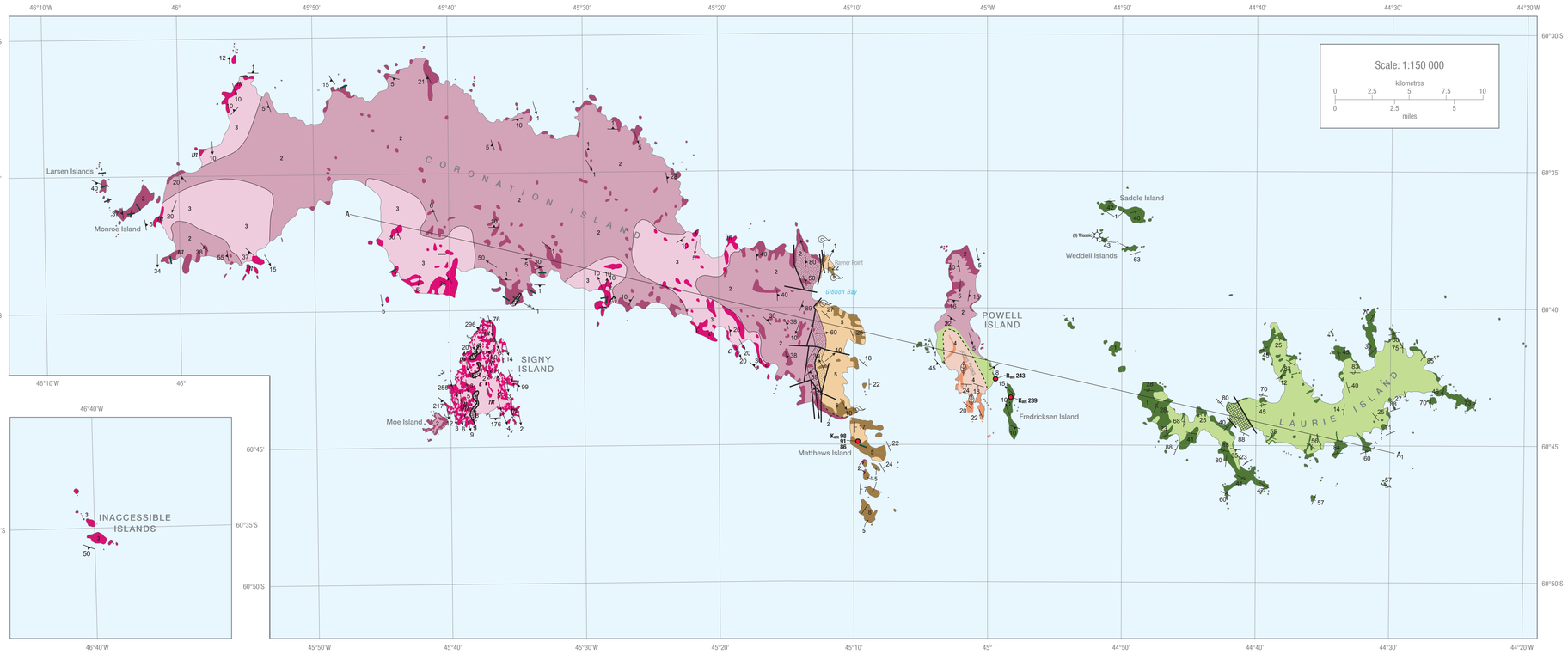


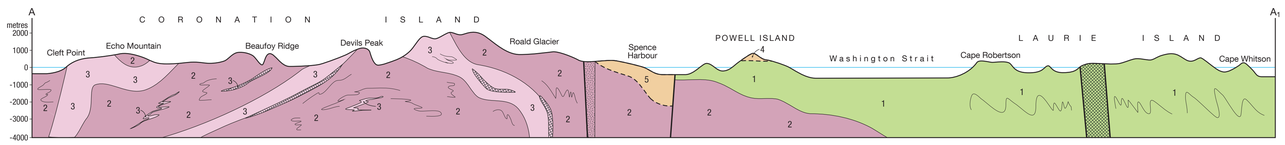


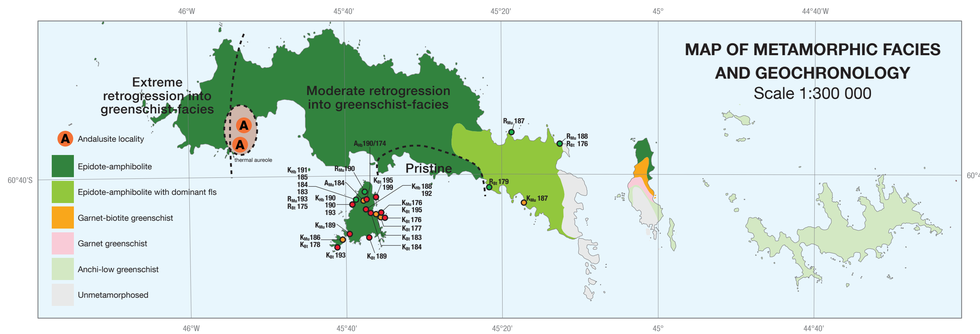


## GEOLOGICAL CROSS SECTION FROM CLEFT POINT TO CAPE WHITSON

**(Line A-$A_1$ drawn on the map)**

Horizontal scale 1:150 000 Vertical exaggeration x 2

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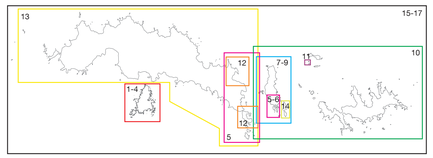
## MAP COMPILATION DIAGRAM

Numbers of the bounding boxes refer to the references listed above





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1:150 000 Scale

# Geological Map of the South Orkney Islands

BAS GEOMAP 2 Series, Sheet 3, Edition 1


Geological interpretation and map compilation by M.J. Flowerdew, T.R. Riley and C.E. Haselwimmer. Geological cross sections compiled by M.J. Flowerdew and C.E. Haselwimmer. Data preparation, digital cartography, design, and layout by C.E. Haselwimmer. Geological mapping and digital map production was undertaken as part of the BAS Environmental Change and Evolution (ECE) programme.





Preferred reference for map:
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Projection: WGS 1984 Antarctic Polar Stereographic, Central Meridian: 60°W, Spheroid: WGS84. Latitude of true scale: 71°S.

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## GEOLOGICAL LEGEND

Geological units are coloured as dark and light tints representing exposed (nunataks) or inferred geology (under ice or snow)

| PERIOD | EPOCH/AGE | SEDIMENTARY ROCKS | PLUTONIC AND METAMORPHIC ROCKS |
|---|---|---|---|
| CRETACEOUS | Early | **Spence Harbour Conglomerate** Predominantly conglomerate with thin persistent sandstone interbeds, exposed on eastern Coronation Island and Matthews Island, deposited as debris flows and braided stream deposits in alluvial fans within terrestrial to marine fault-bounded basins. Boulders lithologically resembling the Scotia Metamorphic Complex (2) are dominant and suggest a local derivation from the west. Age constraints come from calcareous sandstone boulders at Rayner Point which contain a Late Jurassic - Early Cretaceous fauna and also from a poorly preserved Late Jurassic marine fauna on Matthews Island. Basal units in the vicinity of Gibbon Bay, eastern Coronation Island, consist of sparsely fossiliferous (Late Jurassic - Early Cretaceous) dark marine shale, the Gibbon Bay Shale. It rests unconformably on the Scotia Metamorphic Complex (1). 5 | |
| JURASSIC | Late | | |
| | Middle | **Powell Island Conglomerate** Conglomerate and sandstone exposed on southern Powell Island, deposited as debris flows and braided stream deposits in alluvial fans within terrestrial to marine fault-bounded basins. Boulders resembling Greywacke Shale Formation (1) suggest a local derivation from the north and east. Youngest braided stream deposits at Johns Peaks contain Middle Jurassic flora. 4 | |
| | Early | | **Scotia Metamorphic Complex (mixed unit)** Scotia Metamorphic Complex (2) with abundant interleaved units of ocean floor derived sequences of uncertain (probable Permian - early Jurassic) age. The oceanic elements include marble, amphibolite and epidote amphibolites, metapelite and metachert which were juxtaposed with the Scotia Metamorphic Complex (2) during Late Triassic / early Jurassic deformation at epidote amphibolite facies metamorphic grade. The mixed unit is exposed on Signy Island, Coronation Island and the Inaccessible Islands. 3 |
| TRIASSIC / PERMIAN | | **Greywacke Shale Formation** Permian - Triassic sandstone (feldspathic arenite and feldspathic wacke) with minor siltstone, mudstone and diamictite deposited as turbidity currents in submarine fans and widely exposed east of Coronation Island. Variably deformed and foliated, metamorphosed to between anchizone to upper greenschist-facies during the Late Triassic / early Jurassic. 1 | **Scotia Metamorphic Complex** Protoliths equivalent to Greywacke Shale Formation (1) but Late Triassic / early Jurassic metamorphism reached epidote amphibolite-facies grade. 2 |

## GEOLOGICAL SYMBOLS

- Geological boundary
- Fault
- Unconformity
- Bedding (70)
- Overturned bedding (42)
- Cleavage or metamorphic foliation (55)
- Fold hinge line (7)
- Rodding within L-tectonites (5)
- Fault breccia
- Ductile shear zone
- Invertebrate fossil
- Radiolarian fossil
- Fossil leaves
- Dolerite Dykes: tholeiitic augite and rarely olivine-bearing dolerite dykes recognised intermittently along the southern Coast of Coronation Island and on Matthews Island. K-Ar whole rock geochronology suggests a Late Cretaceous intrusion age for the dolerites.

**Radiometric ages**
Coloured circles (key below) on the 'Map of Metamorphic Facies and Geochronology' indicate method and ages (Ma) of metamorphism and on the main map indicate method and ages of sedimentary and igneous protoliths.

**Age reliability (main and metamorphic maps)**
- Unreliable age
- Possibly reliable age
- Reliable age

**Inferred protolith ages (main map)**
- $R_{RR}$ Rb-Sr whole rock radiometric age
- $K_{WR}$ K-Ar whole rock radiometric age

**Metamorphic ages (metamorphic map)**
- $K_{Bi}$ K-Ar biotite radiometric age
- $K_{Hb}$ K-Ar hornblende radiometric age
- $K_{Mu}$ K-Ar muscovite radiometric age
- $R_{Mu}$ Rb-Sr muscovite radiometric age
- $R_{Bi}$ Rb-Sr biotite radiometric age
- $A_{Hb}$ Ar-Ar hornblende radiometric age
- $A_{Mu}$ Ar-Ar muscovite radiometric age

## OTHER SYMBOLS

- Coastline
- Sea