Ministero dell'Istruzione, dell'Università e della Ricerca
Programma Nazionale di Ricerche in Antartide

ANTARCTIC GEOLOGICAL 1:250,000 MAP SERIES

REEVES NÉVÉ QUADRANGLE
(VICTORIA LAND)

2012

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GIGAMAP
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REEVES NÉVÉ

Museo Nazionale dell'Antartide
Sezione di Scienze della Terra - Siena (Italy)

EXPLANATION

m	Scree, glacial drift and moraine (m). Quaternary.

POST-ROSS MAGMATISM AND SEDIMENTATION

FERRAR VOLCANIC SUITE

Kb	KIRKPATRICK BASALT (Kb) Subaerial lavas, a few metres up to several ten metres thick, randomly separated by thinner sedimentary volcanogenic interlayers and pillow lavas.The Mesa Range basalts (Mount Murchison quadrangle) provide 178 Ma K/Ar ages.
Fd	FERRAR DOLERITE (Fd) Tholeiitic dolerite sills and minor dykes, usually intruded in the sedimentary sequence of the Beacon Supergroup, immediately above the pre-Beacon peneplain. Black lines (omitted in the cross sections): major lenses and seams (meanly some ten metres thick) of Section Peak Formation sandstones forming sandwich type interlayers within the Ferrar Dolerite sills. A K/Ar age of 174±10 Ma has been reported from Archambault Ridge (Mount Murchison quadrangle).

BEACON SUPERGROUP

Sf	SECTION PEAK FORMATION (Sf) Mainly fluviatile, cross-bedded, coarse-to medium-grained sandstone with a feldspathic to quartzose composition. Minor intercalations of conglomerate, black shale, carbonaceous or noncarbonaceous silty mudstone and minor coal occur as well. A middle to Late Triassic age is inferrable by the presence of *Dicroidium odontopteroides* at Vulcan Hills (Mount Murchison quadrangle) and *Dicroidium Zuberi* and *Dicroidium odontopteroides* at Benson Knob (Mount Joyce quadrangle). An Early Jurassic age in the Section Peak Formation has been confirmed by palynomorphs assemblage at Section Peak site (Sequence Hills quadrangle). This age could be extended to the upper part of the Section Peak Formation cropping out in the Reeves Névé quadrangle.
Nt	NEALL MASSIF TILLITE (Nt) Massive or faintly bedded green sandy mundstone matrix-supported diamictite. An Upper Carboniferous-Permian age is tentatively inferred.

TERRANES AND UNITS OF THE ROSS OROGEN

WILSON TERRANE

GRANITE HARBOUR IGNEOUS COMPLEX

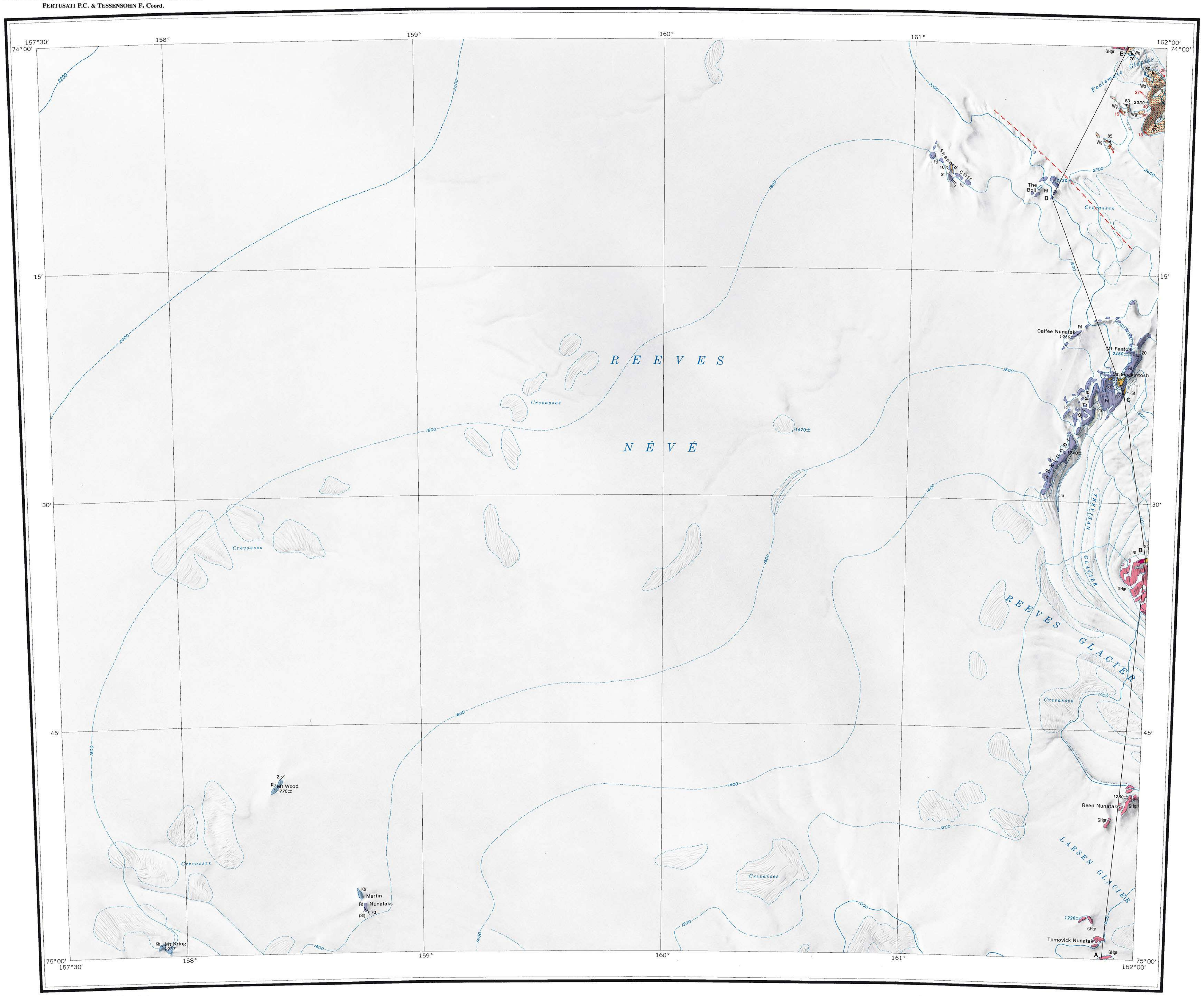
GHgr	GRANITE HARBOUR GRANODIORITE AND GRANITE (GHgr) Syn- to post-kynematic biotite granite, granodiorite and tonalite intruded in the Wilson metamorphic complex before 480±20 Ma (cooling ages).

WILSON METAMORPHIC COMPLEX

Wg	GREENSCHIST FACIES METASEDIMENTS (Wg) Metasandstone, slate, phillyte and metalimestone, often contact metamorphosed. The age is unknow, but a Precambrian-?Lower Cambrian age is inferred. Local name: Priestley Formation.

SYMBOLS

～	Geological boundary.
26	Bedding.
30	Regional schistosity and cleavage.
30 a b	Fold axis, (a) plunging, (b) horizontal.
▲	Post Early Jurassic thrust; teeth on overthrust side.
⇌	Fault; ticks (on the downthrown side) or arrows where the sense of motion is known.



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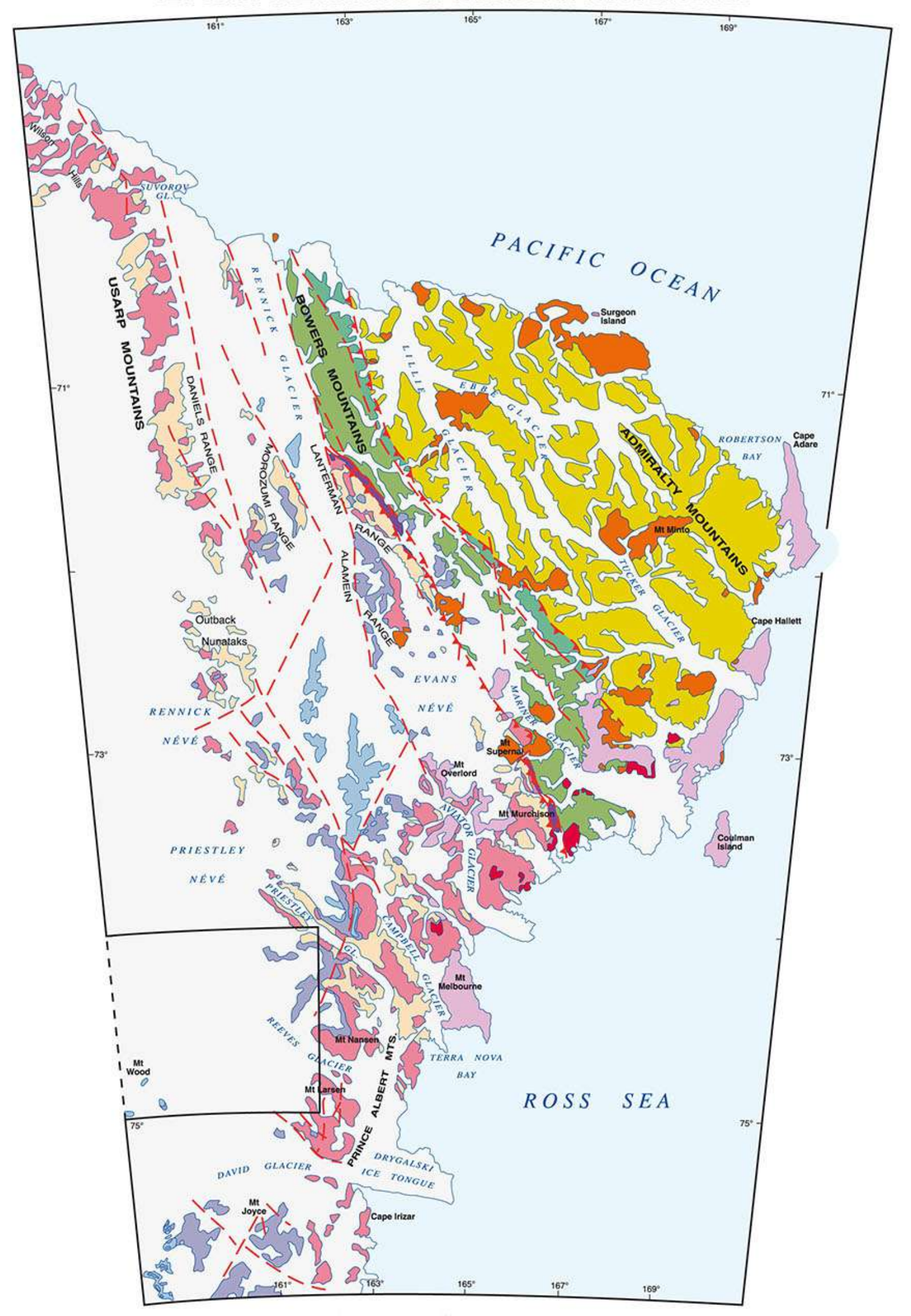
SCALE 1:250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometres

Lambert Conformal Conic Projection - Standard Parallels 72°40' and 75° 20' - Contour Interval 200 Meters - Datum is mean sea level

TECTONIC SKETCH MAP OF NORTHERN VICTORIA LAND



CENOZOIC MAGMATISM AT THE ROSS SEA MARGIN

b a	McMurdo Igneous Complex: Meander Granite and Syenite (a); Malta, Hallett and Melbourne Volcanic Suites (b)

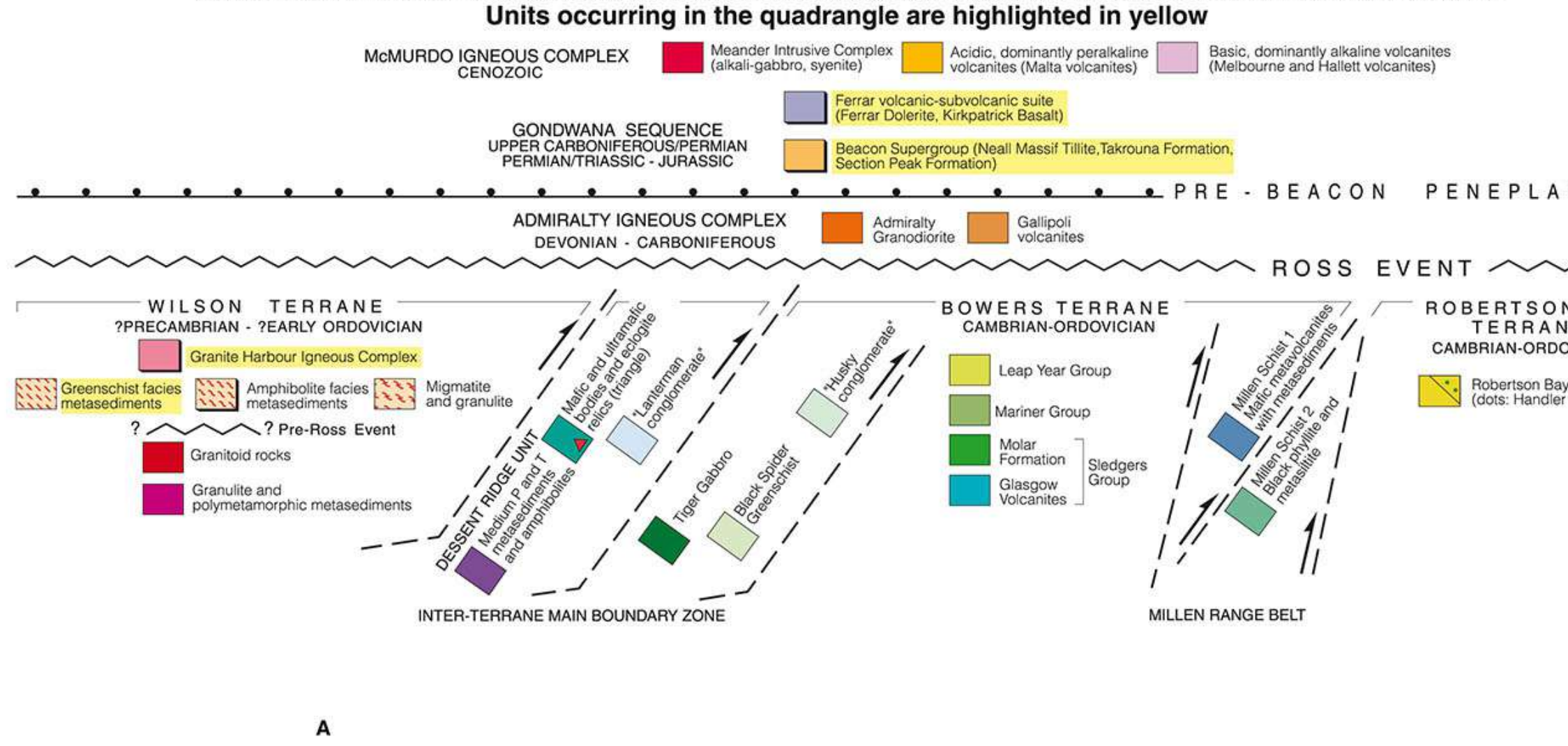
POST-ROSS MAGMATISM AND SEDIMENTATION

a b	Kirkpatrick Basalt (a); Ferrar Dolerite and Beacon Supergroup (b)
🟧	Admiralty Igneous Complex
▲	Thrusts
╱	Faults

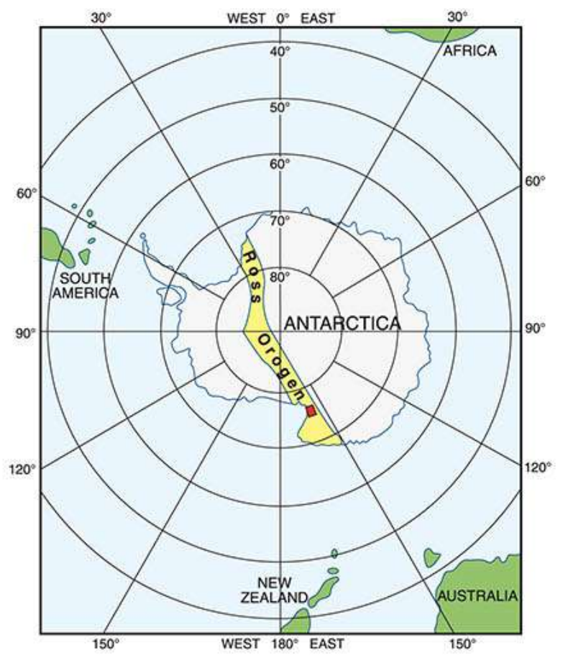
TERRANES AND UNITS OF THE ROSS OROGEN

a b	Wilson Terrane: Wilson Metamorphic Complex (a); Granite Harbour Igneous Complex (b)
🟪	Dessent Ridge Unit in the Mountaineer Range and possible correlatives at the eastern margin of the Lanterman Range
🟩	Bowers Terrane
🟩	Millen Schist
🟨	Robertson Bay Terrane

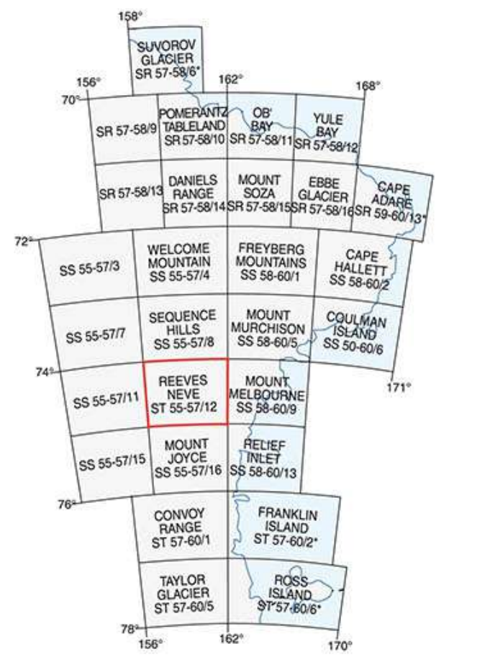
SYNOPTIC TABLE OF STRATIGRAPHIC AND TECTONIC RELATIONSHIPS IN NORTHERN VICTORIA LAND
Units occurring in the quadrangle are highlighted in yellow

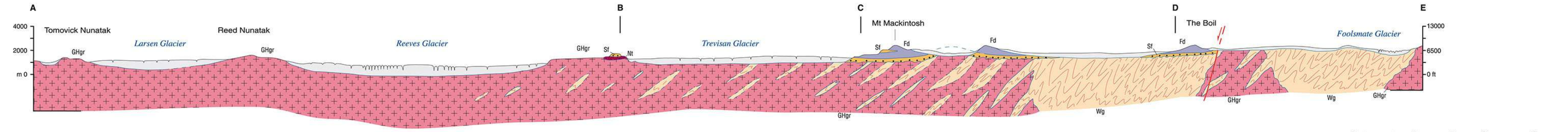


LOCATION DIAGRAM



INDEX TO ADJOINING SHEETS





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G E O L O G I C A L   O U T L I N E S

PREVIOUS WORK

James Clark Ross was the first to discover the Transantarctic Mountains, the Ross Sea and the Ross Ice Shelf. He landed on Possesion Island sampling volcanic and granitic rocks and also reached the southernmost volcanic Franklin Island (1840). In the 1900 the Borkgrevink's second expedition landed on Possession Island, Coulman Island, Mount Melbourne (on the beach of Edmonson Point), Franklin Island and Ross Island. The collected bed rocks were Tertiary volcanics. In the 1901- 04, landing and sampling collections were made (mainly in southern Victoria Land) during Scott's First Expedition (Ferrar 1907). The first to visit the Mawson-Priestley region were David, Mawson and Mackay of Shackleton's British Antarctic Expedition (1907-09). David's party, on foot, from Cape Royds along the coast, crossed the ice tongues of Mawson and David Glaciers and the Nansen Ice Sheet, then, ascending the Backstair Passage to Polar Plateau, reached the South Magnetic Pole. During the journey they visited outcrops at Pryor Island, Cape Irizar, Backstair Passage and Mount Crummer (Shackleton, 1909). Important geological work in the northern Victoria Land was done by the Northern Party of Scott's Second Expedition (1910-13). Scott's Northern Party (Abbott, Browning, Campbell, Dickason, Levick, Priestley) surveyed the region around Terra Nova Bay (lower Priestley Glacier area) in 1912, before being forced to winter-over in a snow-cave on Inexpressible Island (Priestley, 1914, 1915; Smith and Priestley, 1921). Micaceous, garnetiferous gneissic schists were sampled from ouctrops and moraines of lower Priestley Glacier; however geological informations of inland (high-middle Priestley Glacier) were mostly inferred on the basis of lithological characters of the erratics (limestones, graphitic micaschists and "paragranulites") in the moraines of lower Priestley and Corner Glaciers: (Smith & Priestley, 1921). In the sixties several New Zealand field parties (Ricker,1964; Nathan & Schulte,1968; Skinner & Ricker,1968; Nathan,1971) surveyed the northern Victoria Land (NVL). In particular Skinner & Ricker,1968 (part I, part II) produced a color schematic geological map of the area of Reeves Névé quadrangle and established the overall framework of regional geology (see Gair et al., 1969, Nathan & Skinner, 1972, Skinner & Ricker,1968, for geological maps and discussion on earlier work). During the 1981-82 International NVL Project, New Zealand and USA geologists (Stump, 1986) investigated the field relations, petrology and geochemistry of the Paleozoic granitoids (Borg et al., 1986, 1987) and the Jurassic tholeiites (Elliot et al., 1986). During the 1982-83 season, NVL was visited by the GANOVEX III German expedition (Roland, 1984). Investigations focused on the geology and petrology of the metamorphic basement complex in the Mountaineer Range (Kleinschmidt et al., 1984), and on regional patterns of metamorphism (Grew et al., 1984). The GANOVEX Team (1987) also produced a 1:500,000 geological map of NVL. In the 1984-85 season, some geological activities were carried out (Roland et al., 1989) and resulted in a geological map of the area between Outback Nunataks and Reeves Gl. (Roland, Olesch & Schubert 1989). Since the 1985-86 season Italian geologists investigated the region between David and Mariner Glaciers, and a 1:500,000 geological map of the same area (Carmignani et al., 1988) was produced. The German and Italian expeditions of the following years triggered the publication of a number of papers; contributions by Ghezzo et al. (1987), Lombardo et al. (1987), Brotzu et al. (1988), Armienti & Tripodo (1989), Biagini et al. (1991a, 1991b), Casnedi & Pertusati (1989), Lanzafame & Villari (1989), Lombardo et al. (1989), Muller et al. (1989), Vita et al. (1989), Armienti et al. (1990), Fitzgerald and Gleadow (1990), Stackebrandt & Thiedig (1990), Talarico et al. (1992), Antonini et al. (1994), Castelli et al. (1994), Musumeci et al. (1994), Palmieri et al. (1994), Rocchi et al. (1994), Salvini & Storti (1994), Tessensohn (1994), Vita-Scaillet et al. (1994), Casnedi et al., (1994); Casnedi & Di Giulio (1999);Henjes-Kunst & Kreuzer (1997), Ricci &Tessensohn (1997), Tessensohn & Lombardo (1997), Musumeci & Pertusati (2000), Musumeci et al., (2006), Pertusati et al., (2006), Bomfleur et al., (2007), Schöner et al., (2007), Goodge & Fanning (2010), Schöner et al., (2011) are related to geological features of NVL.

SHORT DESCRIPTION OF GEOLOGY

The Reeves Névé quadrangle encompasses an Early Paleozoic metamorphic basement, representing the Ross Orogen (Late Cambrian - Early Ordovician) and a flat-lying cover spanning from Carboniferous - Permo-Trias to Quaternary time, with large stratigraphic gaps. The Early Paleozoic basement consists of the Wilson Terrane (WT), and includes mono and polymetamorphic rocks of Precambrian -?Cambrian age, intruded by large bodies of the Late Cambrian-Early Ordovician Granite Harbour Igneous Complex. The WT was deformed by the Early Paleozoic Ross Orogen with development of an east verging thrust and fold system developed under greenschist and amphibolitic facies conditions. After the Ross Orogenesis the area was uplifted and eroded. After the Devonian Admiralty-Gallipoli magmatic event the area was newely uplifted and eroded. On the resulting peneplain surface, the Carboniferous-Permian tillite (Neal Massif tillite) of Gondwanian pertinence and subsequent Section Pk sandstone (Beacon Supergroup) were deposited and in turn were covered by large flows of the Jurassic Kirkpatrick Basalt. The coeval Jurassic Ferrar Dolerite formed sills chiefly along the basal Beacon horizon. The youngest event (not detectable in this quadrangle) was the emplacement of the Cenozoic McMurdo igneous rocks, which consist of the older Meander intrusive suite (32-38 Ma) and of the younger Melbourne alkali-volcanic suite (< 2Ma).

LITHOSTRATIGRAPHY

WILSON TERRANE

Metamorphic Complex

Only Greenschist facies metasediments (Wg) crop out in this quadrangle; they consist of low grade metasandstone, slate, phyllite and metalimestone, often contact metamorphosed, that crop out along the northwestern side of the Priestley Gl. and in the O'Kane Canyon area. Major metalimestone lenses occur to the north of Mt. Baxter (Mt Melbourne quadrangle). These rocks, in the surrounding quadrangles, grade both along and across strike to Amphibolite facies metasediments (Wa) and to higher grade Migmatite gneisses (Wmg); the latter contain relics of partially retrogressed granulite. The protoliths of all the metasediments seem to belong to a unique very thick sequence of fine- to medium-grained siliciclastic sediments with rare interlayered carbonate rocks (Precambrian-?Cambrian) that underwent metamorphic re-equilibration at different metamorphic grades during the Ross Orogeny (Carmignani at al.,1987; Casnedi & Pertusati, 1989; Castelli et al., 1997; Skinner, 1989).

In the northeastern corner of this quadrangle one of the most typical sections of the Priestley Formation is magnificently exposed and, due to low metamorphism, the sedimentary structures are well preserved. Sections surveyed here and in the surrounding areas (Foolsmate Glacier-O'Kane Canyon) for litho-stratigraphic-sedimentological analysis, allowed to recognize in the sequence different units displaing a general regressive trend. Hemipelagites of basin plain facies (slaty shale with thin -a few centimeters- intercalations of fine sandstone) are followed by turbidity fans prograding from NW (thick sequence of sandstones). They pass up into a platform with anoxic facies (clastic carbonate beds, thin sandstones and predominant slate with pyrite bearing black shale). The top of the sequence is characterized by shallow-water deposits (sandstones and cross bedded sandstones of increasing energy). The thickness evaluation of the sequence cannot be accurate because of the complicated tectonic structure but a minimum thickness (without taking into account the Priestley Schist) can be assumed to be more than 2000 m. Its sedimentary evolution can be interpreted in terms of peripheral foreland basin development and probably connected with the Kanmantoo Basin (Australia).

The paleontological records are scant and not totally reliable. The occurrence of palynomorphs comparable to Precambrian acritarchs (Ribecai, 1991) suggests a possible Precambrian age for the Priestley Formation; the fragments of possibly echinoderm and probably gastropods (Casnedi & Pertusati, 1991) suggest a lower Cambrian age.

From radiometric data the age of Kanmantoo Group is constrained by the 526±4 Ma U-Pb zircon data from a tuff near the top of the underliyng Normanville Group and 516 Ma, age of the oldest synkynematic granites intruded in the Kanmantoo Group. Post kynematic dykes gave an age of c. 510 Ma (Chen & Liu, 1996). This age means that the Kanmantoo Group deposited very rapidly, probably less than 10 million years during the Cambrian (Flottman at al., 1998).

The Foolsmate detrital muscovites yelded total fusion ages of single flakes ranging from 500 Ma to 1,6 Ga with a pronounced clustering in the 560-620 Ma range. These ages constrain the lowest limit of the deposition of the Priestley Formation in the area at 550-560 Ma (Calonaci et al., 2002) and suggest a more reliable Early Cambrian depositional age as previously hypothesized (Casnedi & Pertusati, 1991).

Granite Harbour Igneous Complex

The geological researches and reconnaissance mapping of north-central Victoria Land, summarized by Gair et al.,1969 and Nathan and Skinner, 1972, showed that three Batholiths crop out in this region: 1) the northern dominantly granitic-granodioritic, Campbell-Aviator Batholith (Nathan 1971) between the Campbell Glacier and Mountaneer Range; 2) the central, strongly composite, Terranova Batholith comprising the Plutonic suites exposed at Terranova Bay and in the Deep Freeze Range (Skinner1972, 1983b,c).The composition of this plutons range from syenogranite to quartz-monzonite but intermediate and mafic rocks (quartz-diorite and gabbro) are locally abundant. Ultramafic Ol-Opx occur in the mafic Boomerang pluton (Skinner 1972); 3) the much larger south Victoria Land Batholith cropping out between Priestley and David Glaciers and farther S well beyond the mapped area. In the Eisenhower Range and farther S this batholith is characterized by the association of foliated syntectonic Larsen granodiorite with post tectonic granite. The three batholiths represent a typically calc-alkaline orogenic suite and the dominant rock type is metaluminous biotite granite and granodiorite.

During the last twenty years, some petrographic and geochemical differences of regional significance have been described for these rocks in Victoria Land. Borg (1984), Borg et al. (1986), and Vetter & Tessensohn (1987) stated that these granitoids occur in two belts, an eastern and a western one. The western belt is made up of S-type, peraluminous, two-mica and mainly K-feldspar porphyritic granite; coeval I-type, metaluminous, hornblende granodiorite, diorite and tonalite form minor plutons and dykes. The eastern belt consists of I-type granodioritic to tonalitic intrusive rocks. Contrasting features are also in the isotopic signature (Rocchi et al., 1994). These belts trend NW-SE throughout the WT, and were interpreted as the magmatic signature of an active continental margin. These subdivision in term of I and S type on the basis of the spatial distribution of intrusive is debatable. A further subdivision has stated by Ghezzo et al., 1987 who distinguish, between metaluminous suite, a belt running from lower Tinker Glacier to Campbell-Rennick divide of peraluminous (S-type) suite. Granite Harbour Granodiorite and Granite (GHgr) cropping out in the eastern border of the map are the westernmost extension of the large intrusive massifs of the Eisenhower Range-Prince Albert Mountains belonging to the Southern Victoria Land Batholith. Ghgr ranges from fine grained mostly equigranular granodiorite to coarse grained inequigranular to strongly porphyritic monzogranite and syenogranite. For this suite Rb/Sr and K/Ar mineral cooling ages (Borsi et al., 1989; Kreuzer et al., 1987) span from 487 Ma to 455 Ma. Their distribution reveals that the older ages (487 - 484 Ma) are restricted to shallow level intrusions in the Eisenhower Range, Mt. Baxter and Mt. New Zealand, while the deeper intrusions of the Deep Freeze Range have younger cooling ages (475 - 456 Ma) that are also closely comparable with the Bt Rb/Sr and K/Ar ages of metamorphic host rocks (Vita et al., 1991). Similarly, the peraluminous intrusions have Rb/Sr cooling age of 481±10 Ma (Biagini et al., 1991b). The differences in cooling ages of both metamorphic and magmatic rocks from the Eisenhower Range and Deep Freeze Range have been attributed to diachronous post-metamorphic cooling probably linked to different uplift rates or block faulting (Armienti et al., 1990, Vita et al., 1991). Recent radiometric data (U/Pb on zircons) indicate (Bomparola et al., 2007) that the emplacement sequence took place on a time span of nearly 30 Myr from 508 to 481 Ma.

BEACON SUPERGROUP

The base of the Beacon Supergroup is represented by a remarkable peneplain surface which is equivalent to, but younger than, the Kukri Peneplain as defined in the Dry Valleys (Barrett et al., 1986). Above this surface the clastic Beacon deposits unconformably rest on many lithotypes of the underlying basement. The Beacon Supergroup rocks occurring in this quadrangle belong to the Neal Massif Tillite and to the Section Peak Formation (Collinson et al., 1986).

Neall Massif Tillite

These glacial and fluvio-glacial deposits (Nt), consist of massive or faintly bedded green sandy mudstone matrix-supported diamictite that rest on the Early Paleozoic basement and are covered by the Section Peak Formation. These rocks, which thickness does not exceed 10-15 m, are exposed only in small outcrops near the eastern boundary of this quadrangle, just NE of the confluence of the Reeves Glacier and Trevisan Glacier (new proposed name) on the western side of Thern Promontory area (Mount Melbourne quadrangle). The pebbles are irregular both in size (from mm up to more than dm) and in shape (angular, subangular and poorly rounded); they are constituted by granites, porfiric volcanites, polideformed and polifasic metamorphites; the sedimentary rocks are black shales, fine sandstones, quartzites, subordinate limestones. Even if characteristic striated pebbles has not been found, the general feature is typical of morainic deposits. For lithology and stratigraphic position they can be correlated with the Neall Massif Tillite and an Upper Carboniferous-Permian age is tentatively inferred.

Section Peak Formation

This clastic formation (Sf) is best exposed along both the sides of the Priestley Glacier and farther north in the Sequence Hills and Welcome Mountain quadrangles. The Section Peak Formation crops out, in this quadrangle, north of Reeves Glacier and forms a 50-80 m-thick sequence of polygenic conglomerates at the base, and arkosic cross bedded sandstones which lie locally above the Neall Massif Tillite. More usually, in the other areas they lie directly above the peneplaned surface on top of the Paleozoic Basement. These sediments are intruded and covered by the Jurassic Ferrar volcanic suite.

The outcrops on this quadrangle represent the westernmost extension of the post-Ross flat lying sediments that constitute the top of the Eisenhower Range tableland. Other outcrops occur in contact with Ferrar Dolerite at the base of the cliff on the eastern side of Mt Mackintosh. Minor outcrops are represented by rafts, sometimes strongly tilted (Martin Nunataks), enclosed in the Ferrar Dolerite. The founding of *Dicroidium odontopteroides* at the Vulcan Hills, in the Mt Murchison quadrangle (Tessensohn & Madler, 1987), is in agreement with the already known Middle to Late Triassic age proposed by Collinson et al., 1986 even if Norris (1965) on the basis of palynomorphs assemblage assigned to the Section Peak Formation an Early Jurassic age. Casnedi et al., 1994; Casnedi & Di Giulio (1999); Di Giulio et al., 1997 attributed a Mid Jurassic age to the Section Peak Formation on consideration that some igneous layers, interpreted by Collinson et al., 1968 as dolerite intrusions, represent basaltic flows (171±5 Ma - K/Ar, Skinner Ridge) emplaced during the deposition of the Section Peak Formation. This attribution to the Jurassic age is indirect and supported by the hypothesis of pene-contemporaneity of basaltic flows and deposition of Beacon sandstone. The palinomorph assemblage on samples collected in the same locality of Norris (1965) confirmed the Early Jurassic age (Pertusati et al., 2006). These results confirm Norris's (1965) previous age assessment, reaffirming that the Section Peak Formation and consequently the Beacon Supergroup extends into to Early Jurassic. The Jurassic age in the upper part of the Section Peak Formation is confirmed by Bomfleur et al., (2007), Schöner et al., (2007), Bomfleur et al., (2011), Schöner et al., (2011). Moreover detrital zircon ages suggest that the deposition of the Section Peak Formation continued until the Early-Middle Jurassic (Goodge & Fanning 2010).

FERRAR VOLCANIC SUITE

Ferrar Dolerite

The Ferrar Dolerite (Fd) consists of tholeiitic dolerite sills and minor dykes, frequently emplaced inside the lower part of the sedimentary sequence of the Beacon Supergroup. Major outcrops are in the Skinner Ridge and Shepard Cliff in the northeastern corner of the quadrangle. In this locality the Ferrar dolerite is characterized by metre thick lenses of sandstone belonging to the Section Peak Formation, that are interlayered with the Ferrar Dolerite sills.

A K/Ar age of 174±10 Ma has been reported for these rocks from the Mount Murchison quadrangle (Brotzu et al., 1989).

Kirkpatrick Basalt

In this quadrangle, the Kirkpatrick Basalt (Kb) consists of meters to decameters thick subaerial lavas, randomly separated by thinner sedimentary volcanogenic interlayers and pillow lavas. These volcanic rocks crop out only in the southwestern corner of the map on three isolated Nunataks. Few beds and lenses of whitish marly siltstone, fine grained sandstone with flora relics occur in the volcanic sequences. No radiometric ages are available in this quadrangle.

K/Ar dates from the Mesa Range basalts (Mt Murchison quadrangle) indicate 178 Ma as minimum age for the whole lava sequence (Elliot & Foland, 1986). A $^{40}Ar/^{39}Ar$ age of 174.2±1 Ma was obtained by McIntosh et al. (1986). At Shafer Peak (Mount Melbourne quadrangle), however, volcanoclastic strata attributed to the Exposure Hill Formation (Elliot et al., 1986) include a 1 m-thick black shale unit which crops just below the basalt lavas. The shale bed signifies a pause in volcanic activity and an interval of lacustrine sedimentation. Samples of the black shale yielded a rich and well-preserved microflora composed of spores and pollen characteristic of the Late Sinemurian-basal Pliensbachian APJ21 zone of Price (1997). This dating suggests that there was a significant time break of about 6 Ma between lacustrine deposition and basalt effusion (Musumeci et al., 2006). The same age (Lower Jurassic) for volcanoclastic and volcano-sedimentary sequence is reportet by Bomfleur et al., (2007), Schöner et al., (2007), Bomfleur et al., (2011), Schöner et al., (2011).

TECTONICS

ROSS TECTONICS

WILSON TERRANE

The distinctive structural lineaments of the Ross Orogeny in this region are NW-SE trending upright folds with well-developed axial planar cleavages and upthrusts, whereas large scale nappe structures are not observed. Structural evolution occurred through a progressive deformation with two major D1 and D2 deformation phases (Carmignani et al., 1987; Casnedi & Pertusati 1989; Palmeri et al., 1994; Musumeci & Pertusati, 2000). The D1 structures, deforming the sedimentary layering, are recognisable only in the lowest grade Priestley Formation and at the head of the O'Kane Canyon. The D2 structures are well-developed in medium and high grade rocks of both the Priestley Schist and the Polymetamorphic Complex, whereas in low grade rocks they correspond to shear bands and crenulation cleavage zones. The main structural features can be summarised as follows NW-SE trending tight to isoclinal upright F1 and F2 folds gently overturned toward the NE. The fold axes plunge gently to moderately towards the NW or SE; steeply dipping axial plane foliations, correspond to a slaty cleavage (S1) in low grade metasediments (Priestley Formation) while S2 evolves from a crenulation cleavage to a well-developed schistosity in medium-high grade metamorphic rocks (Priestley Schist and Polymetamorphic Complex); NNW-SSE and NW-SE trending ductile and ductile-brittle shear zones and/or fault zones dip steeply to moderately toward the SW or NE, and are coeval or partly postdate the S2 schistosity.

POST - ROSS TECTONICS

The most important and widespread feature related to the post-Ross tectonics is represented by the regional unconformity along the pre-Beacon peneplaned surface. This surface is the only record which testifies the erosion of the Ross Orogen and further post-Admiralty uplift and erosion.

The Mesozoic tectonic evolution was characterized by folds, reverse and normal faults related to the continental transcurrent faulting, which accommodates the transtensional movements between two symmetric areas of spreading, i.e. the SE Indian Ridge and the mid-Pacific (Tessensohn, 1994). This led to the development of trascurrent and normal fault systems that produced several basins, interpreted as pull-apart structures (Tessensohn, 1994).

The Rennick Graben (Murchison quadrangle and Freyberg quadrangle) represents the best example of pull-apart basin linked to Mesozoic transtension. Normal faulting, with vertical throws up to 600 m at the head of Campbell Gl. (Roland & Tessensohn, 1987), is the most prominent feature of Mesozoic tectonics. However, compressive structures are described in the Lanterman Range (Roland & Tessensohn, 1987) and in Mt Melbourne-Sequence Hills quadrangles (Pertusati et al., 2006).

In this quadrangle only two tectonic lineaments can be individuated. 1) A NW-SE striking fault inferred in the northeastern corner of this quadrangle due to a low topographic position of the Ferrar Dolerite in respect to elevation of metamorphic basement. 2) A well exposed E-NE dipping (35-45°) thrust plane along the cliffs south of Foolsmate Glacier. The associated shear zone crosscuts and displaces Jurassic dolerite sills; the oriented clasts of the cataclasite and the drag of bedding and cleavage in the Priestley Formation indicate a W-SW tectonic transport. The anomalous high value (20°) of N dipping Ferrar Dolerite at Mt Fenton, Skinner Ridge, could be an other tectonic feature of shortening. The similar structures occurring in nearby area consist of southwest verging fold and thrust affecting the Beacon sandstones in the Mt Melbourne quadrangle: south of the Shafer Peak-Mt. Cavaney area, the Paleozoic basement and the Section Peak Formation are deformed by NW-SE striking anticline and syncline gently overturned toward SW. Moreover, NW of Tymber Peak, the basement crystalline rocks and sills of Ferrar Dolerite are thrusted southwestward. Although, no geometric relationship was observed in the field between the compressive and extensional structures, Tessensohn (1994) proposed the compressive structures to be linked to the strike-slip motions active during the development of the pull-apart basins.

A more recent extensional tectonics of Cenozoic age, associated to the emplacement of McMurdo Igneous Complex and to the spreading of the Ross Sea, has not been detected in this quadrangle.

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