Tectonophysics, 36 (1976) 301—314

SEDIMENTARY BASINS OF THE EAST ANTARCTIC CRATON FROM GEOPHYSICAL EVIDENCE

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(Received June 17, 1976)

ABSTRACT

Drewry, D.J., 1976. Sedimentary basins of the East Antarctic craton from geophysical evidence. In: M.H.P. Bott (editor), Sedimentary Basins of Continental Margins and Cratons. Tectonophysics, 36 (1—3): 301—304.

Ninety-five percent of Antarctica is buried under an ice sheet up to 4.7 km thick. Within interior East Antarctica ($\sim 10.2 \cdot 10^6$ km^2) recent airborne geophysical observations, principally radio echo sounding, have enabled widespread investigation of ice covered bedrock. Limited seismic refraction profiling, magnetic and gravity investigations combined with the radar studies have provided a generalized picture of sedimentary basins in Antarctica between 180° and 60°E.

Two major basinal structures have been detected within East Antarctica — the Wilkes Basin and Aurora Basin complex. The former lies sub-parallel to the Transantarctic Mountains, while the Aurora Basin forms a branching system of basins in central East Antarctica trending northwest towards the Wilkes Land coast.

Analyses of macro-scale terrain roughness and bedrock reflection coefficients from radio echo sounding indicate significant differences between basins and their surrounding regions. Small-scale surface irregularities and slowly changing, high reflectivities from radar measurements are interpreted as suggesting the presence of a smoothing cover of sediments. Residual magnetic anomalies (from airborne operations), when combined with topographic data, exhibit low gradients over basins, but steep, fluctuating characteristics over adjacent basement highs. Source-depth calculations from oversnow magnetic determinations across the Wilkes Basin indicate an average thickness for the sedimentary layer of <3 km. This is corroborated by reinterpretation of gravity anomalies, which average ~ -30 mGal, over the basin. Sediments appear absent or extremely thin on the flanks of the Wilkes Basin where seismic refraction shooting has detected the near-surface presence of granitic crust. Furthermore an increase in roughness of terrain combined with sudden breaks in slope argue that these basin margins may be fault-controlled and deeply eroded.

The distribution and configuration of the depressions is therefore thought to be governed by intra-cratonic fracture patterns possibly related to ancient orogenic sutures. Juxtaposition of basins and flanking basement highs of probable Precambrian and Early Palaeozoic age are reminiscent of basin and swell structures of the African and Australian cratons, with which East Antarctica has had a common geologic history throughout most of the Phanerozoic. Any sediments must pre-date growth of the ice sheet and are hence older than Miocene.

INTRODUCTION

Ninety-five percent of Antarctica is buried under an ice sheet up to 4.7 km in thickness. Rock exposures lie only along parts of the coastal periphery and in favourable highland localities such as the Transantarctic Mountains. Reconnaissance geological exploration of these areas, principally since the International Geophysical Year, has established East Antarctica as a stable craton having experienced little or no orogenic deformation since the Mid-Palaeozoic (Craddock, 1972; Elliot, 1975). Exposures in the Transantarctic Mountains, George V Coast, Prince Charles Mountains and Queen Maud Land (Fig. 1) reveal a widespread non-marine sedimentary sequence of Mid-Phanerozoic age and lying unconformably upon a complex metamorphic and granitic basement. Termed the Beacon Supergroup, this upper unit exhibits important similarities in terms of lithology, faunal and floral content and lack of deformation with other Gondwana-type Systems (e.g. Karroo Supergroup of southern Africa, Gonwana System of India and the Santa Catarina System of South America).

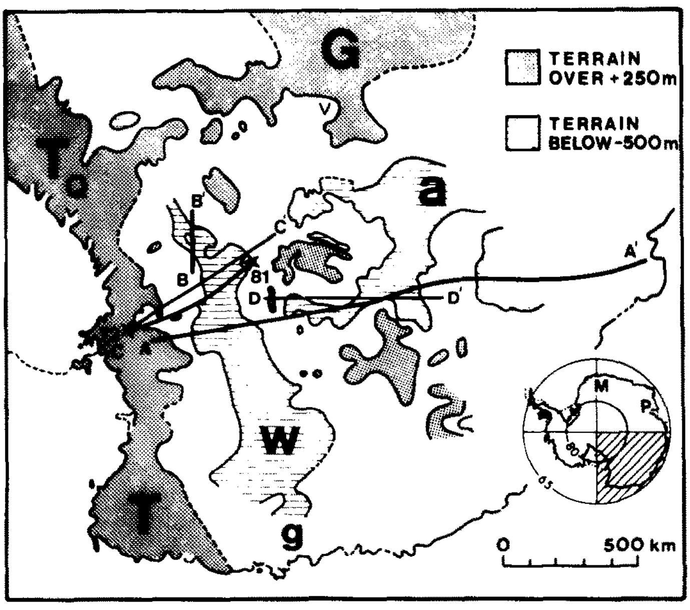

Fig. 1. Major terrain elements of East Antarctica from radio echo sounding. w = Wilkes Basin, a = Aurora Basin, T = Transantarctic Mountains, G = Gamburtsev Mountains (subglacial), V = Vostok Station, g = George V Coast, P = Prince Charles Mountains, M = Queen Maud Land, Q = Queen Alexandra Range. A—A'. = aeromagnetic flightline (Ostenso and Thiel, 1964). B—B'. = line of magnetic source depth calculations (Robinson, 1964) given in Table II. C—C' = radio echo sounding profile used in Fig. 4. D—D' = radio echo sounding profile used in Fig. 5. *72, *81 = seismic refraction profiles (Crary, 1963). Gravity observations (Robinson, 1964) used in Fig. 4 obtained between these two points.

Little is known, however, regarding the sub-ice geological configuration of interior East Antarctica (an area of $10.2 \cdot 10^6$ km^2) such as the presence or distribution of sedimentary accumulations. In recent years, airborne geophysical surveys, principally radio echo sounding, have enabled widespread study of these ice covered bedrock areas. Such work has been conducted principally by the Scott Polar Research Institute with the logistic support of the US National Science Foundation. Limited seismic refraction profiling, magnetic and gravity observations accumulated during the last twenty years can now be reinterpreted and used in combination with radar soundings to yield a generalized picture of sedimentary basins in Antarctica between 180° and 60° E.

TOPOGRAPHIC IDENTIFICATION OF BASINS

Continuous radio echo sounding has been completed over $3.3 \cdot 10^6$ km^2 of East Antarctica on a 50 to 100 km grid network. Computer-aided reduction of data has enabled the compilation of maps depicting bedrock morphology at a scale of $1 : 5 \cdot 10^6$ and larger (Drewry, 1975a). These have

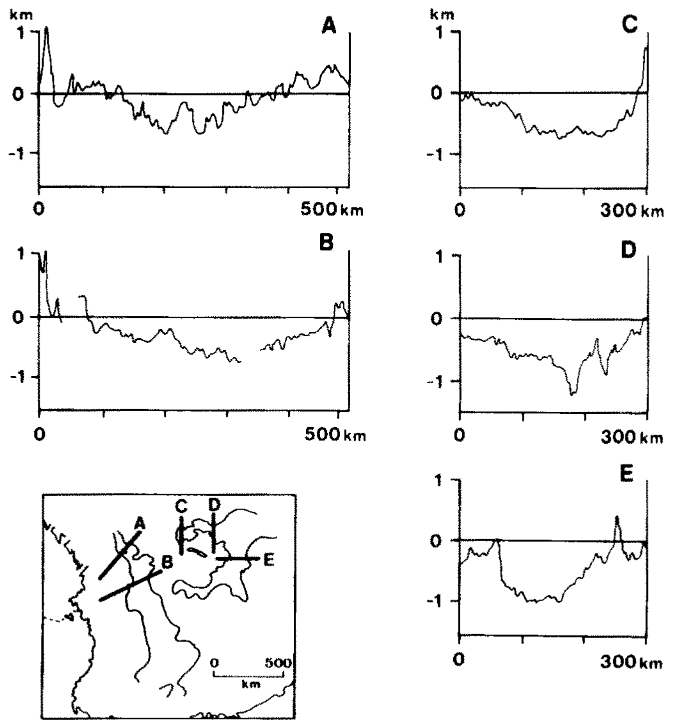

Fig. 2. Radio echo sounding profiles across the Wilkes and Aurora Basins, East Antarctica. Bedrock elevations relate to present sea level and have not been isostatically adjusted.

assisted detection and delimitation of two major basinal structures — the Wilkes Basin and a basin complex in central East Antarctica (referred to here by the unofficial name 'Aurora Basin') (Fig. 1). The former lies sub-parallel to the Transantarctic Mountains. It extends ~1,250 km from George V Coast where it is ~400 km wide, narrowing steadily to about 100 km width at latitude 81°S, and here terminating against a series of uplifted blocks. Extensive areas of terrain reach 1,000 m below present sea level (bsl) especially at the northern extremity of the basin. Elsewhere only local zones are depressed to this level, the surface usually being at between 500 and 750 m bsl (Fig. 2).

The Aurora Basin, although of approximately similar proportions, forms a branching system of sub-basins trending northwest towards the Wilkes Land coast (Fig. 1). Cross-profiles (Fig. 2) show that the basin reaches 300 km in width and in places 1,250 m bsl. There are, however, local deeps in linear belts 30—50 km wide and reaching 300—600 m below the mean elevation of the basin. A small salient of the 'Aurora Basin' runs in front of a major highland area in central East Antarctica (Fig. 1). This trench ~200 km long, attains a mean depth of 750 m bsl (locally 1,000 m bsl) and is flanked by scarps 1,700 m in height on the mountainous eastern side and 1,000 m on the lower western limb.

Basins of lesser extent have also been detected in East Antarctica — inland of the Queen Alexandra Range of the Transantarctic Mountains, beneath and to the south of the Soviet base Vostok, and in the coastal sectors of Terre Adélie. These latter basins will not be considered further in this paper.

EVIDENCE FOR SEDIMENTS

Bentley (1974) and Bentley and Clough (1972) following the earlier suggestions of Robinson (1964) considered that there was probably no thick sedimentary section lying inland of the Transantarctic Mountains. Their conclusions were based upon limited seismic investigations and the interpretation of sparse magnetic and gravity observations. While there can be little criticism of the numerical reduction of these results, their evaluation in terms of specific geological inferences and in particular their extrapolation to extensive areas of Antarctica appear to have more serious limitations. Radio echo sounding in East Antarctica has provided substantial background data with which these previous geophysical studies may now be less ambiguously assessed. The analyses and reinterpretations given here show that the data may indeed support the presence of significant sediment bodies located within major topographic basins of the craton.

Radio echo sounding

Terrain roughness

Airborne profiling in East Antarctica has enabled roughness of the

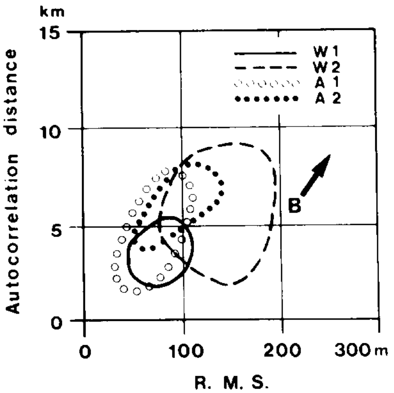

Fig. 3. Terrain roughness characteristics of the Wilkes and Aurora Basins from radio echo sounding. *W1* = central zone of Wilkes Basin, *W2* = inner margins of Wilkes Basin, *A1* = southern portion of Aurora Basin, *A2* = northern portion of Aurora Basin. Basement terrains (*B*) possess considerably rougher surfaces and plot well away from the smooth basins shown above. R.M.S. of the abscissa is root mean square deviation.

bedrock surface to be investigated statistically (Drewry, 1975b). Calculation and comparison of vertical and horizontal variations in rock altitudes (using normalized variance and autocorrelation functions) indicates significant differences in terrain roughness 'signatures' within and between basins, and in relation to their surrounding regions (Fig. 3). Measurements show that both the Wilkes and Aurora Basins exhibit broadly similar statistical properties characterized by only small-scale surface irregularities. Flanking areas, however, are distinguished by the substantially rougher nature of bedrock (high variance and low autocorrelation distances (ibid.)).

Reflection coefficients

Analyses of the returned radio signal power allow estimates of reflection strengths to be made across parts of East Antarctica. Reflection strength is related to both micro-scale roughness of the bedrock surface and its dielectrical properties. A coefficient of reflection (R) can be defined as:

$$R = P_r/P_t - L - G \qquad (1)$$

where P_r/P_t is observed two-way ratio of received to transmitted power, L is two-way dielectric absorption of a plane wave in ice, and G is loss due to geometrical factors.

Absorption in ice, at a given frequency (e.g. 60 MHz), is closely dependent upon temperature although the relationship is still imprecisely known. Laboratory measurements of the ice loss parameter, tan δ, by Westphal (see Robin et al., 1969) have been used although Robin (personal communication, 1976) considers that they may be in systematic error of up to 20 dB for central East Antarctica. Further error may arise in estimation of the vertical ice sheet temperature profile from which absorption is calculated. Although mean annual surface temperatures and accumulation rates can be used basal conditions cannot be accurately predicted mainly due to uncertainties in geothermal heat flux. Since temperatures close to the pressure melting point will significantly increase absorption, uncertainty in temperature at depth will give rise to errors in L of up to 5 dB.

Geometrical factors take into account the antennae size and type, range effects and surface refraction:

$$G = 10 \log_{10} (\lambda^2/64\pi^2) + 2g - 20 \log_{10} (r_a + r_i/n) \tag{2}$$

where λ is wavelenth in air, n is refractive index of ice, g is gain of radar antennae, r_a is range in air, and r_i is range in ice. For consistency and in order to avoid subjective judgement of surface characteristics, bedrock was considered a specular reflector and an inverse square (of range) law applied.

The considerable problems attendant in computing meaningful values for R should not be minimized, with the principal uncertainty arising from errors in estimating the true absorption. Nevertheless variations in reflection coefficients, if calculated at successive, closely spaced localities, should approximate changes in bedrock characteristics rather than uncertainties in L and G which alter more slowly with distance. Reflection coefficients were, therefore, calculated from radio echo records every ~2 km along a 1,500 km flight in East Antarctica which crossed the Wilkes and Aurora Basins and their neighbouring areas. Mean values of R were obtained for each discrete topographic zone. The differences between adjacent region means are given in Table I and they provide good additional evidence for gross changes in the properties of underlying materials across basins and their surroundings. A more detailed discussion of the interpretation of reflection strengths and their use in evaluating sub-ice bedrock geology will be given elsewhere.

Both the distinctive, small scale of surface irregularities within the Wilkes and Aurora Basins and the contrast in reflection coefficients between basins and flanking regions are here interpreted as strongly suggesting the presence of a smoothing cover of different geological materials such as sediments.

TABLE I

Difference in mean radio power reflection coefficients between basins and adjacent areas in East Antarctica

		Difference in dB
1	Eastern margin of Wilkes Basin and central Wilkes Basin	9
2	Western margin of Wilkes Basin and central Wilkes Basin	5
3	Eastern margin of Aurora Basin and central Aurora Basin	13
4	Northern margin of Aurora Basin and central Aurora Basin	5 *

* Mean value for northern margin derived from only a small sample (< 50 measurements).

Seismic investigations

In East Antarctica only 20-odd reconnaissance, seismic refraction profiles have been shot which yield information on the elastic properties of sub-ice materials. None of these profiles were located over major topographic basins or, indeed, with any regard to subjacent structures which were undetermined at the time of field investigation. Bentley and Clough (1972) indicate that the quality of the seismic profiles is usually poor being often of short length (<1 km) or comprising only a single shot. Few have been reversed. Furthermore the 'P'-wave velocities likely to be encountered for sediments (3.5—5.0 km s^{-1} depending upon lithology, consolidation etc) are close to that of the overlying ice (3.8—4.1 km s^{-1}), and this lack of contrast may result in early arrivals from the rock being obscured with consequent difficulty in seismogram interpretation. Despite such limitations three or four refraction profiles are located in areas where they bear upon the investigation of sedimentary basins (Fig. 1).

In Skelton Névé, on the immediate flank of the Transantarctic Mountains, refraction studies suggest a thin (~0.5 km) upper layer of consolidated sediments, ascribed to the Mid-Phanerozoic Beacon Supergroup which crops out nearby (Crary, 1963) (Column 72, Fig. 4). On the western side of the Wilkes Basin a successfully reversed profile yields an uppermost velocity of 5.8 km s^{-1} — typical of Antarctic continental basement (Column 81, Fig. 4), and which may be taken to indicate the absence of sediments unless extremely thin (Crary, 1963).

A single refraction shot was made at 78.0° S, 148.7° E over the Wilkes Basin but only a total travel time and an apparent velocity were obtained (ibid). Nevertheless an ice depth of 3.086 km was determined and can be used to suggest a maximum sub-ice 'P'-wave velocity of 5.5 km s^{-1} . Crary indicated that this result could point to lower velocity material; the evidence is, however, merely conjectural.

Elsewhere in central East Antarctica seismic data are scanty. At Vostok station (Fig. 1) only seismic reflection measurements were undertaken. Kapitsa (1960) has indicated that some energy was returned from below the ice—rock interface and is suggestive of a thin sedimentary layer. Recent radio echo soundings have shown that Vostok lies above a shallow sub-ice depression 300 km east-northeast of the Aurora Basin.

Magnetic measurements

Few of the results of a very limited number of magnetic observations in Antarctica have been analyzed in detail and most are from West Antarctica (Behrendt, 1968). Magnetic studies were conducted on the 1960—61 McMurdo—South Pole Traverse (Robinson, 1964) which obliquely crossed the axis of the Wilkes Basin in the region of 80° S (Fig. 1). In the light of extensive radio echo sounding coverage Robinson's results may be re-

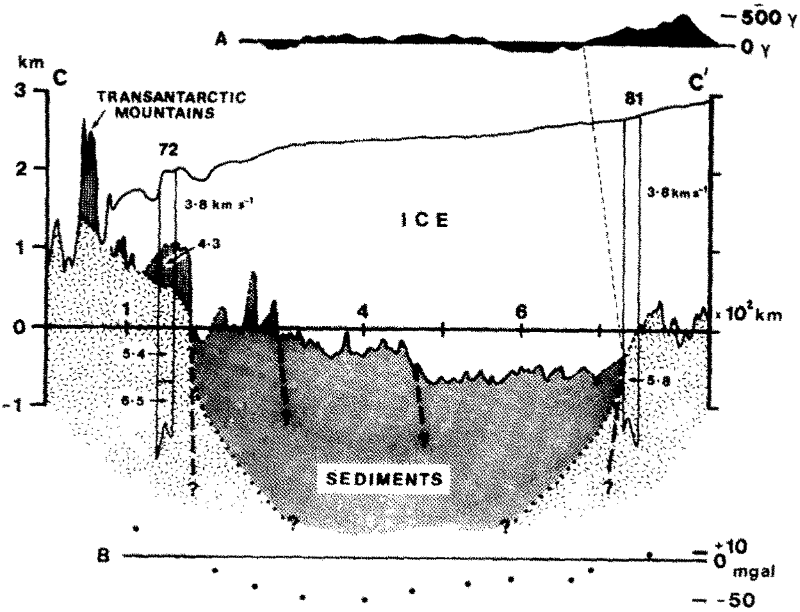

Fig. 4. Inferred structure of the Wilkes Basin. Ice sheet surface and bedrock profiles from radio echo sounding (C—C' in Fig. 1). Columns 72 and 81 present seismic refraction data with velocities given in km s^{-1} (Crary, 1963). Upper profile A presents residual magnetic anomalies (Ostenso and Thiel, 1964) along part of A—A' (Fig. 1); a possible correlation with bedrock is indicated. Lower profile B shows regional free-air gravity anomalies (Robinson, 1964) along line 72—81 (Fig. 1). Possible faults are signified by heavy dashed lines. Inferred sediments and basement are shown by appropriate shading. Sediments in the exposed Transantarctic Mountains (Late Palaeozoic Beacon Supergroup) are confirmed from geological observations.

examined to provide information on the possible sedimentary composition of the basin.

Source depths, calculated by the half-slope method on suitable anomalies of $>150\gamma$ across the Wilkes Basin, are given in Table II. Depth to bedrock is also given corrected to more accurate radio echo sounding determinations.

Across the southern end of the Wilkes Basin it can be seen that magnetic 'basement' lies on average 2.7 km below the ice—bedrock interface. Although the half-slope technique yields only maximum depths to anomaly sources such estimates may nevertheless be taken as strongly presumptive evidence for the existence of a sedimentary cover.

Ostenso and Thiel (1964) have reported an aeromagnetic flight from McMurdo to Wilkes Stations (Fig. 1). Unfortunately data on aircraft altimetry were subsequently destroyed and no source-depth calculations could be performed on the results. A qualitative examination of the anomalies, however, does reveal useful regional variations. The section across the Wilkes Basin is shown in Fig. 4. It is characterized by a very smooth residual field with

TABLE II

Magnetic anomaly source depths, ice thicknesses and inferred sediment thicknesses across the Wilkes Basin, East Antarctica

Station [1]	Depth to magnetic anomaly [1] (km)	Ice thickness [2] (km)	Inferred sediment thickness (km)
101.15—102.0 [a]	3.50	2.73	0.77
102.10—102.12	4.00	2.83	1.17
102.13—102.15	9.60	3.30	6.57
102.16—103.0 [b]	3.10	2.96	0.14
103.3—103.6	3.70	2.76	0.94
103.13—103.20	6.90	2.36	4.54
103.21—104.4 [c]	2.10	2.45	—

Mean inferred sediment thickness for basin 2.7 km.
[a] 'Eastern' flank of basin (see Fig. 1).
[b] Isolated high in basin (see Fig. 1).
[c] 'Western' flank of basin (see Fig. 1).
[1] Data from U.S. McMurdo—South Pole Traverse 1960—61 (Robinson, 1964).
[2] Data from Robinson (1964) adjusted to radio echo sounding determinations (Drewry, 1975c).

gentle gradients and amplitudes of no more than 250γ consistent with that likely to be generated over low magnetic sedimentary layers. In view of likely positional errors for the measurements (only dead-reckoning navigation was used) the sharp transition to more intense and fluctuating anomalies corresponds surprisingly well with the western edge of the Wilkes Basin.

The anomaly pattern over the Aurora Basin is more complex but nevertheless shows similarities to that described for the Wilkes Basin. Residual anomalies are shown in Fig. 5 for two flight lines, displaced by 20 km, against a radar profile. Orientation of the aeromagnetic and radar flight lines were not the same (Fig. 1). Bearing in mind these sources of error the correspondence between radar topographic and magnetic anomaly patterns is surprisingly good. Profile *A* shows a close correlation between basin and residual anomalies of low gradient (amplitudes $\leqslant 300\gamma$) suggesting a sedimentary infill. Intervening highs of possible basement rocks are characterized by a more intense anomaly pattern with amplitudes of $>600\gamma$.

Profile *B* shows a poorer correlation which has probably resulted from non-coincidence of the respective flight tracks — with the magnetic line crossing and recrossing the basin margins.

Gravity observations

Despite considerable errors encountered in Antarctic gravity determinations (Bentley, 1964; Drewry, 1975c) cautious interpretation of significant anomalies can yield limited information on sub-ice structures and materials.

The thorough analysis of gravity data by Robinson (1964) shows a zone

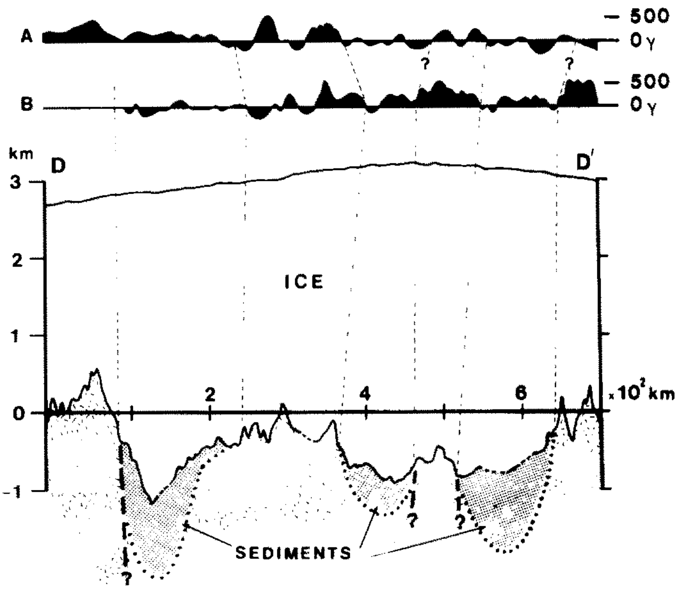

Fig. 5. Inferred structure of the Aurora Basin. Ice sheet surface and bedrock profiles from radio echo sounding (*D—D'* in Fig. 1). Upper profiles A and B present residual magnetic anomalies (Ostenso and Thiel, 1964) along parts of *A—A'* (Fig. 1). Possible correlations of anomaly segments and bedrock are indicated. Other symbols as in Fig. 4.

of strongly negative regional free-air and Bouguer anomalies inland and approximately parallel to Transantarctic Mountains. Both Robinson (1964) and Bentley (1974) have suggested that a sedimentary basin is unlikely to explain the free-àir anomalies of <—30 mGal and have postulated the presence of undetermined active tectonic processes as an 'unsatisfactory' explanation.

It is important to realise that the evidence then available for the presence of sediments in East Antarctica could not be interpreted unambiguously. Since there was little information on the overall pattern of sub-ice bedrock or its inferred geological characteristics geophysical data for most inland areas were treated together. This procedure had the effect of masking significant spatial variations especially in gravity and magnetic parameters. The data across the Wilkes Basin listed in Table II, for instance, were assessed in combination with source-depth calculations along the entire traverse route — including basement and basin areas alike. The fact that no seismic refraction profiles were successfully accomplished over the Wilkes Basin, and only crustal velocities encountered, inevitably compounded the conclusion that available geophysical data for East Antarctica indicated, on average, typical crystalline, continental crust and that the Wilkes depression was merely a structural downwarp.

It has been demonstrated in previous sections that radio echo sounding investigations allow a reassessment of previous magnetic and seismic results and the possibilityof a sedimentary presence in the Wilkes Basin to be entertained. In the light of these findings Robinson's gravity determinations can also be shown to reflect a sediment accumulation. Since the bulk of central East Antarctica is in approximate isostatic equilibrium (Grushinsky and Frolov, 1967) we can compute the thickness of a sediment layer of infinite extent (h) likely to give rise to an observed gravity anomaly (g_{obs}):

$$h = g_{obs}/2\pi G\Delta\rho \qquad (3)$$

where G is the universal gravitational constant, and $\Delta\rho$ denotes density contrast between local sediments and average subjacent basement rocks. Taking density values for sediments of 2 400 kg m^{-3} and crystalline basement of 2 700 kg m^{-3} we obtain a value h = 2.5 km for the mean anomaly (—31 mGal) over the Wilkes Basin. Bearing in mind the gross oversimplification of eq. 3 and the errors to which Antarctic gravity observations are subject, this result is not significantly dissimilar to the sediment column calculations presented in Table II.

In the Aurora Basin there are fewer and less well controlled gravity measurements. Only the oversnow traverse from Wilkes to Vostok stations has yielded any data (Walker, 1966), but is disadvantaged in this discussion in that there is no continuous radar profiling in the region.

BASIN STRUCTURE AND SEDIMENT AGE

It is believed that the geophysical data, discussed in previous sections, taken together, argue for the presence of sediment-filled basins within the East Antarctic craton. They also provide some limited information for the interpretation of the possible structure of these basins.

Structure

Radio echo results have allowed broad identification of basin characteristics. Sediment appears to be extremely thin or absent on the inland flank of the Wilkes Basin where terrain roughness becomes significantly greater than along its axial core (Drewry, 1975b, and Fig. 3). This conclusion is corroborated by seismic refraction shooting which detected the near-surface existence of granitic crust on the western margin of the basin (Fig. 4). Since P-wave velocities were similar to those detected on the edge of the Transantarctic Mountains at Skelton Névé, such basement rocks are assumed to pass beneath the Wilkes Basin. Furthermore radar measurements indicate sudden breaks in slope which point to possible fault-control and deep erosion of the basin edges. Faulting on the western submerged flank of the Transantarctic Mountains (eastern margin of the Wilkes Basin) has long been entertained, although radio echo sounding studies have shown this inland zone to be extremely complex (Drewry, 1972).

Fig. 4 attempts to present a generalized section across the Wilkes Basin at approximately the 78°S parallel, incorporating a variety of geophysical information. While the data have been superimposed in this figure the radar and aeromagnetic flight lines and the oversnow traverse routes for gravity and seismic results were not coincident (see Fig. 1). Nevertheless it is felt that Fig. 4 does provide a representative picture of these parameters.

The thickness of sediments infilling the Wilkes Basin is probably <3 km. Bedrock highs penetrate the cover in some localities (e.g. 80° S and 78° S). In the former area (see Fig. 2) this situation is indicated not only from radio echo profiling, but magnetic source-depths show the rapid approach of magnetic materials over a possible inlier (Table II).

Much less information is available for interpretation of the Aurora Basin. Sediment thicknesses are unknown but a pattern of smooth basins and intervening rough basement highs (possibly faulted) is suggested from radar and magnetic profiling. A cross-section is shown in Fig. 5. It is probable that the Aurora Basin has a much more complex tectonic setting and history than the Wilkes Basin and will thus require extensive geophysical investigations to fully elucidate its structure.

The distribution and configuration of both the Wilkes and Aurora sediment-filled depressions are thought to be governed by intra-cratonic fracture patterns, possibly related to ancient orogenic sutures. The Wilkes Basin in particular lies parallel to the inland edge of the 450—550 m.y. Ross Orogen. The situation in the Aurora Basin remains unknown. Juxtaposition of basins and flanking basement highs of probable Precambrian and Early Palaeozoic age is reminiscent of basin and swell structures of the African and Australian cratons.

Sediment age

The age of sediments within interior basins remains essentially unknown. They must, however, predate the East Antarctic ice sheet which is now considered to be of mid-Miocene age (Drewry, 1975d). It is possible to speculate that within these interior basins mainly terrestrial sedimentation progressed during the later Mesozoic with the stripping of adjacent 'Gondwana' terrains. The Transantarctic Mountains would have been a principal source of clastic material for the Wilkes Basin while the Aurora Basin would have been infilled from the Gamburtsev Mountains and other sub-glacial highland massifs in central East Antarctica (Fig. 1). In coastal localities a marine facies could be present, akin to the situation existing in southern Australia during the late Mesozoic and Cenozoic.

CONCLUSIONS

Two major sub-ice basins have been identified in central East Antarctica. The presence of sediments within these structures, suggested from radio echo sounding and aeromagnetic investigations, has been supported, for the Wilkes Basin, by the reinterpretation of oversnow seismic refraction, magnetic and gravity studies. A sediment thickness of up to 3 km is supposed. Much less is known regarding the structure of the more complex Aurora basin. Both basins, however, may be in part, fault-controlled and related to a pattern of ancient orogenic lineations. Sediments are of pre-Mid-Cenozoic age. This pattern revealed by geophysical observations of contrasting sedimentary basins and intervening basement highs is in keeping with the presumed coeval nature of the East Antarctic craton and other Gondwana provinces in Phanerozoic time.

The discussion in this paper has highlighted the lack of geophysical information for Antarctica. Since our knowledge of the gross regional composition of Antarctic bedrock can only come from such remote sensing studies further investigations, combining several geophysical techniques and directed towards the elucidation of specific crustal problems, appear as a major future priority.

ACKNOWLEDGMENTS

Radio echo sounding investigations were supported financially by UK Natural Environment Research Council and logistically by US National Science Foundation, US Navy Antarctic Support Force and Antarctic Air Development Squadron VXE-6. It is a pleasure to thank LCDR A.L. Herr Jr. (plane commander US Navy C-130F Buno 148320) for his enthusiastic support during radio echo sounding operations 1974—75. I also wish to thank the SPRI radio echo sounding teams in collection of data and R.H.N. Steed for assistance with data processing.

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