

April 18, 2023

To:

Heather Woods (CP)

Ross Cloutier and Rob Rohn (HeliCat Canada)

Joe Obad and Eirik Sharp (Canadian Avalanche Association)

Elias Ortner (Mike Wiegele Helicopter Skiing)

Gilles Valade and Kevin Seel (Avalanche Canada)

Fabian Karg and Kevin Williams (Avalanche Canada Foundation)

RE: 2022/23 Supporter Update of SFU Avalanche Research Program

On behalf of my entire research team and SFU, I would like to thank all Canadian supporters and collaborating operations for their continued support of the SARP research program. Our research would not be possible without your financial support and expert input. We are grateful for this support, and we are looking forward to continuing our work with the Canadian avalanche community.

The purpose of this document is to inform the Canadian supporters of the Simon Fraser University Avalanche Research Program (SARP), including the NSERC Industrial Research Chair in Avalanche Risk Management (IRC), about the activities accomplished by the research team between May 1, 2022 and April 30, 2023 and to provide a brief outlook on the planned activities for the next twelve months.

1 Team

Over the last year, the core SARP team consists of the following personnel:

- Dr. Pascal Haegeli (team leader)
- John Sykes (PhD student in Geography)

- Florian Herla (PhD student in Geography)
- Stan Nowak (PhD student in SFU's Visual Analytics graduate program)
- Anne St Clair (PhD student in REM)
- Eeva Latosuo (PhD student in REM, started Sept. 2022)
- Rosie Langford (MRM thesis student)
- Annelise Neweduk (MRM project student)
- Kelsea Krawetz (MRM thesis student, started Sept. 2022)
- Griffin Slimkowich (MRM project student, started Sept. 2022)
- Nick Rigby (Undergraduate research assistant, started in June 2022)

Amélie Goulet-Boucher (MRM thesis student) left the program without completing her degree or research project.

In addition, SARP includes the following affiliate members:

- Dr. Patrick Mair, Harvard University (research associate, statistics)
- Dr. Simon Horton, Avalanche Canada (research associate)
- Grant Statham, Parks Canada (adjunct professor)
- Dr. James Floyer, Avalanche Canada (adjunct professor)
- Dr. Reto Rupf, Zurich University of Applied Sciences (research associate, tourism)

2 2022/23 Highlights

2.1 Research Projects

Over the last 12 months, the research efforts of SARP were focused on projects that can be grouped into six overarching themes.

2.1.1 Quantifying Exposure and Decision-Making in Mechanized Skiing

John Sykes (PhD) continued to explore ways to meaningfully examine the GPS tracks that the SARP team has been collecting over the last few years. We have been working closely with Roger Atkins and Mike Welch at CMH Galena to analyze the data in a meaningful way that provides useful insight. Note that John's research was mainly on hold between Nov. 2022 and May 2023, as he was working as an avalanche forecaster for the Chugach Avalanche Center in Alaska for the winter. We expect John to conclude his PhD research by the end of 2023 or in early 2024.

2.1.2 Avalanche Hazard Modelling in Support of Operational Avalanche Forecasting

Florian Herla (PhD) has completed his evaluation study that examined how well critical avalanche layers that were of concern to public avalanche forecasters are captured by our snowpack model simulation. His paper about this research is currently under review in the journal *Natural Hazards and Earth System Science*.

Florian has now embarked on his final project for his PhD, which examines the possibility for predicting avalanche problems from snowpack simulations. His goal is to complete his PhD this October.

Simon Horton (Research Associate), now working full time for Avalanche Canada, continues to collaborate with us. He has been exploring ways to use the algorithms developed in our research group to cluster snowpack simulations and highlight areas where conditions are similar. For the ISSW, Simon is preparing a paper that summarizes all our research around the application of the conceptual model of avalanche hazard.

Kelsea Krawetz (MRM – Thesis) joined our snowpack modelling team as a new Master student last fall, and we are slowly introducing her to this work. Her research will examine the impact of improved precipitation forecasts on our snowpack simulations, which is part of our SAR-NIF project with Environment and Climate Change Canada and the University of Sherbrooke.

2.1.3 Examining and Supporting Operational Forecasting Procedures

Stan Nowak (PhD) continued his research on understanding avalanche forecasting practices to better inform the design of data visualizations and recording methods for avalanche hazard assessments. This year, a particular focus of his was examining the hand-off between forecasters and how to improve the passing on of critical contextual information about assessment decisions, evidence used, and critical considerations for forthcoming days. Without this context, forecasters can be left searching for clarifying information that could otherwise have been communicated. Stan is scheduled to complete his PhD studies this summer, and he is currently exploring possibilities with future employment with Avalanche Canada.

2.1.4 Avalanche Terrain Mapping

In addition to his analysis of the GPS tracks at CMH Galena, **John Sykes** (PhD) continued his collaboration with researchers from Norway and Montana State University as well as Grant Statham to improve a GIS algorithm for automatically mapping avalanche terrain according to the Avalanche Terrain Exposure Scale (ATES). This research is the foundation for large-scale avalanche terrain mapping in Canada. John and his collaborators are currently in the process of finalizing the code base and several manuscripts about this work for publication in academic journals.

2.1.5 Public Avalanche Risk Communication

Over the last 12 months, we worked on several projects aiming to better understand recreational backcountry users and improve the effectiveness of avalanche risk communication and education.

Anne St Clair (PhD) continued developing her comprehensive framework for avalanche risk communication and education, which takes a detailed look at all the different factors that affect the effectiveness of avalanche risk communication and education initiatives. The objective is to provide a comprehensive and unifying foundation for the design and evaluation of avalanche awareness initiatives in different contexts.

Due to various circumstances and challenges, Anne's intent to pursue a community-based avalanche safety project in the Canadian Arctic have been put on hold for the time being.

Rosemary Langford (MRM – Thesis) continued her research identifying and characterizing in-field avalanche risk management practices of recreationists traveling in the winter backcountry:

How do recreationists assess risk in the backcountry? What cues, observations, and supports do recreationists use to inform decisions in the field? How do they combine these cues, observations, and supports to make decisions? The findings of this research will provide the empirical understandings necessary to make the design of avalanche information products and curricula more evidence-based and resonate better with the increasingly diverse backcountry user audience.

Anneliese Neweduk (MRM – Project) is in the process of completing her project on a more holistic and informative approach to understanding and characterizing backcountry recreationists. In addition to activity and avalanche safety training, our characterization includes detailed information on recreationists' motivations and reasons for engaging in winter backcountry activities, experience level, trip planning practices, preferences for when and where they recreate, their terrain preferences, and basic socio-demographic information. Collectively, this information provides a much richer picture of recreationists' avalanche safety needs, spotlights whether existing practices are adequate for specific desired experiences, and identifies where, when, and how to best communicate with certain cohorts of recreationists. Anneliese is using data from the Euregio and Swiss avalanche bulletin user research panel for this research.

Griffin Slimkowich (MRM – Project) joined the group in September and started with his research on avalanche awareness and risk management practices among snowshoers and winter hikers on Mt Seymour on the North Shore Mountains right away. His research efforts included a stakeholder meeting in the fall, and the design of a short and long intercept survey. Griffin started surveying snowshoers and winter hikers at the trail head at Mt Seymour in the second half of February with support from Mt Seymour Resort and BC Parks Trail Ambassadors. By the end of the season, we have interviewed about 130 individual snowshoers and winter hikers. Griffin will analyse the collected information over the summer, which will provide useful information for the design of new winter's survey campaign.

Eeva Latosuo (PhD) also joined our team in the fall as a new PhD student. Her PhD studies are funding through a research contract from the Colorado Avalanche Information Center (CAIC). The purpose of her research is to examine the effectiveness of CAIC avalanche information products for different user groups and provide the CAIC with the necessary information to make evidence-based decisions about project developments and improvements. To kick off this project, Eeva and Pascal are travelling to Colorado in the last week of April to host several stakeholder meetings. The results of these meetings will provide the foundation for Eeva's PhD research proposal.

In addition to supporting all the different student projects, **Pascal Haegeli** continued to collaborate with the Tyrolean and Swiss avalanche warning services to better understand their bulletin user community and the effectiveness of their bulletin products. The analysis of the 2022 survey provided detailed insight on how recreationists apply the bulletin information, how they understand the terminology used in the bulletin, and how they navigate through the bulletin. The 2023 survey, which was launched in late March, examines the added value of the

hazard description in the bulletin and the usefulness of individual terrain and travel advice statements.

2.1.6 Seasonal Avalanche Hazard Summaries

Nick Rigby (Undergrad Research Assistant) has been working on seasonal avalanche hazard summaries based on the content of Avalanche Canada avalanche bulletins. He is currently working on the summary for the 2022/23 winter, and once he has completed this final summary, we will have seasonal summaries for all winters since 1997. These summaries will provide important context for other research projects, such as avalanche accident analyses.

2.2 Data Collection and Infrastructure

During the 2022/23 winter season data collection efforts have included to the following efforts:

- **Collection of GPS tracks of professional terrain choices**
With the mechanized skiing industry resuming regular operations this winter, we continued with the collection of GPS tracks with CMH Galena, where the focus of John Sykes' GPS currently is.
- **Euregio and Swiss Avalanche Forecast User Research Panel**
We expanded and redesigned the database infrastructure for the Euregio and Swiss avalanche forecast user research panel. Together, these panels currently consist of approximately 8,000 community members interested in participating in avalanche risk communication research.
- **Colorado Avalanche Forecast User Research Panel**
To support Eeva Latosuo's research in Colorado, we set up a similar research panel for the CAIC. We had a soft-launch of the project in March at the CO Backcountry Avalanche Workshop (COBAW), and the panel currently consists of 22 interested individuals. However, the proper launch of the project will be in the fall of 2023.

2.3 Securing Additional Research Funding

Over the last 12 months, we were able to secure the following funding in addition to the existing contributions from our Canadian industrial partners.

SARP has secured a **research contract with the Colorado Avalanche Information Centre (CAIC)** for conducting avalanche forecast user research in Colorado. This is a collaboration with the CAIC and the Social Science Research Group at the US National Center for Atmospheric Research (NCAR) in Boulder, CO. The SFU portion of the budget of the proposed project (approx. \$200k) will fund Eeva Latosuo for the duration of her PhD studies (2022-2026).

SARP was also a partner in Avalanche Canada's **successful SAR-NIF submission for updating the Canadian avalanche accident database**. While Avalanche Canada is the lead agency on this three-year project, SARP will provide guidance on the design of the updated database and support the documentation of the fatal avalanche accidents in Canada since 2007. However, SARP's main contribution will be the analysis of the patterns and trends in the accident information, which will be conducted towards the end of the project. This analysis is well suited for a Masters student project.

Pascal Haegeli was also able to secure a **WSL Fellowship** for CHF 14,685. The purpose of this fellowship is to cover living expenses for a 4-month visit at the WSL Swiss Institute for Snow and Avalanche Research SLF in Davos during Pascal’s upcoming study leave (see Section 3 “Outlook for Next 12 Months” for details).

Pascal Haegeli also successfully secured a **NSERC Discovery Grant**, the primary Canadian academic funding program for natural scientists. The proposed research aims to improve the use of snowpack models for avalanche forecasting in Canada by developing methods for data assimilation and ensemble forecasting. The grant consists of \$47,000/yr over 5 years (total budget: \$235,000). As far as we know, this funding level is above the average NSERC Discovery Grants.

2.4 Outreach

2.4.1 Peer-reviewed Publications

We submitted/published a total of **9 academic peer-reviewed papers** over the last 12 months:

1. Herla, F., Haegeli, P., Horton, S., and Mair, P. (submitted). A large-scale validation of snowpack simulations in support of avalanche forecasting focusing on critical layers. Published by Natural Hazards and Earth System Science as a discussion paper on April 12, 2023. Doi:10.5194/egusphere-2023-420.
2. Van Tilburg, C., Paal, P., Strappazon, G., Hölzl, N., McIntosh, S., Smith, W. W. R., . . . Tremper, B. (submitted). Wilderness Medical Society Practice Clinical Guidelines for Prevention and Management of Avalanche and Non-Avalanche Snow Burial Accidents, 2024 Update. Submitted to Wilderness & Environmental Medicine on April 3, 2023.
3. Abby, M., Haegeli, P., Finn, H. and Mair, P. (accepted). A user perspective on the avalanche danger scale – Insights from North America. Accepted for publication in Natural Hazards and Earth System Science on April 1, 2023. doi: 10.5194/egusphere-2022-764.
4. Sykes, J., Haegeli, P., and Bühler, Y. (2022). Automated snow avalanche release area delineation in data sparse, remote, and forested region. *Natural Hazards and Earth System Sciences*, 22, 3247-3270. doi: 10.5194/nhess-22-3247-2022.
5. Herla, F., Haegeli, P., and Mair, P. (2022). A data exploration tool for averaging and accessing large data sets of snow stratigraphy profiles useful for avalanche forecasting. *The Cryosphere*, 16, 3149–3162. doi: 10.5194/tc-16-3149-2022.
6. Horton, S., and Haegeli, P. (2022). Using snow depth observations to provide insight into the quality of snowpack simulations for regional-scale avalanche forecasting. *The Cryosphere*, 16, 3393–3411. doi: 10.5194/tc-16-3393-2022.
7. Fisher, K., Haegeli, P., and Mair, P. (2022). Travel and terrain advice statements in public avalanche bulletins: A quantitative analysis of who uses this information, what makes it useful, and how it can be improved for users. *Natural Hazards and Earth System Sciences*, 22(6), 1973-2000. doi: 10.5194/nhess-22-1973-2022.

8. Gain, A. K., Bühler, Y., Haegeli, P., Molinari, D., Parise, M., Peres, D. J., Pinto, J.G., Schröter, K., Trigo, R.M., Llasat, C.M., and Kreibich, H. (2022). Brief communication: Key papers of 20 years in Natural Hazards and Earth System Sciences. *Natural Hazards and Earth System Sciences*, 22(3), 985-993. doi:10.5194/nhess-22-985-2022.
9. Fisher, K., Haegeli, P., and Mair, P. (2022). Exploring the avalanche bulletin as an avenue for continuing education by including learning interventions. *Journal of Outdoor Recreation and Tourism*, 37, 100472. doi:10.1016/j.jort.2021.100472.

Several additional research articles are currently in preparation and close to submission.

In addition, we were involved in the following report:

1. Campbell, C., and Haegeli, P. (2022). Snow avalanches. In S. Safaie, S. Johnstons, & N. L. Hastings (Eds.), *Resilient Pathways Report: Co-creating new knowledge for understanding risk and resilience in BC Geological Survey of Canada*. p. 56-71. [available at <https://www.drrpathways.ca/>].

2.4.2 Masters and PhD theses

No students have graduated within the last 12 months. However, multiple students are expected to graduate before the end of 2023.

2.4.3 Publications in Community Journals

Over the last 12 months, the SARP research team has published **three articles in community journals**.

1. Hordowick, H., and Haegeli, P. (in press). Is it a problem? Exploring avalanche problem assessments in public avalanche forecasting. *The Avalanche Journal*.
2. McNeil, K., and Haegeli, P. (in press) Full Circle: Utilizing Public Health Practices in the Avalanche Industry – Next steps in a cross-disciplinary approach to public avalanche safety. *The Avalanche Review*.
3. Fisher, K., Haegeli, P., and Mair, P. (2022). Avalanche Education Via Learning Interventions in the Bulletin. *The Avalanche Journal*, 130, 27-28.

2.4.4 Presentations at Academic Conferences

We gave **six presentations** at three different academic conferences this year. While we gave in person presentations at the 2022 International Symposium on Snow in Davos, Switzerland, and the 2022 Annual Meeting of the Society for Risk Analysis in Tampa, Florida, we attended the 2022 AGU Fall Meeting virtually.

1. Langford, R., and Haegeli, P. (2022). How do winter backcountry recreationists make avalanche risk management decisions? Oral presentation at the 2022 Annual Meeting of the Society for Risk Analysis in Tampa, FL, December 4-8, 2022.
2. Haegeli, P., Neweduk, A., St. Clair, A., and Rupf, R. (2022). Reporting from the Avalanche Trenches? Addressing Challenges in Promoting Evidence-Based Risk Communication

Practices in a Natural Science Dominated Field. Oral presentation at the 2022 Annual Meeting of the Society for Risk Analysis in Tampa, FL, December 4-8, 2022.

3. Herla, F., Horton, S., and Haegeli, P. (2022). An Informative large-scale validation of snowpack simulations in support of avalanche forecasting in Canada. Virtual presentation at the 2022 AGU Fall Meeting in Chicago IL, December 12-16, 2022.
4. Horton, S., Herla, F., and Haegeli, P. (2022). Dynamically aggregating avalanche forecast regions based on simulated snow profiles. Virtual presentation at the 2022 AGU Fall Meeting in Chicago IL, December 12-16, 2022.
5. Sykes, J., Larsen, H., and Haegeli, P. (2022). Automated Avalanche Terrain Exposure Scale (ATES) mapping – Localization and validation in western Canada. Virtual presentation at the 2022 AGU Fall Meeting in Chicago IL, December 12-16, 2022.
6. Herla, F., Horton, S., and Haegeli, P. (2022). An informative large-scale validation of snowpack simulations in support of avalanche forecasting in Canada. Oral presentation at the 2022 International Symposium on Snow in Davos, Switzerland, September 25-30, 2022.

2.4.5 Technology Transfer

Over the last 12 months, core SARP members gave **12 online and in person technology transfer presentations** to avalanche safety practitioners in Canada, the United States and Europe. In total, an estimated 400 avalanche professionals were reached with these presentations (1000 if each presentation is counted individually).

1. Haegeli, P. (2022). Describing skiing terrain meaningfully. Eagle Pass Heliskiing guides' training. November 27, 2022 (size of audience: approx. 25).
2. Haegeli, P. (2022). An overview of our social science research program with implications and opportunities for avalanche awareness education. Online instructor seminar for American Institute for Avalanche Research and Education (AIARE). November 14, 2022 (size of audience: approx. 100)
3. Haegeli, P. and SARP Team (2022). SFU Avalanche Research Program – Where to next? Annual General Meeting of HeliCat Canada. October 19, 2022 (size of audience: approx. 50).
4. Haegeli, P. (2022). Improving avalanche risk communication with a better understanding of our audiences. Colorado Avalanche Information Center – 2022 Forecaster Training. October 11, 2022 (size of audience: approx. 30).
5. Campbell, C., and Haegeli, P. (2022). The Disaster Risk Reduction Pathways Project— Resilience Pathways Report. Spring Meeting of Canadian Avalanche Association. May 4, 2022 (size of audience: approx. 200).
6. Haegeli, P. and SARP Team (2022). SFU Avalanche Research Program – Where to next? Spring Meeting of Canadian Avalanche Association. May 4, 2022 (size of audience: approx. 200).

7. Hordowick, H., and Haegeli, P. (2022). Insights into avalanche problem assessments in public forecasting. Spring Meeting of Canadian Avalanche Association. May 4, 2022 (size of audience: approx. 200).

Horton, S., and Herla, F. (2022). Latest advances in snowpack modelling – Operational forecasting tools and the research behind them. Spring Meeting of Canadian Avalanche Association. May 4, 2022 (size of audience: approx. 200).

2.4.6 Public Outreach

Over the last twelve months, core SARP members also **participated in four public avalanche awareness events** reaching an estimated 800 recreationists (1,500 if each presentation is counted individually).

1. Horton, S., and Haegeli, P. (2022). Refining snowpack model predictions with snow depth observations. 2022 North Rockies Snow and Avalanche Workshop. November 12, 2022 (size of audience: approx. 200)
2. Haegeli, P., Rupf, R., Mitterer, C., Walcher, M., and Stucki, T. (2022). Resultate der 2022 Lawinenreport Umfrage. 2022 Alpinforum in Innsbruck, Austria, November 12, 2022. Presented by Christoph Mitterer and Matthias Walcher. (size of audience: approx. 250)
3. Sykes, J., and Haegeli, P. (2022). Drivers of Terrain Selection in Professional Ski Guides. 2022 Colorado Snow and Avalanche Workshop. October 14, 2022 (size of audience: approx. 350)
4. Sykes, J., and Larsen, H. (2022). Automated Avalanche Terrain Exposure Scale (ATES) Mapping – Localization and Validation in Western Canada. 2022 Colorado Snow and Avalanche Workshop. October 14, 2022 (size of audience: approx. 350)
5. Horton, S., and Haegeli, P. (2022). Refining snowpack model predictions with snow depth observations. Virtual 2022 Colorado Snow and Avalanche Workshop. October 13, 2022 (size of audience: approx. 350)

In addition, we have further strengthened our outreach efforts via the **SARP Instagram channel** (https://www.instagram.com/sfu_avalancheresearch/). Our objective is to make our work more accessible by frequently sharing information about our research. A tremendous thank you to Rosemary Langford for being the main engine behind this initiative. We are currently at 53 posts and 649 followers.

2.5 University Teaching

While Pascal's SFU teaching responsibilities this year did not include teaching my **avalanche risk management** course (REM427/627), he taught part of the material to Kelsea Krawetz, one of our new Masters students, as a directed studies course to ensure she is exposed to this material during her time in SARP.

2.6 Other Relevant Activities

2.6.1 Justice, Equity, Diversity and Inclusion (JEDI)

We continue our efforts to actively contribute to a more just, equitable, diverse and inclusive society. You can find our positionality statement with tangible action items on our website at <https://www.avalancheresearch.ca/jedi/>.

2.7 Challenges

In my opinion, the main operational challenges for my program remain:

- Maintaining a continuous and meaningful connection with supporting organizations and practitioners to ensure the research we work on is meaningful to the community; and
- Providing my students with the training they need to allow them to start a promising career in the avalanche community.

Any guidance on these challenges is welcome.

3 Outlook for Next 12 Months

3.1 Context

Important context for the SARP activities over the next 12 months includes the fact that the 1-year no-cost extension of the NSERC Industrial Research Chair will come to an end on August 31, 2023. This means that all funds need to be spent by that time.

In addition, the upcoming activities of our research group are shaped considerably by the fact that Pascal will have his first study leave at SFU from Sept. 1, 2023, to Aug. 31, 2024. This means that he does not have any teaching or administrative duties at the university for 12 months. The intent of a study leave is to allow faculty members to focus on research, strengthen existing collaborations, build new research relationships, and recharge one's batteries. Since this is Pascal's very first study leave, he will get his full salary for the full 12 months.

Pascal's current plans for the study leave are:

- Sept. – Oct.: Preparation for ISSW
- Nov. – Dec.: Research visit at the WSL Institute for Snow and Avalanche Research SLF in Davos, Switzerland.
- Jan. – Mar.: Spending the winter in the interior of BC connecting with Canadian avalanche community research partners
- Apr. – May: Research visit at the WSL Institute for Snow and Avalanche Research SLF in Davos, Switzerland.
- Jun. – Aug: Research visit at the National Center for Atmospheric Research in Boulder CO, holidays, and preparation for re-entering university life

3.2 Personnel

Because of Pascal's study leave, SARP is not taking on any new students in the fall of 2023. Given that Pascal will spend considerable time away from SFU during his study leave, it would be difficult to properly onboard new students.

However, there will be considerable changes in the student body of SARP over the next 12 months as many students are expected to graduate:

- Florian Herla (PhD)
- John Sykes (PhD)
- Stan Nowak (PhD)
- Rosemary Langford (Masters)
- Anneliese Neweduk (Masters)

Without any new additions, this means that the number of SARP PhD and Master students will decline considerably. However, we are currently working on possibilities to keep some of the graduating PhD student involved in the research group at PostDoc after their graduation.

3.3 Priorities

The main priorities for the next twelve months are summarized under the four headings research, funding, outreach and other.

3.3.1 Research

- Finalize research projects and successfully graduate John, Florian, Stan, Rosemary, and Anneliese.
- Finalize PhD research proposals with Anne and Eeva.
- Publish past and current research results in academic journals including Henry and Heather's research.
- Conduct MRM snowpack modelling research project with Kelsea.
- Establish overall research objectives with the Colorado Avalanche Information Center and conduct the first targeted research project during the winter of 2024.
- Analyze second avalanche bulletin user survey for Euregio and Swiss Avalanche Warning Service and publish all the results.
- Design follow-up study for Euregio and Swiss Avalanche Warning Services.
- Initiate new research projects with Avalanche Canada and Canadian avalanche industry partners.
- Recruit students for new project including the NSERC Discovery Grant.
- Strengthen communication about research project development and implementation with research partners.

3.3.2 Funding

- Establish research priorities and funding arrangements with Avalanche Canada and other Canadian industrial research partners
- Discuss continued funding for research collaboration with Swiss and Euregio avalanche warning services.

- Explore possibilities for SSHRC funding opportunities

3.3.3 Outreach

- Present the SARP research program at the 2023 International Snow Science Workshop (October 2023). ***As of this writing, SARP members have submitted 14 abstracts to the conference!***
- Attend the 2023 Annual Meeting of the Society for Risk Analysis (December 2023).
- Continue to build a research network outside of traditional avalanche research fields within SFU (e.g., big data, visualization) and beyond (e.g., risk communication).
- Further strengthen public outreach with brief research videos on social media, practical resources on the website, presentations, and articles published in the Avalanche Journal and presentations.
- Strengthen connection with operators and avalanche professionals by visiting them during my study leave.

3.3.4 Other

- Develop a better plan for giving students the opportunity to go into the field and connect with collaborating operations and avalanche professionals in a meaningful way.
- An additional important personal priority for Pascal's study leave is to recharge his batteries and establish a better work-life balance.

4 Questions

If you have any question about SARP's research activities, please contact Pascal anytime either by email (pascal_haegeli@sfu.ca) or phone (778-782-3579 or 604-773-0854).