KIMBERLITES: DESCRIPTIVE GEOLOGICAL NOMENCLATURE AND CLASSIFICATION

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We present a new approach to the nomenclature, classification and interpretation of kimberlites and other complex and unusual rocks encountered during diamond exploration. As far as possible, we align kimberlite terminology with that of mainstream volcanology to present a scheme that is practical, applicable by geologists of varying experience levels, and relevant to the economics of diamond deposits. Reliable evaluation and mining of primary diamond deposits is founded on a good understanding of the geology of kimberlites and related rocks. Description, classification, and interpretation of these rocks underpin the development of three-dimensional geological models which are essential for understanding diamond distribution and generating reliable resource estimates.

The five-stage scheme is subdivided into two broad parts: observations (Stages 1 and 2) and progressive interpretation (Stages 3 to 5). Stage 1, background information (including setting and contacts), and Stage 2, rock description (alteration, structure, components, texture), involve only limited genetic interpretation. The components of samples are ascribed to three classes or groups: crystals, in particular olivine (phenocryst and xenocryst); compound clasts which are magmaclasts, accretionary clasts (pyroclastic and sedimentary) and lithic clasts (xenolith, autolith); and interstitial matrix (groundmass and mesostasis, interclast cement or clastic matrix). Magmaclasts include melt-bearing pyroclasts and melt segregations. Two new terms are proposed for the common components of most pyroclastic kimberlites, i.e. pyromagmaclast and pyrocryst, to describe melt-bearing pyroclasts and melt-free crystals liberated during pyroclastic eruptions. Where possible, further classification of a rock is based on increasing degrees of genetic inference. Stage 3, petrogenetic classification, includes the parental magma type and mineralogical classification. Stage 4 is the broad textural-genetic classification into coherent or volcaniclastic, with further subdivision of coherent into intrusive or extrusive and volcaniclastic into pyroclastic, resedimented volcaniclastic or epiclastic. Stage 5 involves the more detailed genetic/process interpretation. The level to which the scheme can be applied, and thus the degree of confidence in the outcome, depends not only on the nature of the rocks, but also the experience of the user with these rock types. Understanding the different and varying degrees of confidence in the conclusions is important, particularly in the economic application of the results.

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