Materials transport and nutrient cycles in watersheds; Human and climate impacts

convener: Mitsuyo Saito (Graduate School of Environmental and Life Science, Okayama University), Shin-ichi Onodera (Graduate School of Integrated and Arts Sciences, Hiroshima University), Takahiro Hosono (熊本大学大学院先導機構, 共同), Adina Paytan (University of California Santa Cruz)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session aims to synthetize watershed sciences in order to understand dynamical processes of materials transport and nutrient cycles in watersheds from headwaters to coastal seas focusing on human and climate impacts. The session will be integrating a variety of research disciplines including limnology, ground water hydrology, coastal oceanography, meteorology, pedology, sedimentology, forestry, agriculture, fishery, social science and more. The watershed sciences also challenge us to solve environmental issues emerged in the watersheds through our profound understanding of relations between humanity and nature. For instance, on one hand, human land uses alter water resources, dynamics of sediments, nutrients and pollutants in waters and soils on watershed scales, while changing climates may alter water cycle, the frequency and intensity of materials transport and natural disaster, sometimes having catastrophic effects on the watershed systems. This session also calls for ideas on new methods for the watershed sciences, such as tracer and molecular technique, hydrological modeling, paleontological approaches, laboratory and field experiments, social-scientific evaluation of ecosystem services and social-ecological systems, and so on, in order to elucidate physical, chemical and biological mechanisms for shedding light on natural phenomena and their changes over time in complex and dynamic watershed systems. Through this session, we would like to facilitate interdisciplinary collaboration among participants to create new knowledge on watershed sciences.

Influence of Hakone volcanic eruption (150629) on the surrounding water environment


Keywords: Mt. Hakone, Eruption, Volcanic product, Owaku marsh, Water quality

1. Introduction

Water resources are abundant in volcanic areas, and grasp of water environmental problems is important for conservation and use. When an eruption occurs, it is conceivable that the surrounding river, groundwater, etc. will be contaminated by components melted from the ejecta. Based on this, in order to grasp the influence of the eruption occurred in Owakudani of Hakone on June 29, 2015, the impact on the surrounding water environment is done once a month.

2. Results and Discussion

2.1. EC·pH of river

In Hayakawa River, EC, pH varied from 200 to 400 μS / cm, 7 to 8, and no noticeable change in value was observed in the investigation after the eruption. In Owakusawa, high EC·low pH of 6,780 μS / cm, pH 2.4 was observed in the investigation immediately after the eruption. Owakusawa's EC tends to decline over time, and after 1608 it is stable at around 3,000 μS / cm. As for pH, it is higher than immediately after the eruption.

2.2. Major dissolved component

In Owakusawa, Cl⁻ tends to decrease as time passes since the eruption. On the other hand, there was no conspicuous decline in SO₄²⁻. The ratio of Cl⁻ / SO₄²⁻ was 1.1 in 1507, but it decreased to 0.2 in 1707. As for
the cation ratio, there is little change compared to the anion.

2.3. Rainwater
Although rainwater is sampled at nine points, high EC (maximum 230 μS / cm) and low pH (minimum 3) are observed at the point near Owakudani. In 1604 to 1608, there is a point where the amount of components contained in the collected rainwater has increased, and it can be related to the concentration of the volcanic gas around it.