Implementation of integrated observation from seafloor through atmosphere –past, current, and future plans

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The authors have challenged to promote our understandings of global dynamics associated with ocean physics particularly by the simultaneous observation through the seafloor to the atmosphere. We have initiated the total station using both D/V ‘Chikyu’ and the seafloor observatory network ‘DONET’ in the Nankai trough. This total station has clarified the Kuroshio current variation in this region by using both the ambient pressure at DONET and the surface current measurement at D/V ‘Chikyu’. This observation performed at the point where D/V ‘Chikyu’ was in operation for a few months, and therefore there still remained some difficulties to extend to areal and long-term observation. Now, we try to extend our proposed total station to the nearshore network from the point of view of not only scientific application but also civil use for natural disaster mitigation such as earthquake, tsunami, and high-tide caused by storm. On the other hand, a global permanent observation network has been developed and operated by the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) since the 2000s as the International Monitoring System (IMS) regime for the real-time monitoring of nuclear explosion’s test in the underground, underwater, and above surface up to the atmosphere. Four technologies with over 330 stations will cover the entire Earth after certification of all of stations. Three categories of geophysical observations of four technologies such as seismic (50 primary and 120 auxiliary stations), infrasound (60 stations), and hydro-acoustic (11 stations) network operated globally may be beneficial and of interest for our proposed integrated observations. In the presentation, we introduce the preliminary results on our integrated observation of total stations and our drawing blue print of future plans.

Keywords: seismic observation, seafloor cabled network, disaster mitigation

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