# オンデマンド地殻変動観測ブイシステムの開発
# Development of on-demand buoy observation system for crustal displacement

*高橋 成実[1]、石原 靖久[1]、福田 達也[1]、越智 寛[1]、出口 充康[1]、坪根 聡[1]、今井 健太郎[1]、木戸 元之[2]、太田 雄策[2]、今野 美牙[2]、久野 晃太郎[3]、久本 泰義[3]、小平 秀一[1]
*Narumi Takahashi[1], Yasuhisa Ishihara[1], Tatsuya Fukuda[1], Hiroshi Ochi[1], Mitsuyasu Deguchi[1], Satoshi Tsubone[1], Kentaro Imai[1], Motoyuki Kido[2], Yusaku Ohta[2], Misae Imano[2], Kotaro Hisano[3], Yasuyoshi Hisamoto[3], Shuichi Kodaira[1]

1.海洋研究開発機構、2.東北大学、3.宇宙航空研究開発機構
1.Japan Agency for Marine-Earth Science and Technology, 2.Tohoku University, 3.Japan Aerospace Exploration Agency

We have developed an on-demand buoy observation system for crustal displacement and tsunami since 2012 in collaboration with Japan Agency for Marine Earth Science and Technology, Tohoku University and Japan Aerospace Exploration Agency. This system has some characteristics, which are use of pressure sensor on the sea bottom and precise point positioning system on the buoy to detect vertical crustal displacement, acoustic measurement between the buoy and seafloor transponders, slack mooring for realtime observation in high speed sea current with the velocity of over five knots. In addition, we adopted double pulse for acoustic data transmission of the pressure sensor data from sea bottom. Collected data from the sea bottom and through the acoustic measurement is sent to the land station using iridium satellite. We succeeded observation of micro tsunami propagated from the Iqique tsunami, Chile, in the Nankai Trough area. We collect pressure sensor data on the seafloor pressure unit with a sampling of 15 seconds in tsunami mode via a wire-end station below 1000 meters from the sea surface, and carry out above acoustic measurement with the sampling of one week. A buoy station on the buoy controls all actions related to the collection of the data for the observation and navigation, saving data, and data transmission to the land station. However, we need to revise to realize long term observation of one or two years and improvement of the reliability for the observation. We have issues on a rate of the data recovery, due to inhomogeneous of the acoustic characteristic of the seafloor pressure unit, contamination of reflection signals from the sea surface into the data transmission signals from the seafloor pressure unit to the wire-end station, troubles on the wire line between the wire-end station and the buoy by buoy rotation, and so on. Therefore, we revised the observation buoy system, which includes change of the flame of the seafloor pressure unit to improve acoustic characteristic, installation of the precise point positioning systems using MADOCA system and MB-ONE to derive vertical crustal displacement from seafloor pressure data, improvement of the control system on the buoy station to enable to start observation according to orders from the land station, and attachment of a fin to control the buoy rotation. And we tuned action flow to decrease electrical consumption and adopted solar panels as the batteries of the entire of the system. To improve accuracy of the acoustic measurement, we need to decrease the slack ratio. We succeeded it from 1.6 to 1.58 at this moment. We try to decrease the slack ratio more to realize accurate acoustic measurement. In this presentation, we report the current sea trials, which started in January, 2016.

キーワード：地殻変動、リアルタイム観測、ブイ
Keywords: crustal displacement, real-time observation, buoy

 