

## Hydrothermal vents in the deep basin of Lake Biwa

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The autonomous underwater vehicle (AUV) “Tantan” was constructed and first deployed in the year 2000, as the world’s first AUV conceived for lake ecosystem exploration and monitoring. Tantan (meaning “freshwater surveillance” in Japanese) was designed to move along bottom slopes keeping a constant distance above the sediments, with a payload that includes two high-definition video cameras, a digital camera, a submersible microscope and various sensors. In December 2009, Tantan identified turbid water ebullition on the deep area in the North Basin of Lake Biwa, which is a larger basin with maximum depth 104 m and 99% water volume, and follow-up investigations were conducted in April, December 2010 and January 2012. This study confirmed the existence of hydrothermal vents, and provided the evidence that their vent numbers per unit area on the lake bottom have increased from 1.0 km<sup>-2</sup> vent in 2009 to 54.0 vents km<sup>-2</sup> in 2012. We also found that those discovered vents located along the ridge of sunken mountains which form the basement of Lake Biwa with covered sediments. Some back-up investigations have been performed with a remotely operated vehicle (ROV) and several kinds of sonar devices, and all of the outputs support the existence of vents found by Tantan.

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