

ALEX DU TOIT

MEMORIAL LECTURES



36th A L du Toit Lecture: Eight boreholes and three tunnels: ICDP Project BASE probes the Moodies Group of the Barberton Greenstone Belt

FEBRUARY
2024

CHRISTOPH HEUBECK

Christoph Heubeck is a German regional geologist, sedimentologist and stratigrapher studying deformed sedimentary basins at the pore- to basin-scale worldwide. Following his undergraduate degree at Würzburg University, Germany, he completed his MSc degree in Austin, Texas, and his PhD at Stanford University, California, all in Geology, the latter with research on the Moodies Group. After six years of international assignments in the oil and gas industry with Amoco and BP, Christoph returned to Germany to take up a faculty position at the Freie University Berlin, where he worked with students in the field in South America, China and Kazakhstan. He returned to the Barberton Greenstone Belt with his own students in 2008 and has been active in the region ever since. Community involvement has included the R40 Geotrail and the Barberton-Makhonjwa Mountains World Heritage Site. Academic projects include developing the potential of the BGB in Eswatini and co-coordinating the ICDP research drilling program BASE. Christoph is currently Chair of General and Historical Geology at Friedrich-Schiller-University Jena, Germany.



LECTURE SERIES

Lecture 1 : Stellenbosch University, Western Cape

Date: Thursday, 15 February 2024

Venue: WP de Kock Lecture Hall, Room 1004

Time: 18:00 for 18:30

Contact: Dr Tahnee Otto : tahneeotto@sun.ac.za

Lecture 2 : University of Free State, Bloemfontein

Date: Tuesday 20 February 2024.

Venue: Lecture Hall 1, Geology Department

Time: 17:00 for 17:30

Contact: Ernest Moitsi : moitsime@ufs.ac.za

Lecture 3 : University of the Witwatersrand, Johannesburg, Gauteng

Date: Thursday 22 February 2024

Venue: 'GLT' ground floor Geosciences Building, East Campus, Wits University, Braamfontein

Time: 18:00 for 18:15

Contact: Dr Grant Bybee : Grant.Bybee@wits.ac.za or Robyn Symons : robyn.symons@wits.ac.za

Lecture 4: University of KwaZulu-Natal, Durban, KZN

Date: 26 February 2024

Venue: UKZN Westville Campus, Senate Chamber

Time: 17.00 for 17.30

Contact: Dr Tanja Reinhardt : Reinhardt2@ukzn.ac.za



36th A L du Toit Lecture: Eight boreholes and three tunnels: ICDP Project BASE probes the Moodies Group of the Barberton Greenstone Belt

Units of the up to 3.7 km thick Moodies Group (~3.22 Ga) of the Barberton Greenstone Belt, South Africa and Eswatini, comprise some of the oldest and best-preserved, sedimentary strata on Earth. They were deposited within a time span of only a few million years in alluvial to pro-deltaic settings, with a dominance of coastal plains and tidal deltas. The strata consist of widespread quartzose, lithic, tuffaceous and arkosic sandstones, polymict conglomerates, common siltstones and shales, and rare BIFs and jaspilites, all interbedded with rare dacitic air-fall tuffs and several lavas. Moodies Group strata preserve abundant sedimentary structures and represent a very-high-resolution record of Paleoproterozoic surface processes. Microbial mats, early diagenetic vadose-alteration zones and tidal rhythmites are locally common. Moodies Group strata provide a unique opportunity to investigate Paleoproterozoic surface environments and to constrain the conditions under which bacterial life spread and thrived in coastal-zone and terrestrial settings on Early Earth.

The ICDP Barberton Archean Surface Environments (BASE) Project drilled eight inclined boreholes of 280 to 497 m length through steeply inclined or overturned Moodies Group strata between November 2021 and July 2022. The unweathered and continuous core record was complemented by sampling in three several-km-long tunnels and by detailed surface mapping. Two to three rigs operated concurrently, delivering 20 to 60 m of high-quality core daily. This core was processed in a large, publicly accessible, hall in downtown Barberton. An exhibition provided background explanations for visitors and related this fundamental-geoscience research project to the geology of the Barberton-Makhonjwa Mountains World Heritage Site. The archive half of the core, nearly 3 km total, remained in South Africa, the working half is curated at the ICDP core repository in Berlin, Germany.

