New data on the structural evolution of western Dronning Maud Land, Antarctica: Focus on the Neoproterozoic –Cambrian and implications for the amalgamation of Gondwana.

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Data collected during four field seasons from 2012-2016 from Ahlmannryggen, Sverdrupfjella and Gjelsvikfjella are described focussing on younger structures potentially correllatable with the amalgamation of Gondwana between 500-600Ma.
In Ahlmannryggen, the Straumsnutane Formation basaltic andesites underlying the Straumsnutane area of western Dronning Maud Land show a complex structural history. Limited primary features include columnar jointing, pillow lavas, amygdaloidal layering,volcanic breccias, cooling cracks and ropy lava. Early planar and linear fabrics and thrust faulting suggest top to the NW tectonic transport directions under brittle-ductile greenschist facies conditions. Syntectonic sedimentary basins combined with published geochronology from synchronous intrusiuons suggest the NW directed deformation is Mesoproterozoic in age.
Right dihedral paleoanalysis of later shallow-dipping slickensided fault planes indicate top to the NW and SE tectonic transport directions. Quartz veining, typically forming multi-generational rotated en-echelon arrays have top-to-SE geometries.The later deformation also occured under greenschist facies conditions as indicated by extensive epidote deposition on the slickenside surfaces. SE vergent overturned folds have been reported in NE Straumsnutane. Reported K-Ar data from mica the slickensides suggest a circa 500Ma age.The data suggest two phases of deformation - an early Mesoproterozoic top-to NW phase involving folding with SE dipping axial planes, thrust faulting and a later Neoproterozoic-Cambrian age SE oriented deformation involving SE oriented quartz veining, SE faulting and folding.
In Sverdrupfjella, early tight D1 and D2 deformation was toward NW involving recumbent folding with strong planar fabrics and lineations. Later D3 deformation with top to the SE geometry is recorded in upright folds as well in deformed granitic veins and pegmatites, as well as younger syntectonic granites and pegmatites. The younger syntectonic granites have circa 500Ma ages.
In Gjelsvikfjella, early D1 and D2 deformation was toward the NW. Later D3 deformation comprises mesoscale scale folds, mesoscale shear zones and syntectonic granitic veins. The mesoscale shear zones show both extensional and compressional geometries, both with top to the SE geometries and typically have syntectonic pegmatitic intrusions. Ages reported from the granitic veins are circa 500Ma
The younger top to SE deformation may suggest that the cratonic cover rocks of the Ritscherflya Supergroup as well as the basement gneisses of W Sverdrupfjella were possibly submerged in the footwall of the meganappe structure interpreted as part of the process of the amalgamation of Gondwana, involving collision between N and S Gondwana in the Kuunga Orogeny (Grantham et al., 2008; Meert, 2002), between ~550-600Ma ago. In contrast, it is possible that rocks in E Sverdrupfjella formed part of the overriding nappe complex.

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