

## P-wave tomography beneath Greenland

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The Greenland landmass has a long and complex tectonic history (~4 billion years). However, most of the continent is covered by the extensive inland ice cap, so it was hard to access its geology and the underlying tectonics. The Greenland Ice Sheet Monitoring Network (GLISN) is an international project by 11 countries to establish a seismic network in and around Greenland (Toyokuni et al., 2014). The project was initiated in 2009, and now it provides broadband, continuous, and real-time seismic data recorded at 33 stations. In this study we aim to investigate the 3-D upper mantle structure beneath Greenland by using the GLISN data.

We inverted a number of P-wave arrival-time data of both local and teleseismic events, observed at 30 GLISN stations, to estimate a 3-D P-wave velocity ( $V_p$ ) model beneath Greenland and surrounding regions. All of the GLISN arrival-time data are downloaded from the Bulletins of the International Seismological Centre. We used the seismic tomography method by Zhao et al. (2012).

In the polar region, if grid nodes are arranged on the basis of equatorial coordinates, distance between two adjacent nodes in the same latitude decreases as it gets closer to the pole. To overcome this problem, we converted our study region from the equatorial coordinates to the ecliptic coordinates. This scheme enables us to solve tomographic equations in quasi-Cartesian coordinates (e.g., Kobayashi & Zhao, 2004; Gupta et al., 2009; Takenaka et al., 2017). We set up a 3-D grid with a horizontal grid interval of 2° and a vertical grid interval of 15–30 km (at depths of 5–700 km).

The results of this study are summarized as follows.

(1) There is a prominent low- $V_p$  anomaly beneath Iceland (depth < 500 km), which is related to the current Iceland plume.

(2) In the shallow mantle (40-250 km depths) beneath central and offshore eastern Greenland,  $V_p$  is relatively lower than those in the other inland areas of Greenland in the depth range, which may reflect the ancient motion path of the Iceland plume. This feature coincides with known basalt areas at central western and eastern coasts of Greenland.

### References:

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Keywords: Seismic tomography, Greenland, Iceland plume, GLISN project