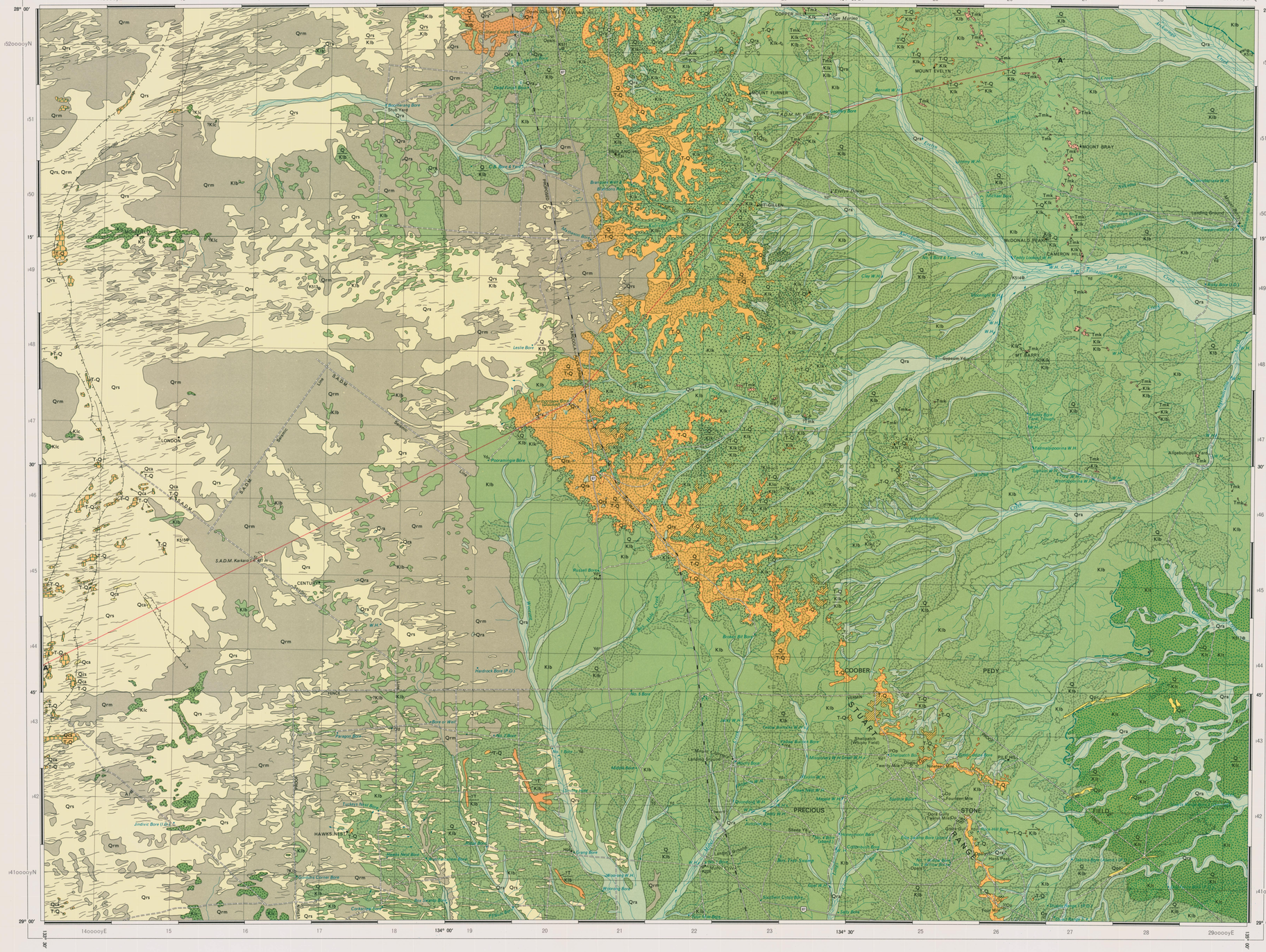
MURLOOCOPPIE

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES ADELAIDE

AUSTRALIA 1:250 000

S.A. GEOLOGICAL ATLAS SERIES SHEET SH53-2 ZONE 5

FIRST EDITION 1976



REFERENCE

CAINOZOIC

QUATERNARY — HOLOCENE

- **Qra** — Fluviatile silts, sands and gravels of modern drainage channels, flood plain areas and claypans.
- **Qrs** — Yellow-red aeolian quartz sands of the Great Victoria Desert. Generally fixed by vegetation and covered by dense growth of mulga trees. Derived in part from underlying Qrm. Boundaries between these two units are often diffuse and subjective. Underlain at a shallow depth by Cretaceous units.
- **Qrm** — Shallow red-clayey, sandy soils often associated with dense mulga growth. Includes thin superficial spreads of maghemitic gravel (buckshot gravel).
- **Qra** — Outwash fans and slope deposits incised by modern drainage probably equivalent in part to POORAKA FORMATION.

QUATERNARY — PLEISTOCENE-RECENT

- **Q** — Undifferentiated Quaternary overlying older units. Extensive silcrete gibber lags overlying red-brown to grey clayey, silty and sandy soils and weathering products derived from underlying Cretaceous. Probably includes POORAKA FORMATION and CALLABONNA CLAY in part. Boundary very diffuse denoting merely a lessening in thickness of superficial cover.
- **Qca** — Pale coloured platy to nodular calcrete. Generally occurs as a thin veneer over T–Q and Cretaceous units in the Great Victoria Desert.
- **Qpr** — Low scarps covered with gypseous silts, pale coloured fragmentary material and undifferentiated Quaternary (Q), representing deflated remnants of the "Gypsite surface" (Pleistocene).
- Gypsite. Massive gypsum crusts and associated gypseous silts overlying gypsum-impregnated Cretaceous rocks. May be associated with a multicoloured jasper silicification.

CAINOZOIC SEDIMENTS AND PALAEOSOLS OF THE STUART RANGE

TERTIARY — PLIOCENE

- **T–Q** — MT. WILLOUGHBY and MANGATITJA LIMESTONE EQUIVALENTS: Pale coloured, soft, silty limestone and dense (dolomitic) limestone, often with irregular, milky, chalcedonic silicification. Pisolitic and concretionary habit in part. Lower portion earthy and fragmental with clastic material. Basal part may contain ferruginous material probably reworked from underlying unit.

  DOONBARA FORMATION EQUIVALENT: Ferruginous and calcareous rocks. Dark, red-brown sandy and silty fragmentary rocks incorporating reworked silcretes, silcretes and Cretaceous shales. Variably lateritic and pisolitic. Patchily silicified to form red, brown and cream "jasper-breccia silcrete". (Soil stratigraphic unit, in part.)

  Heavily ferruginised rocks derived entirely from Cretaceous units (soil stratigraphic unit).

  Silcrete of older units reworked within red-brown fragmental rocks, described above. Some red-brown sandstone with silcrete clasts. Patchily silicified to give conglomeratic silcrete with red-brown matrix. Grey conglomeratic silcrete may develop within this unit.

TERTIARY — MIOCENE

- **Tms** — Unnamed: Widespread, strongly silicified medium to coarse clayey sands bearing polished silcrete pebbles. Usually occurs as a massive, grey columnar, sandy or "conglomeratic" silcrete. Reworked into the overlying T–Q unit. Schematic section only.
- **Tmk** — MIRACKINA CONGLOMERATE: Channel fills. Coarse conglomerate with rounded and polished silcrete and quartz clasts. Fine to coarse grained, cross-bedded and massive impure, quartz sands. Minor siltstones, shales and pure quartz sands. Upper part silicified to a massive columnar grey silcrete, porcellanitic shale or conglomeratic silcrete, and may be heavily ferruginised.

TERTIARY — OLIGOCENE

- **Tsi** — Silcrete. Small remnants of massive homogeneous buff to dark grey silcrete. Angular quartz grains in a dense siliceous matrix. Generally broken down and reworked into younger units.
- **T** — Undifferentiated Tertiary units as described above comprising Tsi, Tmk and T–Q in varying proportions.

Unconformity.

SUCCESSION IN GREAT ARTESIAN BASIN

MESOZOIC

CRETACEOUS — ALBIAN

- **Klo** — OODNADATTA FORMATION: Grey and greenish-grey shales, claystones and siltstones. Very minor, feldspathic, sandy siltstones and silty fossiliferous limestone. Generally strongly bleached and altered in outcrop.

  COORIKIANA SANDSTONE MEMBER: Fine to coarse grained, kaolinitic, feldspathic, micaceous, glauconitic quartz sandstones. Varies from massive, gritty sandstone to fine grained, fissile sandstone. Interbeds of sandy siltstone and silty shale. Sandstones often cross-bedded and/or strongly bioturbated. Coarser units often silicified and/or ferruginised.

CRETACEOUS — APTIAN

- **Klb** — BULLDOG SHALE: Blue-grey and grey claystones and shales (very dark grey when fresh). Lenses of fine grained silty sandstone, particularly near upper and lower boundaries. Lenses and concretions of fossiliferous limestone common. Scattered Adelaidean cobbles and boulders throughout. Generally strongly altered, bleached and gypsified in outcrop.

  Unnamed unit transitional between the BULLDOG SHALE and CADNA-OWIE FORMATION. Dark chocolate-brown claystones with "cone-in-cone" limestones and thin lenticular conglomeratic, sandy interbeds. Persistent brown-weathering limestone horizon marks the top in the Giddi Giddinna—Oolgelima area. Characterised by lag boulder fields.

CRETACEOUS — NEOCOMIAN

- **Klc** — CADNA-OWIE FORMATION: Very fine to medium grained impure quartz sandstones with micaceous siltstone and shale. Thin calcareous sandstones, "cone-in-cone" limestones and coarse pebbly quartz sandstones, in part ferruginised. Coarse sandstones with rounded and smoothed exotic (Adelaidean) boulders.

Transgressive disconformity.

IN SUBSURFACE ONLY

JURASSIC

- **Jus** — ALGEBUCKINA SANDSTONE: Poorly cemented, white to pale brown, fine to coarse grained quartz sandstone, kaolinitic in the lower part, with pebble horizons. Minor siltstone and shale.

Unconformity.

SUCCESSION IN ARCKARINGA BASIN

IN SUBSURFACE ONLY

PALAEOZOIC

PERMIAN — ARTINSKIAN

- **Plt** — MOUNT TOONDINA FORMATION: Upper part, interbedded sandstone, siltstone, coals and carbonaceous shales, minor calcareous or pyritic sandstone. Lower part, pale to dark grey non-carbonaceous, partly calcareous, clayey sandstones, siltstones and shales.

SAKMARIAN

- **Plp** — STUART RANGE FORMATION: Greenish-grey, sandy to silty claystone (marine).
- **Plb** — BOORTHANNA FORMATION: Upper part, conglomeratic sandstone displaying graded bedding. Lower part, pebbly to cobbly claystone (reworked marine glacigene sediments).

PRECAMBRIAN

- **pC** — Undifferentiated basement rocks including adamellites and acid gneisses of Gawler Craton. Section only.

GEOLOGICAL BOUNDARIES
- ACCURATE
- APPROXIMATE
- STRIKE AND DIP OF BEDDING
- LINEAMENT
- TYPE SECTION LOCALITY
- FOSSIL LOCALITY
  - MACROFOSSIL (MOLLUSCS)
  - FOSSIL WOOD
  - MICROFOSSIL
- GEOLOGICAL SECTION — A A'
- MAIN ROAD
- SECONDARY ROAD
- TRACK
- NATIONAL ROUTE NUMBER
- TOPOGRAPHIC DEPRESSION
- BOUNDARY FENCE
- CONTROL POINT, ASTRONOMICAL
- EPHEMERAL STREAM
- SWAMP
- CLAYPAN
- BORE
- WELL — W
- TANK — T
- WATERHOLE — W.H.
- STRATIGRAPHIC BORE — St.
- MINE

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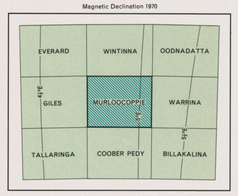
Magnetic Declination 1976



Annual variation +1 minute

SCALE

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

MILES 2 1 0 2 4 6 8 10 12 14 16 18 20 MILES

PRINTED IN AUSTRALIA
A. R. GARGETT, GOVERNMENT PRINTER
SOUTH AUSTRALIA

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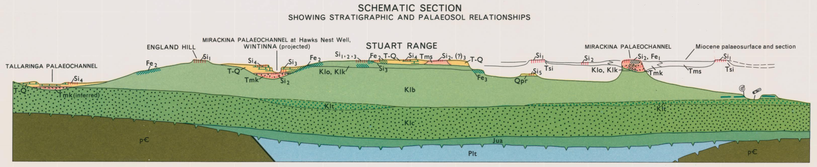
Printed for the Geological Survey of South Australia as a contribution to the Geological Map Series of the Commonwealth.

SCHEMATIC SECTION

SHOWING STRATIGRAPHIC AND PALAEOSOL RELATIONSHIPS



Ferruginisation and possible silicification associated with gypsite profile development ..... Fe_2, Si_5
Disconformity
Chalcedonic silicification within T–Q limestones ..... Si_4
Disconformity in part
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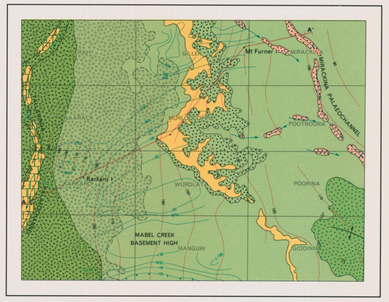
Disconformity
Variable ferruginisation and massive "grey billy" silicification of Tms and Tmk ..... Si_2, Fe_1
Disconformity
Massive "grey billy" silicification equivalent to the "Silcrete of the Cordillo Surface" (?Oligocene) ..... Si_1
Silicification
Ferruginisation
Superimposition of profiles ..... (e.g.) Si_{1-2-3}
Silcrete (Si_1) clasts
Cross-bedding
Fault (diagrammatic)
Unconformity, disconformity

Note: Stratigraphic relationships between various silicification and ferruginisation phases are not fully understood, although disconformities as indicated have been established.

STRUCTURAL SKETCH



- Quaternary (overlying Cretaceous)
- Tertiary—Quaternary
  - Plio-Pleistocene
  - Pliocene
  - Mio-Pliocene
- Cretaceous
  - Oodnadatta Formation
  - Bulldog Shale and transitional unit
  - Cadna-owie Formation
- Structure contours (metres, relative to mean sea level)
- Seismic basement (modified from Milton, 1971)
- Top of Cadna-owie Formation ("C" seismic horizon)
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- Interpreted Bulldog Shale—Cadna-owie Formation boundary
- Anticline
- Attitude of bedding
- Geological Section — A A'

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Issued under the authority of the Honourable H. R. Hudson, B.Ec., M.P., Minister of Mines and Energy.

Published 1976.

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