

## **After the Canadian Diamond Rush: Insights into Kimberlites and their Evaluation**

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Insights into kimberlites result from investigations undertaken as part of the development of diamond resources. Prior to the Canadian diamond rush landmark publications on kimberlites focussed on the diamond mines of southern Africa and many kimberlite pipes were represented by one summary geological model. This model was applied to other parts of the world, including some of the many hundreds of kimberlites discovered in Canada during the diamond rush. The requisite detailed investigations to develop the Canadian mineral resources, including many in the Arctic, resulted in a wealth of new data. As found elsewhere, the significantly diamondiferous deposits formed from repeated kimberlite magmatism across Canada. Summary geological models for the Canadian discoveries, however, reveal at least three distinct types of kimberlite pipes, only one of which is comparable to the southern African type. The two new types of kimberlite pipes had not been previously recognised and application of the southern Africa model to completely different types of kimberlites misled some evaluation projects. The three contrasting types of kimberlite pipes found in Canada are characterised by fundamentally different emplacement products, processes and, importantly, diamond distributions. Three new summary geological models were developed to (i) provide a norm for comparison or indicate new geological situations, and (ii) act as a guide for the successful application of predictive geology during the development of new resources. Macroscopic petrography, using olivine as a proxy for diamond, further enhances the prediction of macrodiamond contents. Summary geological models and macroscopic petrography, together, improve the assessment of new deposits by maximising the value of expensive drillcores and related materials leading to better evaluation strategies and more reliable and economically relevant geological models. In turn, this increases the degree of confidence in the resulting resource estimates which are used to determine whether the diamonds present can be extracted economically.