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Water control on variation in eruptive style during the first eruptive episode of the Barombi Mbo Maar, Cameroon
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The first eruptive episode of the Barombi Mbo Maar is represented by about 60m thick pyroclastic material. Approximately 20m of this display a contrasting bedding and grading in sustained thinly well-bedded succession of ash- and lapilli-beds, low concentration turbulent pyroclastic flow, bombs- and highly vesiculated scoria-rich bed, and lithic- and xenolith-rich explosive breccia, while the other part, under the lake level is mainly covered by the vegetation. The sequence of volcanic activities that sustained the settling of these materials developed subsequently in four eruptive phases: phreatic ? phreatomagmatic - strombolian - phreatomagmatic. This variation in eruptive style is consistent with recent studies of the deposit stratigraphy, regarding lithofacies from individual accessible beds of the deposit unit, the grain-size distribution and the componentry. Our results suggest that eruption style changes can be interpreted as follows: initially, a rising magma interacted with potential surface water coming from the collapse of part of an ancient maar wall to produce series of phreatic eruption. The scar of this older maar visible at the west of the Barombi Mbo Maar is consistent with this observation. Assuming that the volume of water was important, the phreatic activity continuously produce ash and lapilli and ended with a phreatomagmatic style represented stratigraphically by a pyroclastic surge. In the course of the eruptive activity, water might have become exhausted giving rise to a more strombolian style mixed by phreatomagmatic material, as suggest by the presence of several centimeter- to decimeter-sized of spatter bombs and vesiculated scoria, mantle xenoliths and country rocks above the surge layer. The eruption would have generated cracks in the basement rocks through which water was re-supplied into the hydrothermal system after a short repose period. Then a new magma source interacted with the groundwater and the phreatomagmatic activity continued with more violence, unraveling the crystalline basement to produce the phreatomagmatic ash, mantle xenolith and country rock fragments-rich explosive breccia.

キーワード: Barombi Mbo Maar, Eruptive styles, Phreatomagmatic eruption, Strombolian activity, Stratigraphy, Cameroon
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