SnT 2025 8 SEPTEMBER ONLINE DAY 9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

P3.5-038

Analysis of Data from Seismic Monitoring Network around Syowa Station, Antarctica

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INTRODUCTION AND MAIN RESULTS

Seismic observation at Syowa Station (69.0° S, 39.6° E; SYO), Antarctica started since 1959 associated with the International Geophysical Year (IGY; 1957-1958) campaign. Since the establishment of the INTELSAT telecommunication link, digital waveform data have been transmitted to the National Institute of Polar Research (NIPR) for the utilization of phase identification more clearly. Arrival-times of the teleseismic phases have been detected with reporting to the International Seismological Centre (ISC), then published as “Data Reports”. The continuously recorded data for a few decades after IGY have been utilized not only to the lithospheric studies but also to the Earth’s deep interiors, which has significant contribution to the Federation of Digital Seismological Networks from a high southern latitude. In this presentation, seismic observation networks and data analysis around SYO and surrounding regions are introduced associated with scientific linkages with regional and global networks.

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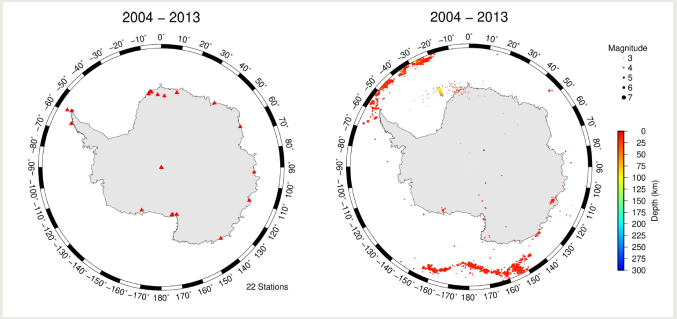
Introduction

Seismic observation at Syowa Station (69.0° S, 39.6° E; SYO), Antarctica started since 1959 associated with the International Geophysical Year (IGY) campaign. Since the establishment of the INTELSAT telecommunication link, digital waveform data have been transmitted to the National Institute of Polar Research (NIPR) for the utilization of phase identification more clearly. Arrival-times of the teleseismic phases have been detected with reporting to the International Seismological Centre (ISC), then published as “Data Reports”. Seismic phase travel-times data incorporated with annual catalogs of detected teleseismic earthquakes are particularly focused on, along with data utilization for public usage. Recorded waveform data, seismic-phase travel-times and corresponding earthquake catalogs have sufficient quality for many analyses involving dynamics and structure of the Earth viewed from Antarctica.



Station distribution and seismicity around Antarctica (from ISC)

Results and Summary

- Phase identifying procedure for teleseismic events at Syowa Station (69.0° S, 39.6° E; SYO), East Antarctica have been carried out since 1967 after the International Geophysical Year (IGY; 1957-1958).
- Arrival times of teleseismic phases, P, PKP, PP, S, SKS have been reported to the International Seismological Centre (ISC) since 1967 and published by “JARE Data Reports” from NIPR.
- Characteristics of detected events, magnitude dependency, spatial distributions, seasonal variations, together with classification by focal depth are demonstrated.
- Besides the natural increase in number for occurrence of teleseismic events on the globe, a technical advance in observing system and station infrastructure, as well as the improvement of procedure for reading seismic phases, could be efficiently combined to produce the increase in detection number in last few decades.
- Variations in teleseismic detectability for longer terms may possibly by associate with meteorological environment and sea-ice spreading area around the Antarctic continent (Iwata and Kanao, Polar Science, 2015)..
- Recorded teleseismic and local seismic signals have sufficient quality for many analyses on dynamics and structure of the Earth’s as viewed from Antarctica.
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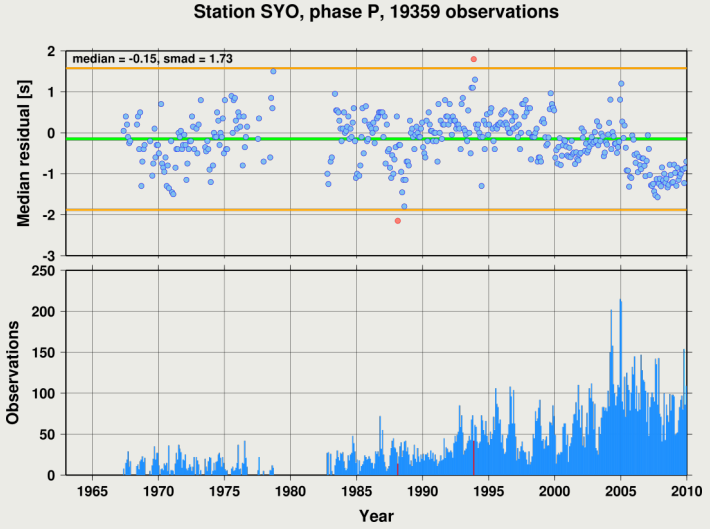
- The continuously recorded data are applied not only to lithospheric studies but to Earths deep interiors, as significant contribution to the Federation of Digital Seismological Network (FDSN) from high southern latitude.



Time variations in travel-time residuals for P-waves at SYO (in totally 19,359 observations) reporting to the ISC.

NiPR National Institute of Polar Research