IVORI *

Marie Dumont

Météo-France - CNRS, CNRM/CEN, UMR 3589, Grenoble, France

Kick-off meeting

*. new Insights on the Snow coVer : from snOwflakes to ice sheets, in seconds to centuRIes

KICK-OFF MEETING SCHEDULE

Provisional programme :

Introduction

14h00 - 14h15 : Overview of the project *(Marie D.)*

14h15 - 14h45 : Introduction (All participants)

Model

14h45 - 15h00 : Physics of the snow model *(Julien B.)*

15h00 - 15h15 : Snow model design *(François T.)*

Measurements

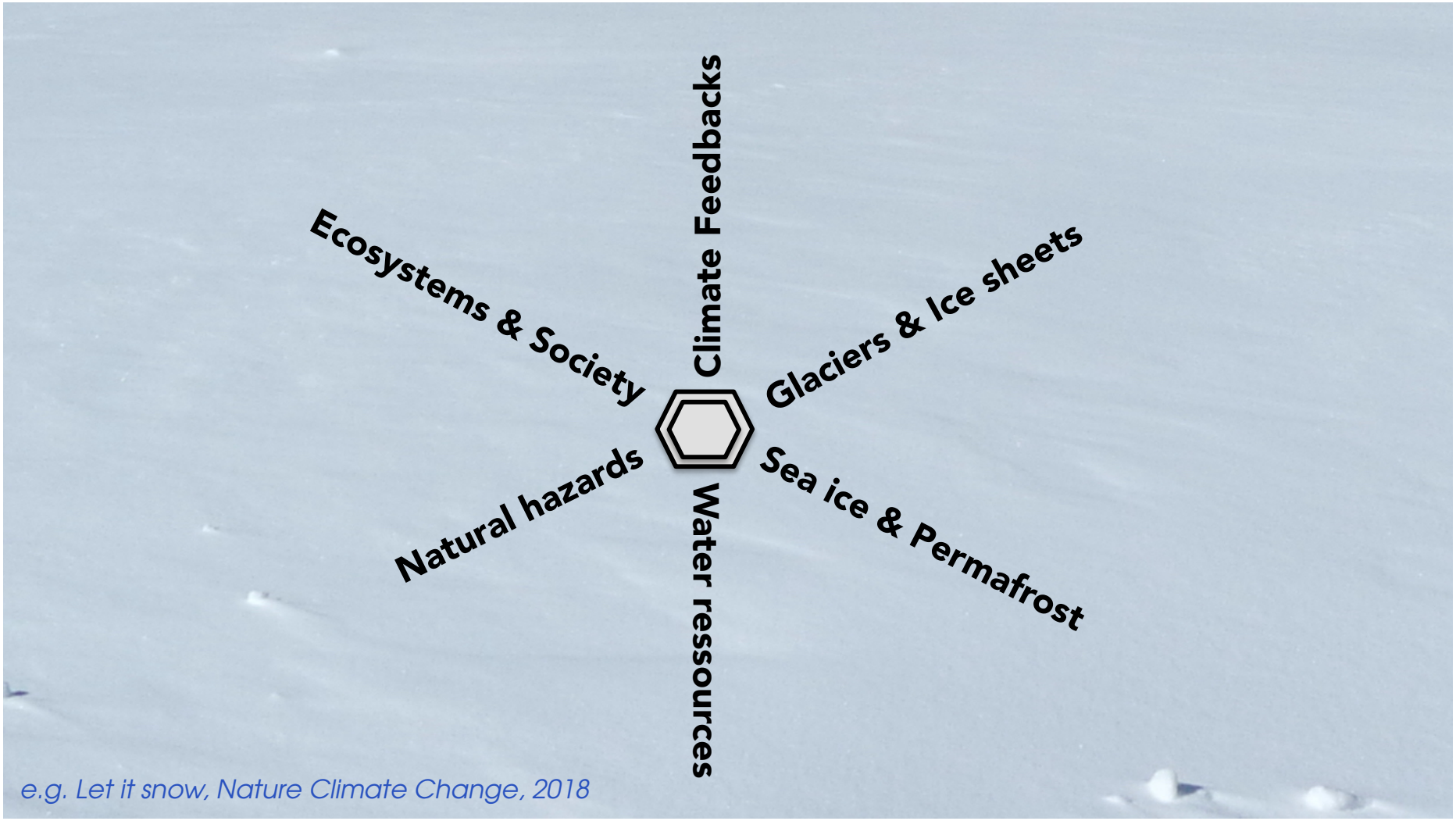
15h15- 15h30 : X-ray tomography *(Pascal H.)*

15h30 - 15h45 : Field campaigns *(Neige C.)*

Discussion

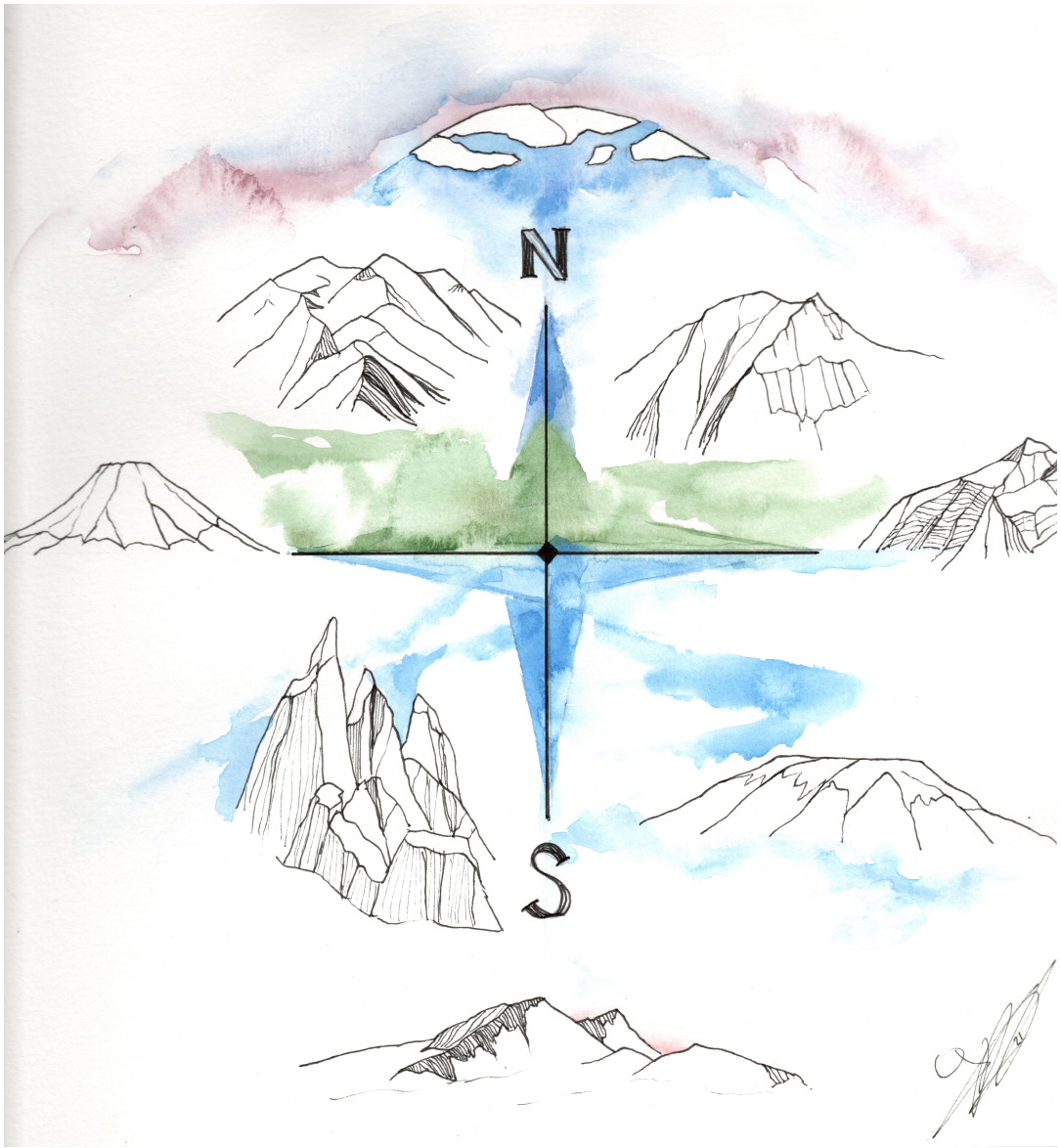
15h45 - 16h30 : General discussions *(All participants)*

WHY IVORI ?



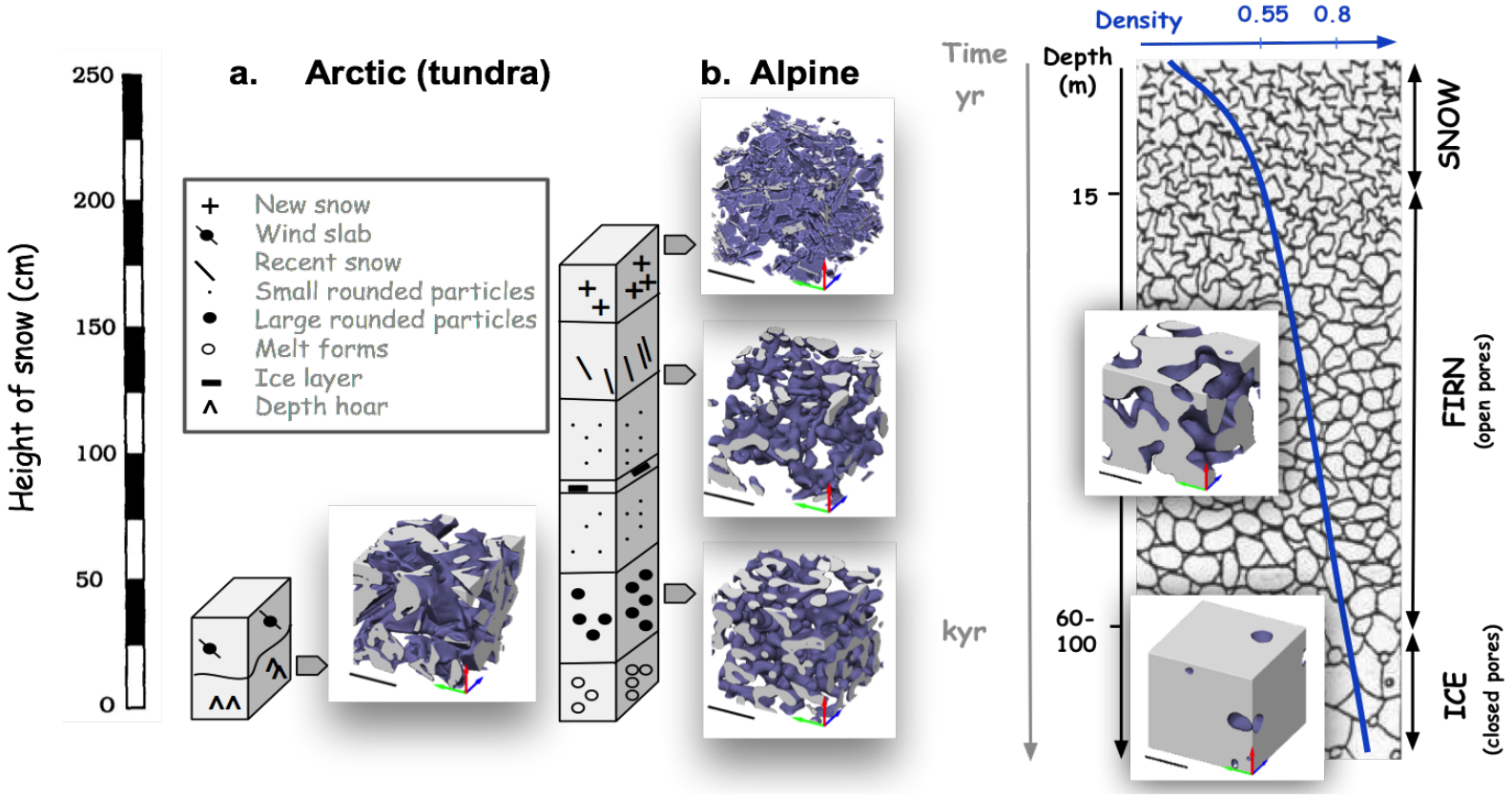
e.g. Let it snow, Nature Climate Change, 2018

WHY IVORI ?



- Various snow cover types on earth
- A wide jungle of snow models
- A gap between the current knowledge in snow physics and the more complex snow models

OBJECTIVES



- To build a modular, "universal" snow model with an advanced representation of the snow microstructure ;
- To accurately quantify climate feedback related to snow, especially the changes in ground thermal regime in the Arctic ;
- To refine our understanding of ice cores.

WORK PLAN

Feb. 2021

Year 1 | Year 2 | Year 3 | Year 4 | Year 5

Methods

WP1: Build a novel, unified microstructure-based modelling platform for snow and firn

- Model design and implementation (*1 research engineer*)
- Numerics of heat and mass transport (*Postdoc1*)

$$\frac{\partial}{\partial t}\psi_j + v_j \nabla \psi_j - \nabla D_j \nabla \psi_j = S_j$$

Process studies

Impacts

Feb. 2021

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WP2 : Understand and quantify the role of water vapour fluxes in snow evolution and the thermal regime of the underlying ground (*PostDoc2*)

- Lab experiments
- *In situ* measurements in the Arctic
- Improved modelling of water vapour transport and soil thermal regime

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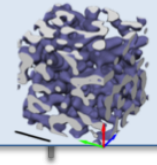
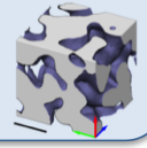
WP3: Understand how initial changes in surface snow microstructure are transferred deeper into the firn (*PhD1*)

- Scanning snow-firn cores
- Design evolution laws from snow to firn
- Improved modelling of the full column





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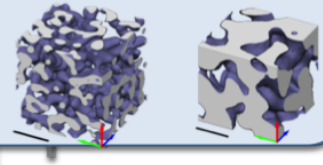
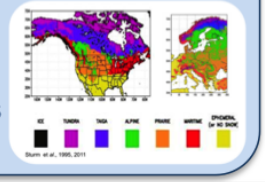


Impacts

WP4 : Determine the respective contributions of snow albedo feedbacks and snow insulation to snow cover evolution and ground temperature

- In situ measurements in the Alps and Antarctica, model evaluation (*Postdoc3*)
- Regional scale simulations for past & future periods (*Postdoc4*)



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Workshop on snow and firn modelling

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Col de Porte

CHARS

Dome C

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- ...canning snow ...irn cores
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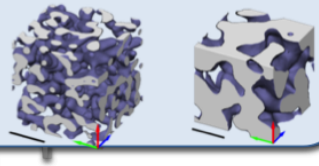

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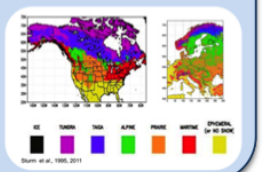


WHO ?

Marie Dumont

Matthieu Lafaysse

Pascal Hagenmuller

Julien Brondex

Neige Calonne

François Tuzet

WHO ?

France

- CNRM/CEN: Samuel Morin (snow modelling and climate);
- SIMAP: Pierre Lhuissier, (X-ray imaging, lab experiments, material science).
- IGE: Ghislain Picard (polar snowpacks); Laurent Arnaud (firn physics, instrumentation); Emmanuel Cosme (assimilation); Maurine Montagnat (ice and firn mechanics);
- LJK: Eric Blayo (numerics for geophysics);
- LSCE: Amaelle Landais and Anais Orsi (ice core and firn).

Germany Aachen Univ.: Julia Kowalski, (numerics for geophysics)

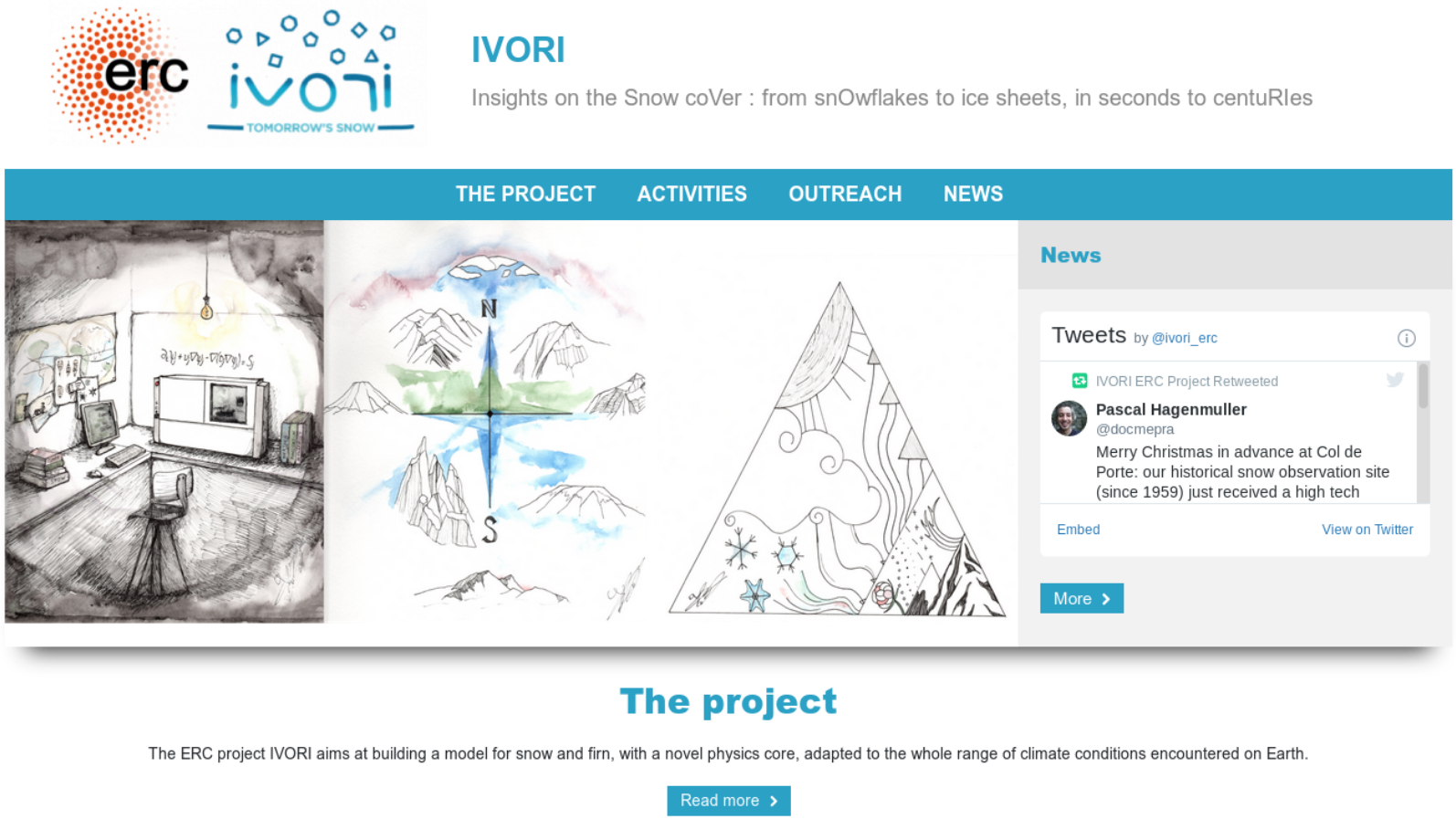
Switzerland WSL/SLF: Henning Löwe (snow physics, X-ray imaging); Matthias Bavay (snow model design, responsible for SNOWPACK model); Charles Fierz, (instrumentation and modelling);

Canada

- Laval Univ.: Florent Domine (arctic snowpacks);
- Sherbrooke Univ.: Alexandre Langlois (arctic snowpacks).

COMMUNICATION

@ivori_erc and ivori.osug.fr



Next steps

- Plenary meeting every year ?
- More focused meeting (per WP ?) more frequently ?
- Which participant is interested in which WP ?
- Other ideas ?