

Introduction of a laboratory syrup eruption experiment for outreach activity

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We have conducted syrup eruption experiments based on the existing outreach eruption experiment (Takeuchi, 2006), and conducted improvements mainly for the open campus of the Earthquake Research Institute since 2014. In this experiment, it is an experimental system integrating individual mechanisms assumed in the dynamics of the volcanic eruption. The experiment, which can be done with the demonstration and measurements at the same time, makes it possible for public people to image the dynamics of the eruption and also to suggest the importance of the observation and disaster prevention. For the analog fluid, we prepare two kinds of syrup of different pH, with citric acid and sodium bicarbonate. Mixing these two fluids in a plastic bottle, foaming is started by chemical reaction. To prevent air leakage, foaming starts by chemical reaction. The tube is connected by using an original designed adapter. The upper end of the tube is softly closed with a rubber plug. When the internal pressure inside the container rises due to foaming, the plug at the upper end of the tube is blown off and vigorous syrup eruption starts. The experiments are recorded by using a pressure gauge, a microphone, and a USB-camera. We can see all data on the display in real time as the demonstration, and constructed a system that can review the data immediately after the experiment.

In the experiment, after opening the plug, vigorous syrup is blown out of the tube and then the syrup is intermittently blown up from the tube. When the pressure goes down, the force to blow up the syrup decreases, and the syrup is drained from the tube effusively. In the pressure gauge, the pressure gradually rises towards the plug opening. Just after the opening, the waveform which suddenly drops is measured. It reminds us a waveform of tilt change before and after the eruption. The acoustic wave is also recorded on the microphone at the same time as the spurting syrup.

I would like to continue to demonstrate this outreach experiment to widely convey the importance of observation, consciousness of disaster prevention, and above all, the fun of investigation volcanic eruption dynamics.

Keywords: Dynamics of volcanic eruptios, Outreach activity, Disaster prevention, laboratory analogue experiment, starch syrup

