Taylor Dome: A Natural Laboratory to Study Firn

K. Keegan (UNR), E. Waddington (UW), K. Christianson (UW), Z. Courville (Dartmouth), E. Osterberg (Dartmouth), M. Albert (Dartmouth), C. Meyer (Dartmouth), M. Stevens (UW), A. Horlings (UW), B. Horlings (Dartmouth)

Why study firn evolution?
- Understanding of firn column important for satellite altimetry, pore close-off processes
- Current models empirically-based, perform poorly outside calibration range

Our Proposed Research
- Investigate accumulation impact on firn compaction
- Take first steps toward physics-based firn compaction model
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Taylor Dome Field Work

1. Microstructure Firn Core
   Chemistry Firn Core
   (Community Firn Core)
2. Install 4 Strain Meters, AWS
3. pRES, GPR

Year 1 (‘21-‘22): Drilling, Installs, pRES & GPR
Year 2 (‘22-‘23): Service instruments, pRES
Year 3 (‘23-‘24): Finish pRES, retrieve data
Taylor Dome Lab Work

**Microstructure Firn Cores**
- Microstructural Analysis - MicroCT
- Permeability
- Diffusivity

**Chemistry Firn Core**
- CFA – Depth-Age Scale

**Summit Firn Cores**

![Permeability vs Density Graph](image1)

- 0.5 m depth
- 17 m depth
Taylor Dome Modeling Efforts

Community Firn Model

- Firn Density
  1. Firn-Microstructure Module
  2. Improved Firn-Compaction Equation
- Firn Air
  3. Improved Effective-Diffusivity Parameterization