論　説

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# 1888 年磐梯山水蒸気爆発に関するノート
## ― (1) 爆発源の位置と噴出方向に関する再検討―

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# Notes on the 1888 Phreatic Explosion at Bandai Volcano
## (1) The Re-examination of the Location of Explosive Source and Direction of Outbursts

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The 1888 phreatic explosion of the Bandai volcano, northeastern Japan, has not been completely explained as yet. The statements and interpretations in the leading article of Sekiya and Kikuchi (1890) were mainly based on circumstantial evidence collected by eyewitnesses including the authors and local residents as well as by the survey of collapsed crater. The inference of the authors that the hydrothermal fluid might be located beneath Kobandai-san has not been examined or verified as yet.

We attempted to qualitatively validate this inference by considering a simple physical model with a pressurized spherical cavity within an elastic half space. The underground model parameters were deduced from currently observed three-dimensional velocity structure underneath the volcano as well as from recent volcano-seismic information. We evaluated the spatial distributions of the maximum tensional stresses along the free surface as well as along the circumference of the cavity. We assumed that when the tensile stress exceeds the tensile strength of the host rock, tensional fractures would form, and consequently, hydrothermal liquid would escape from the cavity.

Detailed comparisons of the numerical evaluation with the reported observations by Sekiya and Kikuchi (1890) and others confirmed that the explosive source was not located beneath Kobandai-san (the collapsed mountain) but beneath the Numano-taira (the old crater). This result provides counter-evidence for Sekiya and Kikuchi's inference and is contrary to the popular belief motivated by their inference.

**Key words** : Phreatic explosion, Bandai volcano, Explosion crater, Bulge structure, Directed outburst

### 1. ノートについての序言

磐梯山噴火は 1888（明治 21）年 7 月 15 日に起きた．噴火直後に現地を踏査した Palmer (1894) はその印象を「近年日本で起きた最大の悲劇であり，そして世界の歴史の中で最も驚くべき火山爆発の 1 つとして記憶に残るものである」と述べている．水蒸気爆発の規模は世界最大級のものであった (Barberi *et al*., 1992)．それから 120 余年が経過しているが，この噴火過程を論じた現今の論文の中には未だ相反した解釈が散見される（浜口, 2010）．また，水蒸気爆発や山体崩壊のメカニズムについても多くの未解明な事柄が残されたままになっている（中村・青木，1993）．

噴火が起きた明治の中期には，今日のように計器観測にもとづく客観的データはなかった．噴火解明の手掛りとなる残されたデータは現地の人々の目撃情報とわずかな写真，それに直後に現地入りした研究者自身によって

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