[https://doi.org/10.1038/s41467-018-08068-y](https://doi.org/10.1038/s41467-018-08068-y)

This invited review paper in Nature Communications summarises the current state-of-the-art in research associated with SERCE activities and interests and provides a review of future research priorities that will feed into future SCAR Scientific Research Program activities.

[https://doi.org/10.1016/j.epsl.2014.04.019](https://doi.org/10.1016/j.epsl.2014.04.019)

[https://doi.org/10.1126/science.aao1447](https://doi.org/10.1126/science.aao1447)

These studies document the use of GNSS observations to identify a viscous solid Earth response to contemporary ice loss. This was unexpected and is one strand of evidence that has been used to identify the presence of weak mantle material beneath West Antarctica.

[https://doi.org/10.1029/2019JB017823](https://doi.org/10.1029/2019JB017823)

This study is one of many studies that have emerged during the lifetime of SERCE that document variations in mantle properties using seismic methods.

[https://doi.org/10.1016/j.epsl.2015.01.001](https://doi.org/10.1016/j.epsl.2015.01.001)


Building on evidence for spatial variations in mantle rheology beneath Antarctica, a suite of studies has sought to model the impact of these 3D variations when investigating the solid Earth response to ice sheet change.


These studies document emerging evidence for ice sheet readvance during the Holocene. They hypothesise that this process was triggered by solid Earth rebound in response to earlier ice mass loss.


The recognition that there are two-way feedbacks between solid Earth deformation and ice sheet dynamics has triggered a new area of research during the lifetime of SERCE. This research has revolved around the development of coupled ice sheet-solid Earth models.

   https://doi.org/10.1175/JCLI-D-17-0352.1

The culmination of research into the effect of 3D mantle rheology and feedbacks between ice sheet dynamics and solid Earth deformation is this paper that documents a new model that accounts for both effects.

   https://doi.org/10.1038/s41586-018-0179-y

Understanding the contemporary pattern of solid Earth deformation in response to past ice sheet change is a crucial step in being able to quantify present-day ice sheet change. Many SERCE-facing scientists were involved in this high-profile study.

   https://doi.org/10.5194/tc-8-743-2014

   https://doi.org/10.1002/2015JF003550
The contemporary pattern of solid Earth deformation in response to past ice sheet change can also be determined via the inversion of complementary satellite data sets.


An emerging strand of SERCE research is the role of geothermal heat flow (GHF) in controlling ice sheet dynamics. The distribution of GHF is poorly constrained – this recent SERCE White Paper documents our current state of knowledge on quantifying GHF across Antarctica.


On a longer timescale, dynamic topography change will impact ice sheet dynamics. This novel article documents the impact on ice sheet stability during a climatic warm period ~3 million years ago.


Another emerging strand of SERCE research is the field of Glacial Seismology. This article documents the development and potential applications of this field.