Re-Os systematics of the Platreef (Sandsloot mine) of the northern limb of the Bushveld Complex

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The Platreef is an erratic zone of PGE enrichment located at the eastern contact of the northern limb of the Bushveld. The Platreef traditionally has been viewed as roughly equivalent to the Merensky reef of the main Bushveld complex, but this view has recently been challenged. We report Re-Os isotopic results from the Sandsloot Platreef mine which bear on this debate. Samples include 5 pyroxenites, 1 serpentinite, and 4 "parapyroxenites" (highly altered, pyroxene-rich rocks thought to result from mechanical mixing of ultramafic magma with metasomatized dolomitic wall rock).

Os and Re contents range from 4 to 56 ppb and from 3 to 18 ppb respectively, and show no systematic variation between rock types. The pyroxenites define an isochron of 2011 ± 90 Ma (including regression, spike calibration and decay constant uncertainties; MSWD = 3). This age agrees with that obtained from the Turfspruit Platreef locality[1], and with the accepted Bushveld age. The parapyroxenite and serpentinite results scatter about the pyroxenite correlation, indicating recent Re/Os disruption in these highly altered rocks. The initial $^{187}Os/^{188}Os$ ratio of the pyroxene isochron is 0.1855 ± 0.0023. This value is much higher than those of most Bushveld samples[2], but only slightly higher than those of laurites[3] and pyroxenite[2] from the Merensky (0.170-0.182), suggesting a genetic link between the Platreef and the Merensky. These radiogenic ratios indicate that both horizons experienced extensive crustal contamination. The higher initial ratio of the Platreef suggests slightly more extensive assimilation in a crustal magma chamber or superposition of minor local contamination on a crustal signature acquired at depth, as proposed to explain Platreef oxygen isotopes[4].

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References

[1] Ruiz J, Barra F, Ashwal LD, and Le Grange M (2004) *Geoscience Africa*, 564.

[2] Schoenberg R, Kruger FJ, Nägler TF, Meisel T, and Kramers JD (1999) *EPSL* **172,** 49-64.

[3] Hart SR and Kinloch ED (1989) *Econ. Geol.* **84,** 1651-1655.

[4] Harris C and Chaumba JB (2001) *J.Petrol.***42,** 1321-47.