

## Field Occurrence of Hitomi-dani Composite Dike, Kawakami, Nara Prefecture

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<http://earth.nara-edu.ac.jp/wada/Wada.htm>

### 1. Introduction

We reappraised the Hitomi-dani dike in central Kii peninsula, southwest Japan. Although the dike was thought to be a simple dike composed only of quartz porphyry, new field and laboratory data show that it is a composite dike consist of marginal basaltic andesite (BA) and central quartz porphyry (QP). Then we present field occurrence, microscopic texture and bulk chemical composition of the Hitomi-dani composite dike.

### 2. Field Occurrence, Microscopic Textures and Chemical Compositions

#### Field Occurrence

The Hitomi-dani dike is exposed at Hitomi-dani valley in Kawakami village, Nara prefecture., and strike and dip are N80E and 90 respectively. The width of dike varies from 8.5 to 9.5m, and the widths of BA and QP also vary. In BA, glassy chilled margin against wall rock and cooling joints perpendicular to wall rock is developed. Characteristically wavy elongated granite enclaves (GRE: Figure 1), up to 1m long, with spherulites are included in the central part of the southern BA. Those enclaves often include amoeboidal basaltic andesite enclaves with fine-grained margin (BAE-1). On the other hand, QP also includes amoeboidal basaltic andesite enclaves (BAE-2) near the boundary between BA and QP. At the boundary between BA and QP there is no chilling structure near the their margins.

#### Microscopic Textures

In BA phenocrysts of plagioclase, quartz, clinopyroxene and orthopyroxene are included in intersertal groundmass. The quartz phenocrysts are mantled by clinopyroxene. QP includes plagioclase and quartz phenocrysts set in microgranitic groundmass, associated with micrographic granite enclaves. GRE is microgranitic and includes clinopyroxene showing hour-glass structure. In mafic enclaves BAE-1 and -2 plagioclase and cpx-mantled quartz are included as phenocryst. All of these microscopic textures strongly suggest that mixing of mafic magma and granite pluton or felsic magma on the way to be cooled and solidified (Vernon, 2004).

#### Chemical Compositions

On the total-alkali vs. silica diagram the sample from BA is plotted in basaltic andesite field, and the samples from QP and GRE are plotted in rhyolite field. In addition, QP and GRE samples show similar patterns on the spider diagram.

### 3. Inferred Emplacement Process

Observations in the field and the laboratory mentioned above following processes are inferred:

- (1) BA magma was intruded into the granitic body. At that time, the body was hot and not solidified on the way to be cooled. Then BA magma was inhomogeneously mixed with a part of the granite body to make BAE-1.
- (2) BA magma associated with irregular-shaped fragments of hot granite (GRE) including BAE-1 was intruded into cold host rock to make a mafic simple dike (BA dike formation).
- (3) QP magma was intruded into hot BA dike to make a composite dike. At this time QP magma eroded BA dike and BAE-2 was included in QP dike.



図1. 人見谷複合岩脈の縁部を構成する玄武岩質安山岩 (BA) に含まれる伸長した花崗岩包有物 (GRE). スケールは長さ1m.

**Figure 1.** Elongated granite enclaves (GRE) in marginal basaltic andesite (BA) of the Hitomi-dani composite dike. Scale bar is 1m long.