

further deformed during Palaeozoic to Mesozoic tectonic with magmatic episodes recorded by extensive alkaline ring complexes that intrude the Air Massif and Damagaram Inlier, as well as, NW- and NE- trending conjugate brittle faults that may be associated with the amalgamation and/or subsequent break up of Pangea. Subsequently sedimentary rocks were deposited over the Trans-Sarahan Mobile Belt during the Palaeozoic.

The prolonged tectonic history of Niger has provided many opportunities for fluid generation and resultant mineralisation. The recently acquired and interpreted potential fields data allows a more thorough assessment of the mineralisation potential within the Air Massif, Damagaram Inlier and South Maradi Promontories, in some cases providing a more coherent look at the geological units than has previously been allowed to the paucity of outcrop in much of the area.

A three-dimensional Weights of Evidence Model for the Drummond basin in NE Queensland: quantitative assessment of controlling variables for epithermal Au

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In this contribution we report results of a mineral potential mapping study of the northern part of the Drummond Basin and Anakie Inlier. These areas are well endowed with epithermal Au, containing economic mineral deposits such as Pajingo, Mount Coolon and Glen Eva, representing classical examples of low-sulphidation, adularia-sericite type gold systems.

WofE (Weights of Evidence) is a GIS approach that assesses the likelihood of finding a mineral deposit of the sought type, in the region of interest. The method uses fuzzy logic derived from expert systems to assign the Weights of Evidence necessary during the construction of binary predictors, which are subsequently combined using the Bayes rule of combination to produce a probability surface (G. Bonham-Carter, 1994, *Geographic information systems for geoscientists: modelling with GIS*, Pergamon, v. 13, 398 p.). When constructing a regional scale, 3D mineral potential model substantial subsurface geological information is desirable. However, such subsurface data is often limited, rendering the extension of this methodology in 3D difficult.

We show possible solutions to this problem by using a range of geophysical inversion tools to estimate depth of intrusions, but also using geochemical regression to depth based on a

combination of Factor Analysis and 3D WofE. Experimental analysis on the geochemical component was based on selected tables queried from the Terra Search database (training dataset).

The advantage of using a 3D WofE model can be debated. However, initial results show that the use of geophysical information improves predictors (e.g., magnetic WORMS help distinguishing between real edges and false edges of intrusions, often misleading because of the surface relationships with cover sediments). Preliminary results show that 3D WofE may also provide a way to reconstruct geochemical signals undercover.

Geomorphology, crocodiles and mineralisation in Morobe Province PNG

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PNG is renowned as a Late Miocene-Pliocene gold province. Gold occurs commonly in fault-controlled epithermal systems associated with andesitic-dioritic stocks, some notable as Cu-Au porphyries, and others clearly as sub-volcanic intrusives. These deposits now lie in extremely rugged, heavily incised mountains. Past modelling of such deposits generally assumed that they formed in a geomorphologic setting akin to that of the present. To the contrary, extreme incision of meandering antecedent rivers through mountain ranges as high as 3 500m, the presence of Pliocene coralline limestones at altitudes of 2500m and local inversion of Pliocene fluvio-lacustrine to shallow-marine sedimentary basins to altitudes of 2 500m indicate very rapid Late Pliocene to Present uplift. Conclusive evidence for the Late Pliocene geomorphologic setting comes in the form of crocodile teeth in the Pliocene Otibanda Formation of the Bulolo depression, now surrounded by 2000-3000m high mountains

These observations confirm that in Late Miocene to Pliocene times, much of the then forming PNG mineralised belt was a terrain with a low relief and wide alluvial plains flanked by swamps and marginal seas. Such a setting would permit the easy ingress of large volumes of water into the thermal systems producing mineralisation; indeed such deposits as the extremely rich volcanic-hosted Tolukuma mineral field could well have formed in an environment similar to that of Lihir today.