



Making Ice Creep in the Classroom

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Understanding the creep of ice has direct application to the role of ice sheet flow in sea level and climate change and to modelling of icy planets and satellites of the outer solar system. Additionally ice creep can be used as an analogue for the high temperature creep of rocks, most particularly quartzites.

We adapted technologies developed for ice creep experiments in the research lab, to build some inexpensive (~€200) rigs to conduct ice creep experiments in an undergraduate (200 and 300 level) class in rock deformation. The objective was to give the students an experience of laboratory rock deformation experiments so that they would understand better what controls the creep rate of ice and rocks.

Students worked in eight groups of 5/6 students. Each group had one deformation rig and temperature control system. Each group conducted two experiments over a 2 week period. The results of all 16 experiments were then shared so that all students could analyse the mechanical data and generate a “flow law” for ice. Additionally thin sections were made of each deformed sample so that some microstructural analysis could be incorporated in the data analysis.

Students were able to derive a flow law that showed the relationship of creep rate to both stress and temperature. The flow law matches with those from published research. The class did provide a realistic introduction to laboratory rock deformation experiments and helped students’ understanding of what controls the creep of rocks.