

Molybdenum isotopic composition of pre-GOE tidal carbonates

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The Transvaal Basin in South Africa contains one of the best preserved carbonate platforms of the Archaean. This platform was deposited between ~2.58 and 2.50 Ga [1], shortly before the 2.40-2.32 Ga great oxidation event (GOE) and is composed of alternating stromatolitic carbonates and shales. The depositional environment of the Transvaal Basin is very similar to modern tidal areas.

Variations in the isotopic abundance of the redox-sensitive transition metal molybdenum have been used in the past few years to constrain the redox conditions of Earth's atmosphere-hydrosphere system in the present and the past [2, 3]. Interestingly, carbonates and black shales from the slope of the Griqualand West Basin in South Africa, which can be well-correlated to the Transvaal Basin, shift towards heavy $\delta^{98/95}\text{Mo}$ values, which might indicate an oxygenation of the atmosphere-hydrosphere system some 100 Ma before the GOE [4, 5]. In our study we determine the Mo content and $\delta^{98/95}\text{Mo}$ composition of tidal carbonates from the platform of the Transvaal Basin, which precipitated in shallow waters and compare them to the contemporaneous deeper platform deposits of the Griqualand West Basin, in order to investigate the influence of sedimentary settings on Mo isotopic signatures. The very low Mo concentration of the carbonates generally lies around 20 ppb and most of our data cluster from +0.2 to +0.6‰ $\delta^{98/95}\text{Mo}$, but our preliminary results also reveal highly variable $\delta^{98/95}\text{Mo}$ signatures between -0.7 and +1.4‰ and indicate an influence of the depositional environment of the stromatolites on their Mo isotopic composition. This observation might be an important aspect for future interpretation of Mo isotopic compositions of chemical sediments.

[1] Sumner & Beukes (2006) *SAJG* **109**, 11-22. [2] Barling *et al.* (2001) *EPSL* **193**, 447-457. [3] Siebert *et al.* (2003) *EPSL* **211**, 723-733. [4] Voegelin *et al.* (2010) *Precambrian Res.* **182**, 70-82. [5] Wille *et al.* (2007) *GCA* **71**, 2417-2435.

Geotechnical assessment of the rock masses in Düzyurt area (Trabzon, NE Turkey)

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In this study, geological, hydrogeological, geotechnical properties of the rock masses in the Düzyurt Area (Trabzon, NE Turkey) were investigated. Engineering properties of geotechnical units were determined in two stages; surface and subsurface studies. Borehole applications, *in situ* testing, scan-line surveys (discontinuity direction, persistence, spacing, opening, roughness infilling material and RQD) and seismic surveys were conducted for description of geotechnical units and determination of vertical and horizontal homogeneity of these units in the site. *in situ* lugeon tests were applied for determination of bedrock permeability. During core drilling, lugeon tests were conducted and permeability of the rock masses is calculated. A total of 16 pumping tests were performed at the site in 5 boreholes. Based on the lugeon test results, permeability coefficients were calculated about 1.88×10^{-8} m/s for whole bedrock consisting of mainly limestone. According to the results, 1/2000 scaled engineering geological map was prepared. In the laboratory studies, physical and strength properties were determined on the samples collected from the boreholes and rock blocks in the geotechnical units. Rock mass strength was calculated with Hoek-Brown empirical approach using by data obtained from laboratory studies and scan-line surveys. Engineering properties of rock masses were performed with RMR system and durability of slopes in the area was investigated using kinematic analysis. GSI value for rock masses were calculated as 50. Based on the excavatability analysis of the rocks using seismic wave velocity and geotechnical properties of the rock mass, the excavatability category of rock masses is moderate-hard ripping.