Relation among crustal deformation, precipitation and groundwater in Kosei area of Shiga Prefecture

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It is said that around 20% of the water flowing into Lake Biwa is groundwater. The main part of it is considered to be the groundwater in the Kosei area of Shiga Prefecture or the west coast area of Lake Biwa. In the Kosei area there are many mountains. The precipitation in the mountain area supplies a lot of water to the groundwater in the Kosei area. Using an autonomous underwater vehicle, Kumagai et al.(2015) found the vent, which is an outlet of groundwater and gas, around the deepest part of Lake Biwa or the northwestern part of Lake Biwa in December 2008. In addition Kumagai et al.(2015) found that the area of the vent has been magnified since December 2010 and suggested that the magnification should have some relation to crustal deformation in and around Lake Biwa. The area in and around Lake Biwa is actually included in the Niigata-Kobe Tetonic Zone and has been in large contraction (10^{-7}/year) for at least a recent few decades. However, it has not been reported that the contraction rate was changed around 2010. Daily positional information of the Geospatial Information Authority of Japan (GSI) shows that length of the east-west baseline across Lake Biwa (Hikone-Takashima baseline) has been uniformly contracted at 10^{-7}/year since 1996. On the other hand it was found that precipitation in and around Lake Biwa has been increased since 2010. Since 2010 groundwater pressure has been also increased at HNO groundwater observation station of Geological Survey of Japan, AIST, which is located in the Kosei area. Therefore it is possible that the increased precipitation in and around Lake Biwa raised the groundwater pressure at Kosei area, which in turn increased groundwater flow to Lake Biwa. If it is right, the increased groundwater flow can magnify the area of the vent. In the presentation, I will show the relation among precipitation, groundwater pressure and crustal deformation in and around Lake Biwa.

Keywords: Lake Biwa, crustal deformation, precipitation, groundwater, Niigata-Kobe Tectonic Zone

