

## **CO<sub>2</sub> and methane flux from the submerged Wakamiko Crater in Aira Caldera of Kagoshima Bay, southern Kyushu, Japan**

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Vigorous fumarolic activity in the submerged Wakamiko Crater, which is one of the active craters of Aira Caldera, southern Kyushu, Japan, has been recognized since at least fifty years ago. Carbon dioxide is a main constituent of the discharged gas and its carbon isotopic signature indicates that the gas is derived from magma below the seafloor. Gas bubbles of a part of the discharged gas reach to the sea surface through overlying seawater about 200 m thick from seafloor vents. Such significant amount of fumarolic gas discharge has been expected an useful proxy for monitoring of magma activity of the caldera. Since 2007, we sampled seawater one or two times every year and measured total dissolved inorganic carbon and methane concentrations in the seawater samples. Occupied seawater in the caldera is overturned in early spring every year, it means that vertical mixing of water bodies is occurred. After the mixing stagnant bottom water body is developed lower than about 100 m in water depth due to salinity and temperature stratification, then carbon dioxide and methane discharged from the fumaroles start to accumulate in the bottom water. Therefore, we can estimate the flux of carbon dioxide and methane from the increasing rate of those gases in the bottom water. The estimated flux of carbon dioxide is ranging from c.138 to c. 362 billion g·y<sup>-1</sup> during 2007 ~ 2012 (maximum at 2011), while methane flux is estimated c. 11 to 40 million g·y<sup>-1</sup> during 2010 ~ 2012 (maximum at 2010).

Adjacent subaerial active volcanoes, Sakurajima and Kirishima-Shinmoedake, have been significantly activated recently. Frequency of explosive eruptions have been increasing significantly since 2007 for Sakurajima and 2011 for Shinmoedake volcanoes. Magma chamber expected lying below Aira Caldera is considered to connect and supply magma to another magma chamber developed below Sakurajima continuously. Carbon dioxide flux of Aira Caldera shows maximum values at 2011, it means that we need to accumulate further data of the flux and observe carefully the relationship with those adjacent volcanoes.