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# A Kinematic Record of Progressive Emplacement of the 3.47-3.23 Ga Mt Edgar Granitic Complex, East Pilbara Craton, Western Australia

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## KEY POINTS

**1. Reverse (dome-down) sense of shear at the margin of a Paleoarchean dome**

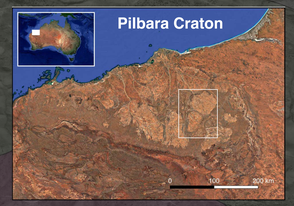
— Field observations, photomicrographs, EBSD

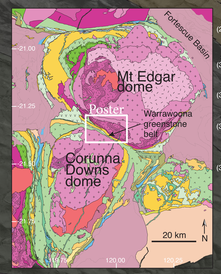
**2. A highly deformed greenstone belt records partitioned kinematics:**

— Dextral shearing in interbedded chlorite schists and cherts
— Reverse shearing in quartzofeldspathic schists

**3. Our observations are consistent with downward flow at the margin of the Mt Edgar dome, indicating a highly mobile crust in the Paleoarchean**

## FIELD AREA




Split Rock Supersuite (2890-2830)
Cleland Supersuite (3275-3225)
Emu Pool Supersuite (3324-3290)
Tambina Supersuite (3448-3424)
Callina Supersuite (3469-3462)

*Major constituents of the Mt Edgar and Corunna Downs Region of the East Pilbara terrane.*

*All ages are in millions of years (Ma)*

- Charteris Basalt
- Wyman formation (3325-3315)
- Euro Basalt (3340-3333)
- Strelley Pool Form. (<3426)
- Panorama Form. (3449-3427)
- Apex Basalt
- Marble Bar Chert Member
- Duffer Form. (3471-3463)
- Mt Ada Basalt (3470)
- McPhee/Dresser Forms. (<3481-3477)
- North Star Basalt

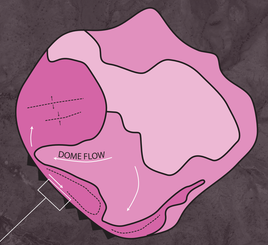
Kelly Group

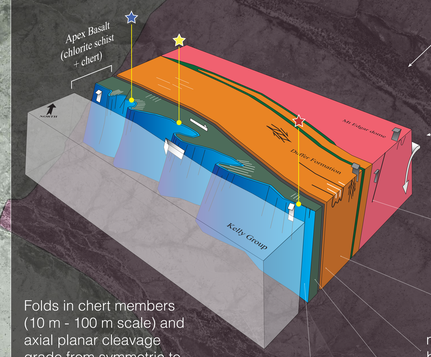
Warrawoona Group

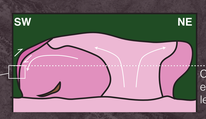
## STRUCTURAL INTERPRETATION

The Warrawoona greenstone belt records partitioned reverse shear and dextral shear resulting from downward flow of granitoids near the margin of the dome

Dextral shearing, resulting in asymmetric folding, accommodates belt-parallel dome flow




Folds in chert members (10 m - 100 m scale) and axial planar cleavage grade from symmetric to dextral asymmetric as Apex Basalt is thinned

Quartz CPO records consistent plane-strain deformation parallel to lineation, either coaxial or reverse sense of shear

Reverse shear sense is recorded by porphyroclast systems and asymmetric folds

Reverse shear is recorded by folded veins, S-C structures, and kink banding

mylonite zone marks partition plane between dominantly dextral and dominantly reverse shear sense

Planar (S>L) foliation in chlorite schists is cut by a strong axial planar crenulation

Strongest reverse shear sense

Mt Ada Basalt

Duffer Formation

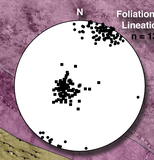
Apex Basalt (includes cherts)

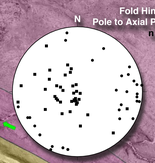
Euro Basalt (Kelly Group)

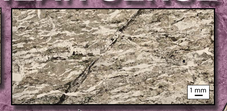




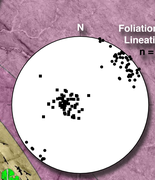
## DOME-DOWN REVERSE SHEAR SENSE



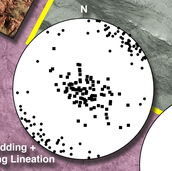




REVERSE SHEAR SENSE







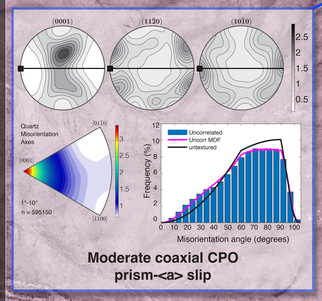




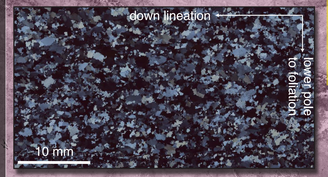




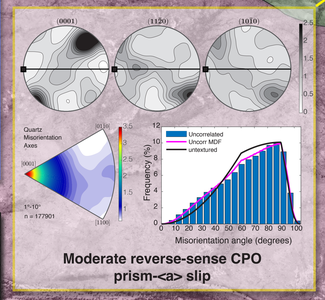

Stronger reverse shear sense




**Moderate coaxial CPO prism-⟨a⟩ slip**

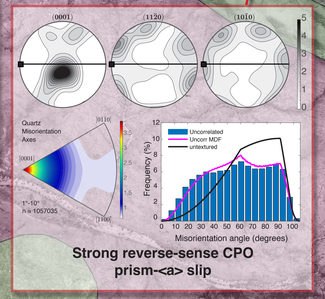



## EBSD of DEFORMED CHERTS




**Moderate reverse-sense CPO prism-⟨a⟩ slip**

REVERSE SHEAR SENSE

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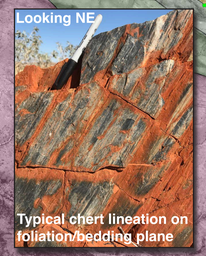


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0 1 2 3 4 5 km