

Ocean Bottom Gravity Measurement Using a Landing AUV

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Gravity measurement at sea is usually conducted by using a research vessel. The accuracy of this sea surface gravity data is around 1 mgal at most. Recently, gravity measurement using the cruising type AUV URASHIMA of JAMSTEC has been conducted. The accuracy of this subsea moving gravity measurement is about 0.1 mgal (Shinohara et al., 2015). On the other hand, gravity measurement at the ocean bottom was also carried out by using a ROV or using a hanging wire rope from a ship (Joshima et al., 2006, etc). The accuracy of this method is higher than those of the two moving methods mentioned above and is comparable with that of on land. The ocean bottom gravity measurement is generally conducted near the targets for exploration. Therefore, relatively large gravity anomalies can be observed. If the ocean bottom gravity measurement by using a seafloor landing AUV is implemented, it is possible to get more accurate gravity data in deep sea at low cost.

Preliminary experiments for ocean bottom gravity measurement using a hovering type AUV Tri-TON of IIS/UTokyo and an ocean bottom gravity meter OBG manufactured by KGE were successfully carried out in August 2015 and December 2016 at Numazu, Shizuoka Prefecture. To avoid use of vertical thrusters while the gravity measurement on seafloor and obtain an efficient grounding force, the buoyancy of Tri-TON attached with OBG was adjusted slightly negative in advance. Although tilt correction bias due to an ambiguity of the passive gimbal leveling system still remains, the gravity data obtained on seafloor have low SD values and its accuracy is almost comparable with those of on land.

Keywords: Ocean Bottom Gravity Measurement, Landing AUV, Tri-TON, OBG