

東南極での広帯域地震計観測:IPY でのガンブルツェフ地域の解明に向けて
- AGAP/GAMSEIS -

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**Broadband seismic deployments in East Antarctica:
IPY contribution to understand the Gamburtsev Province
- AGAP/GAMSEIS -**

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The ‘Antarctica’s GAmBurtsev Province / GAmBurtsev Mountain SEISmic experiment (AGAP / GAMSEIS) (IPY # 147)’ is an internationally coordinated deployment of more than 35 broadband seismographs over the crest of the Gamburtsev Mountains (Dome-A) – Dome-F area. The seismological investigations could provide detail information on crustal thickness and mantle structure and make key constraints on the origin of the Gamburtsev Subglacial Mountains (GSM), and more broadly on the structure and evolution of the East Antarctic craton and subglacial environment. The GSM are one of the most enigmatic tectonic features on Earth. Buried beneath several kilometers of ice, the mountains are characterized by peak elevations reaching ~3000 m above sea level. Until recently, only limited constraints were available on the crustal and upper mantle structure of the GSM but new data from the GAMSEIS allows for more detailed investigations. In this study, we use S-wave receiver functions and Rayleigh wave phase velocities to analyze data from the GAMSEIS deployment and to improve estimates of crustal thickness beneath the East Antarctic craton and the GSM. Our results indicate that the cratonic crust surrounding the GSM is ~40-45 km thick, which agrees well with previous studies and is consistent with average Precambrian crustal thickness found globally. Beneath the GSM, the crust thickens to ~55-58 km and provides isostatic support for the high mountain elevations. It has been suggested that thicker crust beneath the GSM may reflect magmatic underplating associated with a mantle plume. However, considering our results with those from other previous and ongoing studies, we instead favor models in which the GSM are an old continental feature associated with either Proterozoic or Paleozoic tectonic events. In terms of the study on deep interior of the Earth, together with crust – mantle studies, teleseismic waveforms observed by the GAMSEIS have an advantage for investigating the lower mantle, the D" layer and the CMB. By using seismographs as a large aperture array, many earthquakes will be observable at the GAMSEIS profile. The epicentral distance range from 60° to 90° would be especially suitable for the observation of the D" reflected phases as well as the core reflected phases of ScS and PcP. The events from 90° to 130° would be appropriate for the observation of the core diffracted phases of Pdiff, and Sdiff, and a core phase of SKS. Reflectivity waveform synthetics for S and ScS phases of the Fiji event to the GAMSEIS profile demonstrated heterogeneous structure around the D" layer. Thus the IPY broadband deployment in East Antarctica is expected to be an important opportunity for supporting the Federation of Digital Seismographic Network (FDSN) in southern high latitude. From GAMSEIS data obtained in 2008-09, local and regional seismic signals associated with ice sheet movement and meteorological variations were recorded; together with significant number of teleseismic events. The detection of seismic signals from phenomenon at the base of the ice sheet, such as outburst floods from subglacial lakes could be expected. In this presentation, in addition to the study of the interior of the Earth, several remarkable detected signals are demonstrated involving meteorological environment.