

Sequence of magma discharge rates of the 1707 Hoei eruption of Fuji Volcano, Japan

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We revealed the sequence of magma discharge rate of the 1707 Hoei eruption of Fuji Volcano based on the historical documents and geological data. Hoei eruption began at Dec.16th,1707A.D. and continued for about half month with many eruptions making pyroclastic fall deposits (Hoei Scoria). The variation of eruption scale will make the vertical variation of grain size of the tephra. Then, we estimated the time of deposition for many fall units with the assumption that the grain size change at the time when the eruption intensity changed. The time of changing of eruption scale is presumed by the historical documents.

The time of deposition for the four tephra groups (Ho-I to IV; Miyaji, 1984) and several fall units which are involved to these groups have been determined as follows: Ho-I: the coarse pumice layers at the bottom of Hoei Scoria, were formed during before the noon at Dec.16th when the eruption occurred to the late afternoon at 16th when the color of the volcanic ejecta changed from white to black. Ho-II: the coarse scoria layers overlay Ho-I, were formed during the evening at Dec.16th to the morning at 17th when the grain size of ejecta changed from coarse to fine. Volcanic activity declined during the late afternoon to the evening at Dec.16th. Ho-III: the alternation of coarser to fine scoria beds and coarse volcanic ash beds, were formed during the morning at Dec.17th to the evening at 25th when the volcanic eruptions occurred in active and in sedative alternately. The volcanic ash layers of Ho-III may have formed at the periods of declination of eruptions. Ho-IV: the lower consist of coarser scoria beds and the upper of finer scoria beds, were formed during the evening of Dec.25th when the eruptions became rather active to before dawn of Jan.1,1708A.D. when the eruptions ceased completely.

The sequence of magma discharge rates of the 1707 Hoei eruption based on the volume of Ho-I to Ho-IV (Miyaji,1993) and the duration time of eruption mentioned above have been clarified. The magma discharge rates in average for Ho-I and Ho-II are $7 \times 10^{-3} \text{ km}^3(\text{DRE})/\text{h}$ which are the maximum during 1707 eruptions. While the rate in average for Ho-III declined to $0.8 \times 10^{-3} \text{ km}^3(\text{DRE})/\text{h}$ except for the active periods at when the rates increased to 1 to $3 \times 10^{-3} \text{ km}^3(\text{DRE})/\text{h}$. The rate in average for Ho-IV grew to $2 \times 10^{-3} \text{ km}^3(\text{DRE})/\text{h}$, especially at the first half period when the rate increased rapidly to $4 \times 10^{-3} \text{ km}^3(\text{DRE})/\text{h}$.