Geology of the Fort à la Corne Kimberlites, Saskatchewan, Canada

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The Fort à la Corne (FALC) Cretaceous kimberlite province comprises approximately 70 bodies which occur below 100 m of glacial overburden. Evaluation of these bodies by De Beers Canada Exploration Inc., Kensington Resources Ltd., and Cameco Corporation is ongoing. The FALC kimberlites are shallow saucer to champagne-glass shaped bodies, most of which have diameters of 500-1300 m and depths ranging up to 200 m. No root or diatreme zones and no hypabyssal or diatreme-facies kimberlite have been encountered. The kimberlites were emplaced into poorly consolidated Upper Cretaceous sediments that overlie Palaeozoic indurated carbonates, below which is the Precambrian basement. The bodies formed by two distinct processes: (1) explosive crater excavation and (2) subsequent crater infilling. During stage (1), little or none of the explosively disrupted country rock material was deposited back within the craters. No extra-crater deposits are preserved. The bodies flare out from a well known aquifer at the base of the Cretaceous. It is proposed that the craters were formed by phreatomagmatic maar-like processes. During stage (2), the craters were rapidly infilled, predominantly by subaerial primary pyroclastic processes despite the fact that the kimberlites were emplaced at a time of overall marine deposition. The styles of the pyroclastic eruptions were very variable. Hawaiian-Strombolian style eruptions formed juvenile lapilli tuffs and ash as well as unusual olivine crystal tuffs. The juvenile lapilli include common, sometimes vesicular, amoeboid-shaped examples. These deposits contain beds up to 15 m thick. Much more explosive kimberlite-specific eruption styles result in the formation, within the craters, of unique mega-graded beds (up to at least 100 m thick). These deposits and other textural features reflect the unusual properties of kimberlite magmas, their low viscosities and high CO^2 contents. This emplacement model is different from the classic southern African diatreme model. It is suggested that the FALC model is a second model for kimberlites with the differences primarily reflecting the near surface country rock geology. The data for FALC, validate, rather than negate, the 'classic' southern African diatreme model. The FALC volcanism lasted at least 25 Ma, but the main kimberlite crater formation was confined to the last 5-10 Ma..

Saskatoon 2002

Technical Programme

SS10: The Albian-Cenomanian central Saskatchewan kimberlite field and relationships to Western Canada Sedimentary Basin host strata
Organizers / Organisateurs: **Bruce Kjarsgaard**
Room / Salle: **Atrium**
Date: **5/28/2002**
Time: **4:00 PM**
Presenter: **Barbara H. Scott Smith**

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MAY 27 - 29

From Plains to Shield: The making of a Continent's Interior
Des plains au bouclier: L'intérieur d'un continent

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Geological Association of Canada - l'Association géologique du Canada
Mineralogical Association of Canada - l'Association minéralogique du Canada
Joint Annual Meeting - réunion annuelle conjointe
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