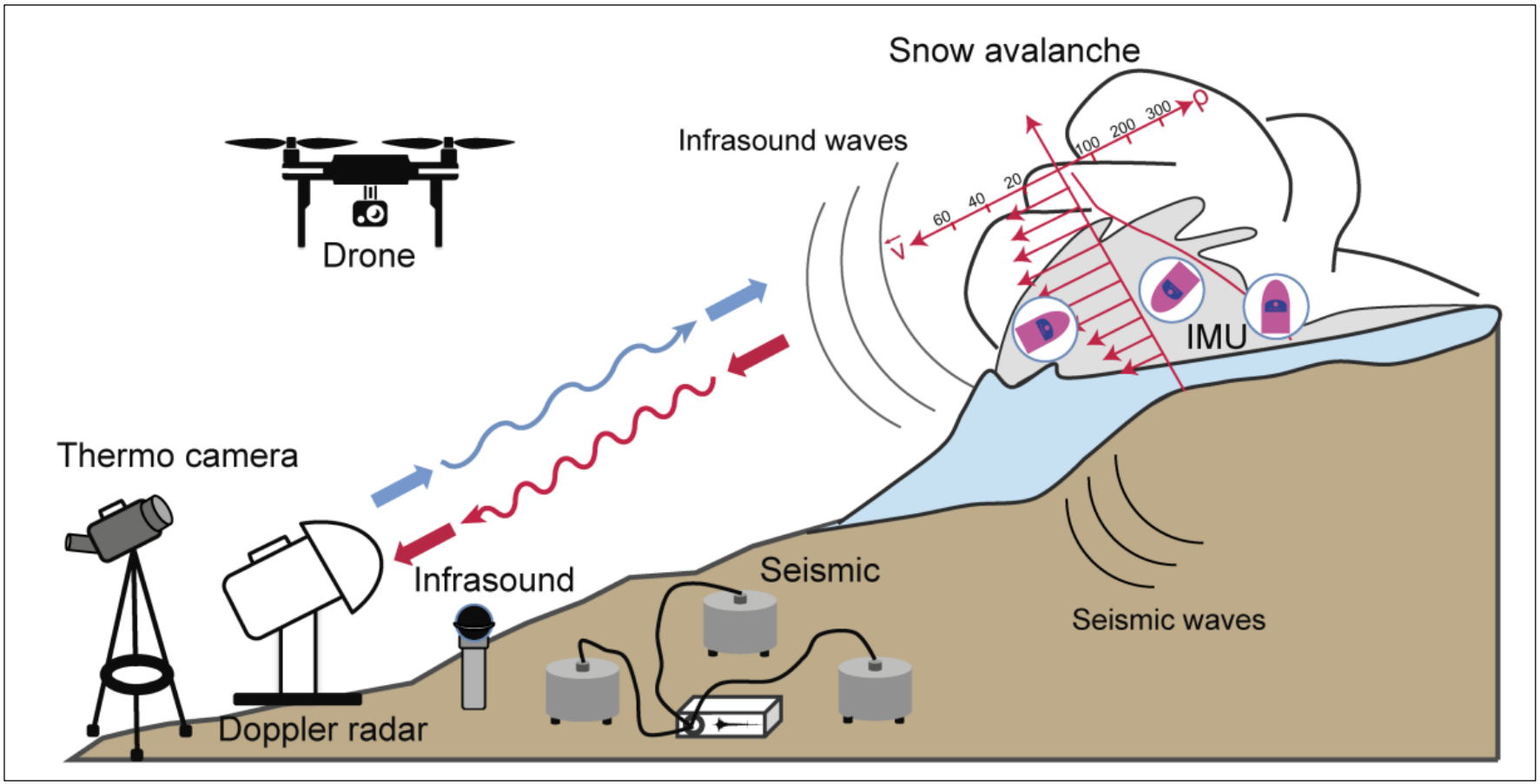
Comment : ・・・・・・・・・

Information from Ski resort

Study of avalanche dynamics

Artificial avalanche experiments in Niseko

To establish a suitable avalanche dynamics model for Japanese avalanche scale



Conclusion

- In Japan, scientists have not listened arguments from the people in the practice.
  ＝＞Science has lost touch with practice

- In Niseko, Scientists can work with the people in the practice
  ＝＞Science can meet practice

What can the scientist do for Niseko?

We can provide the avalanche risk information from the scientific view, but it should be only information form the one side

Real avalanches do not occur in PC

We need to discuss “Who and how to determine the avalanche risk information in Niseko to continue Niseko rule?”