

Seismic tremors and their relation to cryosphere dynamics in April 2015 around the Lützow-Holm Bay, East Antarctica

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Characteristics and statistics of seismic tremors occurring during April 2015 were investigated by using short-period and broadband seismographs deployed at Syowa Station (SYO), in the Lützow-Holm Bay (LHB), East Antarctica. In order to examine a relationship between surface environments in particular cryosphere variation, the MODIS satellite images were utilized for comparison with the detected tremor events. Since a large volume of sea-ice was discharged during the April, together with several large icebergs passed through from the west to the east at northern edge of the fast sea-ice of LHB, it was expected to detect seismic tremors involving cryosphere dynamics. During the month, a total number of 49 tremor events including short duration ice shocks were identified. Majority of the events (N=39) had their duration times more than 15 minutes, which were divided into both tremors and ice shocks on the basis of experienced definition at SYO. Cryospheric sources recorded by seismic tremors were classified into several origins (collision, calving, crevassing, crashing, etc.); “crevassing events” along the large cracks inside the fast sea-ice in LHB (04 April), “discharge events” of fast sea-ice from the Bay (07 April), “collision events” between iceberg and the edge of fast sea-ice (14 April), “crashing movement” between fragmentation of fast sea-ice and packed sea-ice (18 April), and other origins. In particular, strong amplitude tremors with harmonic overtones were assumed to be occurred independently from whether condition, because these overtone tremors were identified at less stormy days by comparison with infrasound data at SYO.