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## Bringing Order to Chaos: Micromorphological Analysis of Late Palaeozoic Glacial Diamictites

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The Late Palaeozoic Ice Age (LPIA) is Earth's most recent, severe glacial epoch and in Namibia experienced its acme at about 300-298 Ma. The record of the glaciation in southern Africa is exceptional, and many of the deposits consist of poorly-sorted diamictites of the Dwyka Group that were deposited beneath glaciers or at their margins. The study of these deposits has often been neglected, because sedimentologists have tended to regard these deposits as complex, massive, or confusing. New quantitative approaches to oriented samples developed in the course of Quaternary glacial studies is beginning to change this, and thus this study will consist of a detailed evaluation of oriented diamictite samples recovered from northern Namibia (Opuwo) the Aranos Basin (central-southern Namibia) and the Karasburg Basin (Namibia-South Africa border). The aim of this Masters project is to produce a substantial new set of directional data. Previous authors have proposed diverse and often conflicting ice-flow directions from different data sources, and it is hoped that this controversy can be resolved.

Oriented samples were collected during fieldwork in 2019 and 2023 from five different locations. Each was cut in three directions, ie "north-south"-, "east-west"- and "top"-orientations, and thin sections were prepared from these, which were then scanned in high resolution. These scans are being quantitatively analysed using the "microstructural mapping" method proposed by Phillips et al. (2011). Measuring the direction of the longest axis of the grains in each oriented thin section will be achieved using CorelDraw. The data from CorelDraw is then exported to OpenStereo, a program which is used for structural geology analysis, to draw rose diagrams of clast orientation. The rose diagrams from each sample will thus represent three sides of a cube, and this "pseudo cube" will allow the orientation of clasts to be characterised in 3D space. From this, an understanding of the dynamics of sediment deformation, and thereby ice flow orientation, will be determined. At PANGEO, preliminary results will be presented.

The main goal of my thesis is to contribute to a nuanced paleo-reconstruction through a better understanding of glacial dynamics in the LPIA. This will not only improve understanding of ancient glacial environments in Namibia but also further the understanding of contemporary glacial behaviour through exploitation of well-preserved samples. Given the complex issues in unraveling past ice flow in ancient rocks, many datasets have been combined by previous authors to achieve this (striation orientations on bedrock, crossbed orientations etc). By contrast, this will be the first large and significant database of flow directions from the LPIA sedimentary record of Namibia drawn from one single source.

**Session:** *Pangeo workshop: Glacial erosion and deposition*

**Keywords:** *diamictite, Namibia, LPIA*