

PREVIEW

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## Back to the Otjosundu manganese deposit: an integrated structural, petrological and geochronological study

Alexis Plunder<sup>1</sup>, Benjamin Le Bayon<sup>1</sup>, Florence Cagnard<sup>1</sup>, Marc Poujol<sup>2</sup>, Nathan Cogné<sup>2</sup>, and Laurent Bailly<sup>1</sup>

<sup>1</sup>BRGM, F-45060 Orléans, France

<sup>2</sup>Université de Rennes, CNRS, Géosciences Rennes - UMR 6118, F-35000 Rennes, France

*The Otjosundu area contains one of the most important Manganese deposit of Namibia. An exploration campaign in the late 2000's acquired an extensive dataset (fieldwork, drillholes, geophysics and petrological data) to improve our knowledge of the deposit. The geological history is however, ill-studied and the deposit is classically attributed to banded iron formation of the Sturtian Chuos formation from the Damara sequence.*

*Using samples from drillholes, we here provide Pressure-Temperature-time constrain using thermodynamic modelling and LA-ICP-MS U-Pb ages on zircon, monazite and apatite to decipher the regional metamorphic evolution. Our petrological study concludes that the Otjosundu Mn deposit is affected by a HT-MP metamorphic event, estimated at ~670°C and 0.6. This HT-MP metamorphism is associated to a strong ductile deformation with development of shear zones, and multiple-scale intense folding. These metamorphic and structural features totally preclude the description of a typical sedimentary sequence, on which the previous authors had based their classical lithostratigraphic comparison. We date this HT metamorphic event at ca. 525Ma using U-Pb ages on monazite in paragneisses and in a granite, and U/Pb ages on zircon in the same granite.*

*Detrital U-Pb ages on zircon reveal that the maximum deposition age is at ca. 540Ma. This excludes the attribution of the gneisses surrounding the Mn deposit to the Sturtian Chuos Formation challenging the prevailing interpretation of this ore deposit. Detrital U-Pb ages on zircon also record older magmatic events at ca. 620 and 585 Ma, which are well-known regionally, but were not previously documented in the Otjosundu area. Finally, U-Pb ages on apatite (490±3Ma) highlight a late thermal event (hydrothermal or static metamorphism). Results of this study illustrates the importance of characterizing the entire geological history of an ore deposit, to improve the future exploration.*