



The internal geology and emplacement history of the Renard 2 kimberlite, Superior Province, Quebec, Canada

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ABSTRACT

The Renard 2 kimberlite is located in the Otish Mountains region of Quebec, Canada and is one of the largest pipes in the Renard cluster. The cluster consists of nine kimberlite bodies and was discovered in 2001 by Ashton Mining of Canada Inc. and its joint venture partner SOQUEM Inc. Renard 2 was emplaced into Archean meta-greywacke derived migmatite, gneiss and granite of the Opinaca Subprovince of the eastern Superior Province at approximately 640.5 ± 2.8 Ma. An undetermined amount of erosion has occurred since emplacement with the present surface expression of the pipe estimated to be 0.75 ha. This kimberlite is interpreted as a steep-sided diatreme with minor irregularities in the external shape. The dominant infill is a massive volcaniclastic kimberlite (MVK) that is classified as tuffitic kimberlite breccia (TKB) and is characterized by a high proportion of granitoid country rock xenoliths. A second dominant infill is a texturally complex, less diluted coherent kimberlite (CK) characterized locally by a transitional textures between CK and TKB. Surrounding the diatreme is a significant zone of variable width comprised of extensively brecciated country rock (+/-kimberlite) and referred to as marginal breccia. In addition to the two main rock types infilling the pipe, a number of hypabyssal kimberlite (HK) dykes and irregular shaped intrusions occur throughout the body, along the pipe contacts, within the marginal breccia and in the surrounding country rock. Geological features displayed by Renard 2 are similar to those described from Class 1 kimberlites of the Kimberley area of South Africa, the Gahcho Kué cluster of Canada and the Pimenta Bueno kimberlite field of Brazil. The economic evaluation of Renard 2 is in progress and to date has included extensive diamond and reverse circulation drilling as well as the collection of an underground bulk sample. Results from material sampled from Renard 2, including a 2449 tonne bulk sample, suggest Renard 2 has an estimated diamond content of 83 cph (carats per hundred tonnes). A three dimension geology model of the pipe has been developed following the investigation of drill cores, subsurface mapping and petrography combined with diamond studies and geophysics. The model produced is being used to guide and direct the evaluation of the kimberlite and unravel the emplacement history of the pipe.

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1. Introduction

1.1. Geologic setting

The Renard cluster consists of nine kimberlite bodies discovered in 2001 by Ashton Mining of Canada Inc. (now a wholly owned subsidiary of Stornoway Diamond Corporation) and its joint venture partner SOQUEM Inc. These are named Renards 1 through 10, with Renards 5 and 6 considered to be one body (Renard 65). The kimberlites were emplaced into the Archean meta-greywacke derived migmatite, gneiss and granite of the Opinaca Subprovince (Percival, 2007) in the James Bay region of Quebec, Canada (Fig. 1). The cluster is located in the northeast portion of the Superior structural province,

which is bordered by Proterozoic rocks of the Labrador Trough in the east and the Grenville Province in the south. Northern portions of the project area are comprised of north–northwest trending plutonic and gneissic terranes. Based on metamorphic grade, mineralogy, lithology and aeromagnetism, the terranes appear to vary in width from 70 to 150 km. Granite–gneiss and retrograde granulite gneiss are the predominant lithologies in the region with lesser amounts of granite and granodiorite. Metamorphic grade is primarily amphibolite facies with local granulite (Percival et al., 1994). The Renard cluster is located at the southern end of the structural feature known as the Mistassini–Lemoyne Tectonic Zone (MLZ) that is defined by north–northeast lineaments and faults (Portella, 1980; Thériault and Chev , 2001). Moorhead et al. (2003) believe this may have had some control on the emplacement of the Renards. The larger kimberlites in the cluster are elongate in a north–northwest orientation, aligned parallel to late faults and diabase dykes of the 2475 Ma Mistassini swarm (Heaman,

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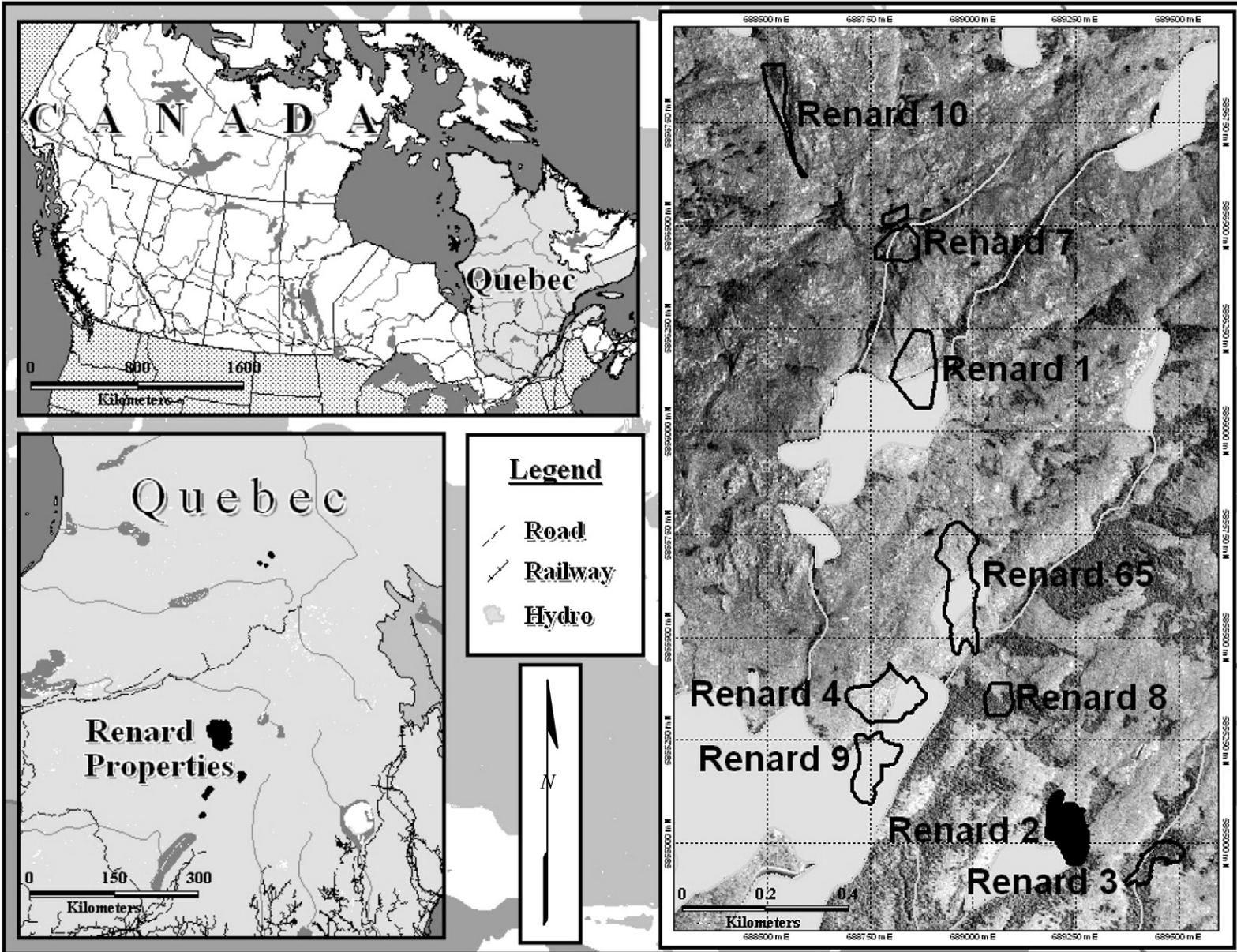


Fig. 1. The Renard kimberlite cluster, in Quebec, Canada. On the right are the plan view outlines (black outline) of the Renard bodies and the location of Renard 2 (filled with black) relative to these.

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