

## SESSION: Antarctic and sub-Antarctic earth science

### MARS Themes:

Earth Systems Observations

### Title:

Geological and Geophysical Research in Western Dronning Maud Land, Antarctica. Fieldwork, Laboratory Methods, History and Progress over ~40 years

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### Abstract:

Fieldwork typically starts ~a week after arrival at SANAE, a week being used for packing equipment, fuel and food, snowmobile training and operation before traveling overland and setting up camp in the area of planned survey up to ~300kms from SANAE. Operating with 2-4 people per team using Scott Polar tents for sleeping, cooking and ablutions and travelling up to ~50kms a day to selected safe sites, fieldwork comprises collecting samples for age- dating, whole-rock major, trace element and radiogenic isotope chemistry and mineral chemistry. Additional data collected includes structural measurements of orientations of layering, folding, faulting and shear zones. Before returning to base and South Africa, one can count on 20 – 25 days of fieldwork during the 5-6 week period in the field with almost half being lost to bad weather. Back in SA whole-rock chemical analysis using XRF (major elements) and ICP-MS (trace elements), follows on from sample preparation involving thin sectioning, crushing and milling of a small aliquot (100gm) to a very fine powder, the powder being used in various quantities for the different methods including radiogenic isotope analyses used to fingerprint minimum source rock age. Mineral chemistry using EMPA or SEM's with ED analytical capabilities is used to determine mineral chemistry compositions to calculate P-T conditions of genesis. LA-ICPMS and Noble gas spectrometers are used to determine ages of selected minerals eg. Zircon, biotite mica and amphibole. Paleomagnetic orientations are measured from oriented samples collected in the field. From the data maps are compiled of rock type, structural data and age data from the different methods, the maps summarizing data spatially in GIS. These data and maps are then compared and integrated with data from surrounding areas and continents contributing to the understanding of Gondwana evolution. A brief summary of the research results over 40 years will be shown.

### Format:

Oral presentation

### Keywords: (add ; between keywords)

Geology, geophysics, Western Dronning Maud Land, Antarctica