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PREFACE

This special issue of the Annals of Glaciology focuses on seismic measurements related to glaciers and ice sheets. This field, often referred to as "cryoseismology" is a relatively new earth science discipline, as modern instrumentation and technology have only recently tackled challenges of sensor deployment in rugged alpine terrain - including glacial ice. Cryoseismology has been attracting glaciologist's interest, because seismic signals carry important information about ice deformation and structure. Seismic sources reflect in-situ stresses, englacial and subglacial hydraulic processes and other conditions in a glacial environment. Moreover, as seismic waves propagate through the glacial body, they are altered according to ice structure such as fracture state and fabric. For these reasons, seismic signals related to glaciers and ice sheets provide valuable and sometimes unique insights into our planet's cryosphere.

The majority of this issue's contributions is centered on the interpretation of passive recordings. Depending on the density and size of the recording seismic networks, signal interpretation ranges between single-station methods and seismic network and array techniques providing additional source constraints such as locations and rupture models. A number of findings are reported documenting thermal and ice dynamic controls on englacial fracturing in various glacial settings, including ice shelves.

Another group of papers uses seismic waves to constrain properties of the glacial medium through which they propagate. This includes the more traditional approach of interpreting seismic waves generated by active sources as well as studies of seismic signals from passive recordings. For the latter, naturally occuring seismic sources are used including surface crevasse icequakes and seismic background noise. While processing of passive earthquake recordings and seismic noise to elucidate subsurface structures has revolutionized crustal seismology in the past 1-2 decades, cryoseismology has yet to master these techniques. Several papers in this special issue push in this direction.

Finally, a set of papers studies subglacial sources in Alpine and Polar environments. Conditions and processes at the ice bed are still largely masked from measurements with sufficient temporal and spatial resolution and seismology may hold the key to important discoveries affecting our understanding of ice flow and ice sheet dynamics. For example, accumulating seismic evidence shows that glacier sliding via sudden stick–slip episodes is more widespread than previously thought. We should not be surprised to see more basal processes revealed via seismic techniques.

Annals of Glaciology is a peer-reviewed thematic journal published by Cambridge University Press on behalf of the International Glaciological Society. A team of 10 Scientific Editors with wide expertise were responsible for assessing the papers in this issue. They acknowledge and are grateful for the work of a large number of peer-reviewers for their critical assessments and efforts to improve the manuscripts.

Fabian Walter

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