

1 **Geochemical signatures of stream sediments within the main**  
2 **geological domains and terranes of North and Central Madagascar**

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18 **ABSTRACT**

19 Geochemical mapping of North and Central Madagascar was carried out using stream  
20 sediments at an average density of one sample per 11 km<sup>2</sup>. Over 50 elements were  
21 determined from some 13,300 stream sediments using a sample size fraction of <150  
22 µm following hot *aqua regia* digestion. Partially extractable concentrations of six  
23 major elements and seven base metals reveal that the Andriamena 'greenstone' Belt of  
24 the Tsaratanana Complex is geochemically distinct from the other geological  
25 divisions within the Precambrian basement of central and northern Madagascar. In  
26 particular, this study has shown the detailed spatial distribution of anomalous  
27 concentrations of base metals which confirm known areas of chromite mineralisation  
28 within the Andriamena Belt. Base metal anomalies also occur in relation to  
29 Cretaceous and Neogene volcanic rocks, for example at Nosy Be, and mafic-  
30 ultramafic intrusions such as along the Maroala deformation zone. The distribution of  
31 anomalous Au in stream sediments showed good correspondence with known gold  
32 districts of central and northern Madagascar. Highest concentrations were measured  
33 in stream sediments from within the Ampasary-Mananjary (southern Androna-  
34 Mandritsara) and Andavakoera (northern margin of North Bemarivo) gold districts.  
35 The results of the stream sediment geochemistry show that these new data provide  
36 valuable information for current and future mineral exploration and environmental  
37 studies in Madagascar, at both regional and local scale.

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39 **KEYWORDS:** Stream sediment geochemistry, Base metals, Au deposits,  
40 Precambrian basement, Geochemical signature