Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SVC11-P01 会場:コンベンションホール 時間:5 月 24 日 18:15-19:30

イエローストーン、ローンスター間欠泉において観測された噴火規模の二極化
Bimodal Distribution of Geyser Preplay Eruptions: Lone Star Geyser, Yellowstone National Park, USA

並木 敦子[1*] ; Hurwitz Shaul[2] ; Murphy Fred[2] ; Manga Michael[3]
NAMIKI, Atsuko[1*] ; HURWITZ, Shaul[2] ; MURPHY, Fred[2] ; MANGA, Michael[3]

[1] 広島大学・総科, [2] 米国地質調査所, [3] カリフォルニア大学バークレー校
[1]Hiroshima University, [2]USGS, [3]UC Berkeley

Geyser eruption intervals are determined by rates of water and heat discharge into shallow subsurface reservoirs and the conduit. In some geysers, small amounts of water discharge prior to a main eruption ('Preplay') can affect eruption intervals. Water discharge during preplay reduces the hydrostatic pressure, which in turn, induces boiling of water that is at, or near the critical temperature. Ascending steam slugs from depth can also lead to shorter eruption intervals (Namiki et al., 2014). In April 2014, we carried a five day experiment at Lone Star Geyser, Yellowstone National Park. Eruptions and their preplays were recorded with an infrared sensor that measured temperature variations immediately above the geyser cone (3.4˜m high), temperature loggers that measured water temperature at the base of the cone and in the outflow channels, water discharge, and visual observations. At Lone Star Geyser, during the preplay phase of the eruption, mainly liquid water is erupted, whereas the main phase of the eruption begins with the liquid-water dominated eruption and turns into the steam discharge. The temperature rise in an outflow channel indicates the occurrence of preplays and initiation of the main eruption. The acquired data suggests that the preplay patterns of Lone Star Geyser are vigorous and complex, consistent with previous observations (Karlstrom et al., 2013). Our new observations reveal two typical styles: 1) vigorous preplays with few events (<5) and long intervals (>20˜minutes), and 2) less vigorous preplays that include several events (>5) with short intervals (few minutes), and continue approximately for one hour. Probability distributions of preplay durations show two peaks indicating the bimodal activity. The bimodality of Lone Star preplays may be a result of subtle change of temperature distribution in a convecting reservoir which has been observed in laboratory experiments (Toramaru and Maeda, 2013).

キーワード: geyser, preplay, bimodal
Keywords: geyser, preplay, bimodal