



New zircon U/Pb age data from the Archaean craton, South-West and southern West Greenland (61°30'N - 64°00'N)

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We present a large new regional age dataset from the Archaean craton of South-West and southern West Greenland between 61°30'N and 64°00'N. The new rock dating program was initiated under the framework of a joint 3-year project (2008-2010) between GEUS and Greenland's Bureau of Minerals and Petroleum that involved new field work and sampling of the entire area. The overall aim of the project is to develop a better understanding of the geological history of the Archaean craton of South West and southern West Greenland, and through this, promote the area towards the industry and future mineral prospectors.

The new age data are all zircon U/Pb data that were obtained by LA-ICP-MS at GEUS. The standard setup at GEUS utilises a Finnigan Element2 ICP mass spectrometer with a New Wave 213 nm UV laser for ablation (Frei & Gerdes, 2009). The accuracy and precision of the ages obtained were routinely ascertained from repeated analyses of the Plesovice, which over the data acquisition period gave a $^{238}\text{U}/^{206}\text{Pb}$ age of 339.3 ± 0.7 Ma (2σ , $N=543$), in perfect agreement with the published value. Due to the possibility of a high throughput in the laboratory, a large number of grains (>100) were typically analysed per sample. This was done in order to ensure a proper statistical basis for deciphering individual age components in these polymetamorphic rocks.

About 270 age peaks were identified from ca. 120 samples of mainly orthogneisses, granites and pegmatites, plus some samples of anorthosites, quartz diorites and mica schists. The new dataset represents a significant contribution to the existing age database for the South West and southern West Greenland, and particularly so, for the less well investigated area south of Frederikshåb Isblink. The dataset and interpretation is presented as a series of thematic age maps covering inherited ages and the timing of gneiss protoliths intrusion, tectonometamorphic events (early and late deformation phases), and late to post-kinematic intrusions.

From the distribution of ages, the following key patterns emerge providing new insights into the magmatic and tectonometamorphic history of the region:

- Intrusion ages of the gneiss protoliths generally decrease from south to north with the oldest ages (ca. 2.92-2.98 Ga) occurring around Sermiligaarsuk fjord and the youngest ages (ca. 2.80-2.83 Ga) in the Buksefjorden area.
- Older, mainly inherited ages (ca. >3.0 -3.2 Ga) are widely distributed throughout the region, but are particularly abundant in the northern area around Ameralik fjord, and in the central part of the Fiskebøl region, where a large enclave of older gneisses occur (see conference abstract by Kokfelt et al.).
- The main tectonometamorphic event occurs earlier in the southern area (ca. 2.86-2.82 Ga), compared to the northern area (ca. 2.80-2.76 Ga), whereas the late tectonometamorphic event is simultaneous in the northern and southernmost areas (ca. 2.73-2.69 Ga).
- A granulite facies event occurs in the area around the Ilivertalik granite at ca. 2.80 Ga, and more regionally at ca. 2.82-2.79 Ga.
- A late thermal event at ca. 2.66 Ga, which elsewhere in the region (e.g. at Storø) is associated with a gold mineralisation, is found in several places in the area north of Grædefjord, and between Nerutussoq and Neria.
- In the south-easternmost part of the area consistent ages of ca. 2.55 Ga are found in granitic rocks and gneisses, overlapping with the age of the Qôrqt granit complex in the Nuuk region.

