

東南極リュツォ・ホルム湾周辺域での
特徴的な多重共鳴的地震微動

金尾政紀¹

¹ 国立極地研究所

**Characteristic seismic tremors with harmonic overtones
around the Lützow-Holm Bay, East Antarctica**

Masaki Kanao¹

¹ *National Institute of Polar Research*

Characteristic seismic tremors with harmonic overtones are observed around the Lützow-Holm Bay (LHB) region, involving surface environmental changes in vicinity of the area, in particular cryosphere dynamics and evolution. A total of 121 harmonic tremors are identified in both three-component short-period seismographs and broadband seismographs deploying at Syowa Station, from October 2014 to April 2015. Many of the tremors have characteristics of strong harmonic overtones, in their frequency content over the 1 Hz, representing nonlinear features (upward and/or downward frequency contents) with duration times from few minutes till few hours. These tremors occur independently with the arrivals of teleseismic phases, as well as are recorded by both the type of sensors simultaneously. The harmonic overtones can be explained by a repetitive source (Powell and Neuberg, 2003), suggesting existence of several inter-glacial asperities which generate the characteristic tremors. It implies the tremor signals might be involved in the local origins, presumably the cryosphere dynamics; discharge of fast-ice from the Bay, collision of icebergs and fast-ices, calving of glaciers. In austral winter in 1997, actually, a few tens of hours duration tremor of harmonic overtones were strikingly observed involving the discharge of a large volume of sea-ice (fast-ice) from LHB (Kanao et al., 2012). The similar nonlinear harmonic tremors associated with the glacial earthquakes have been reported at Whillans Ice Stream, West Antarctica (Winberry et al., 2011, 2013), with the colliding icebergs in the Ross Sea (MacAyeal et al., 2008) and nearby the Neumayer Station of Dronning Maud Land (Eckstaller et al., 2007), respectively. In contrast, relatively small tremor signals are estimated to have very local origins, such as ice-shocks in relation to the sea-ice level changes in relation to oceanic tide variation in LHB. It is noticed that the laming signals by an ice-breaker ship "Shirase" are clearly identified around 11-13 January 2015, when the ship approach nearby Syowa Station. The laming signals have frequency contents over few Hz with 10-15 min. intervals. In this regard, seismic tremors associated with cryosphere dynamics are likely to be involved with variations in surface environments, and continuous monitoring of their time-space variability provides indirect evidence of climate change in the Antarctic.