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OFFSHORE 9 PART 6

MICROFOSSIL ANALYSES, SAILFISH

NO. 1, AUSTRALIA

for

MAGELLAN PETROLEUM AUSTRALIA, LIMITED

by

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Figure 1. Faunal Summary - Sailfish No.1

May 15, 1972

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MICROFOSSIL ANALYSES
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As customary in previous reports, correlations with the standard biostratigraphic zonation of the tropics is approximated by means of planktonic foraminiferal correlations. Benthic species are used as auxiliary correlation indices and for the interpretations of bathymetry in developing a paleoenvironmental log for Sailfish No. 1 (Fig. 1). Water depths are defined as follows: upper sublittoral, 0-100 feet; middle sublittoral zone, 100-300 feet; lower sublittoral zone, 300-600 feet; upper bathyal zone, 600-1500 feet; middle bathyal zone, 1500-3000 feet; lower bathyal zone, 3000-6000 feet; abyssal zone, greater than 6000 feet. Water depths are indicated on the basis of the depth distribution of modern analogs of the fossil species. General correlations with the New Zealand section are given together with correlations with standard planktonic numerical zones.

The Sailfish well penetrated the Upper Miocene boundary at about 1060 feet, where the facies change from sublittoral to upper bathyal. From 1060 to about 2020

feet the faunas are typical of the Upper Miocene and the bathymetric character shows deepening with depth in the well. There are a few traces of deeper water species; these are likely due to reworking. If we accept the possible greater water depths, especially between 1450 and 1690 feet in the well, there is a pronounced break in the environmental logging.

The Middle Miocene occurs at about 2020 feet, with a middle bathyal type of fauna. A lower bathyal fauna was encountered at about 2290 feet and an abyssal fauna occurs below about 2670 feet.

Lower Miocene planktonic species, representing Neogene Zone 8, occur below about 3390 feet together with abyssal benthic species. At 4040 feet and below there appears to be a few specimens of the Oligocene reworked into the Lower Miocene assemblages as noted in the following faunal summary.

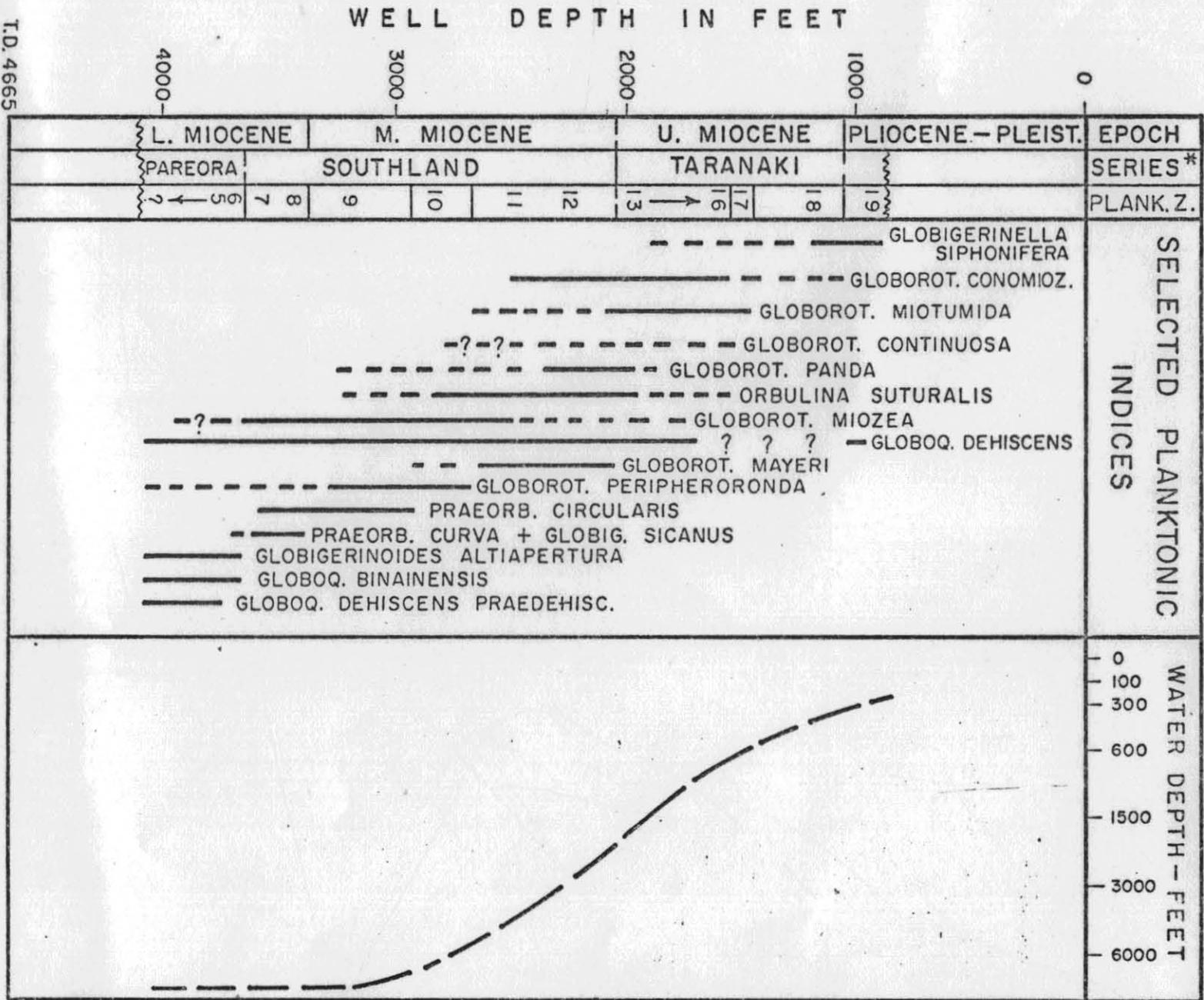
In general, the Upper Miocene is unusually thin as contrasted with other basins, especially in the lower portion between 1450 and 2020 feet. The Middle Miocene is comparatively well developed; however, the Lower Miocene section is unusually thin, with several planktonic zones missing or poorly developed. Neogene Zones 5, 6, 7, and 8 are very thin; they often represent very thick sections in other basins.

In the well log, sands are indicated just below 2770

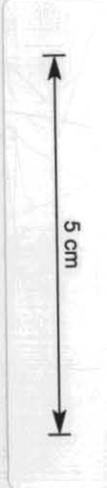
feet in about Neogene Zone 10 with a characteristic set of deep water benthic species and just below the upper limit of the Globorotalia peripheroronda. These must represent turbidites or transported sands, possibly reflecting part of a subsea fan type of deposit.

In the lowermost Middle Miocene, between about 3120 and 3340 feet, there is a second sand which is associated with a deep-water fauna suggesting that this, too, is a turbidite deposit.

FAUNAL SUMMARY, SAILFISH NO. 1
ORVILLE L. BANDY



* NEW ZEALAND SERIES



I.D. 4665

REPORT ON SAILFISH NO. 1, AUSTRALIA

Summary microfaunal analyses
by Orville L. Bandy
May 15, 1972

WELL DEPTH (in feet)	AGE AND DOMINANT FAUNA	FACIES
852- 880	Pliocene ? bryozoan and mol- luscan fragments	Sublittoral
880- 910	Pliocene Planktonics Globigerina bulloides Globigerina druryi de- coraperta Globigerinella siphonifera Globorotalia inflata Globorotalia pachyderma (dextral) Globorotalia punctulata Orbulina universa Benthics Amphicoryna scalaris Cibicides spp Dentalina substrigata Sphaeroidina bulloides (0.59 mm) Uvigerina striate form	Lower Sublittoral
940- 970	Pliocene, Lower (Neogene Zone 19) Planktonics As above plus Globoquadrina dehiscens (rare) Globorotalia crassaformis Benthics Cibicides praecinctus var. Discanomalina bradyi (australis)	Lower Sublittoral

WELL
DEPTH

(in feet)

AGE AND DOMINANT FAUNA

FACIES

970-
1060Pliocene, Lower (Neogene Zone 19)
Planktonics as aboveLower
Sublittoral

Benthics

Canceris peroblongus
Glandulina laevigata
 (small)
Hoeglundina elegans
Lenticulina costata
Parrellina imperatrix

1060-
1450Upper Miocene, Kapitean of New
Zealand, about Neogene Zone 18
PlanktonicsUpper
Bathyal

As above plus
Globigerinoides sacculifer
Globorotalia conomiozea
 (Upper Miocene)
Orbulina bilobata

Benthics

Bolivinita pohana var.
Cyclammina (one specimen
 possibly reworked)
Discanomalina semipunctata
Florilus decepatrix
Lenticulina calcar var.
Lenticulina gibba
Lenticulina mamilligera
Lenticulina nikobarensis
Martinottiella communis var.

Note: The characteristic occurrence of
Cyclammina is deeper than about 1500
 feet (living) today. The single
 occurrence noted here is thought to
 be due to reworking.

1450-
1540Upper Miocene, Tongaporutuan equi-
valent of New Zealand (?), about
Neogene Zone 17

WELL	DEPTH	AGE AND DOMINANT FAUNA	FACIES
	(in feet)		
		Planktonics include <i>Globigerina angustiumb- illicata</i> <i>Globorotalia miotumida</i> <i>Orbulina suturalis</i> (rare)	Upper Bathyal or deeper
		Benthics include <i>Amphicoryna hispida</i> <i>Cassidulina laevigata</i> <i>Gavelinella parvumbilia</i> <i>Karrerria maori</i> <i>Stilostomella nuttalli</i> (rare) <i>Stilostomella verneuili</i> (rare)	
		Note: Rare specimens of <i>Stilostomella</i> suggest much deeper water than upper bathyal depths, in contrast to the remainder of the fauna. Ordinarily these occur with a typical abyssal type fauna. The depth assignment here is based upon the shallowest possible conditions. If we assume true abyssal depths are represented, a major environmental break occurs at a well depth of about 1480-1510 feet.	
1540-	1690	Upper Miocene, Tongaporutuan equivalent of New Zealand (part), Neogene Zone 16 (?) Planktonics include <i>Globorotalia continua</i>	Upper Bathyal or deeper
		Benthics include <i>Cibicides matanzasensis</i> var. <i>Bolivina hentyana</i> <i>Gyroidina soldanii</i> group <i>Globocassidulina pacifica</i> group <i>Pullenia quadriloba</i> <i>Sphaeroidina bulloides</i> continuous below this level	

WELL DEPTH (in feet)	AGE AND DOMINANT FAUNA	FACIES
1690- 2020	<p>Upper Miocene, lower Tongaporutuan equivalent of New Zealand, Neogene Zones 16-13, incl.</p> <p>Planktonics include</p> <p><i>Globoquadrina dehiscens</i> (continuous below this)</p> <p><i>Globorotalia miozea</i> var. ? (rare)</p> <p><i>Globorotalia panda</i> (rare)</p> <p><i>Globorotalia margaritae</i> (rare)</p> <p><i>Globorotalia scitula</i> vars.</p> <p><i>Orbulina suturalis</i> (continuous below this)</p> <p>Benthics include</p> <p><i>Alabamina tenuimarginata</i></p> <p><i>Bulimina costata</i> var.</p> <p><i>Bulimina inflata</i> var.</p> <p><i>Cassidulinoides bradyi</i></p> <p><i>Chilostomella oolina</i></p> <p><i>Chilostomella ovoidea</i></p> <p><i>Cibicides subhaidingeri</i></p> <p><i>Globocassidulina crassa</i></p> <p><i>Gyroidina orbicularis</i></p> <p><i>Marginulina obesa</i> var.</p> <p><i>Uvigerina auberiana</i></p> <p><i>Uvigerina miozea</i></p>	Middle Bathyal or deeper
2020- 2170	<p>Middle Miocene, upper Waiauan of New Zealand, Neogene Zone 12 (part ?)</p> <p>Planktonics include</p> <p><i>Globorotalia mayeri</i>*</p> <p>Benthics include</p> <p><i>Bulimina truncanella</i> ?</p> <p><i>Heronallenia lingulata</i></p> <p><i>Uvigerina canariensis</i> var.</p> <p>Note: In New Zealand and Australian areas <i>G. mayeri</i> defines the upper limit of the Waiauan according to Jenkins.</p>	Middle Bathyal or deeper

WELL DEPTH (in feet)	AGE AND DOMINANT FAUNA	FACIES
2170- 2290	Middle Miocene, Waiauan, Neogene Zone 12 Planktonics include Globorotalia conica, upper limit of con- tinuous occurrence Benthics include Bolivina affiliata Lingulina seminuda var.	Middle Bathyal or deeper
2290- 2500	Middle Miocene, lower Waiauan, Neogene Zone 11 ? Planktonics include Globorotalia miozea typical Benthics include Cancris auricula Ceratobulimina awamoana Cyclammia incisa (1.5 mm) Ehrenbergina marwicki Globobulimina pacifica var. Lingulina decipiens Sphaeroidina variabilis Stomatorbina concentrica Gyroidina allani (0.68 mm) ?	Lower Bathyal Zone
<p>Note: A number of benthic species, although continuously present, show a gradual size increase. This trend is also characteristic of size values for modern benthic faunas.</p>		
2500- 2670	Middle Miocene, lower Waiauan, Neogene Zone 11 Planktonics include Globigerina woodi Benthic species include Cassidulinoides chapmani "Rotalia" scabricula Uvigerina woodringi (rare)	Lower Bathyal Zone

WELL DEPTH	AGE AND DOMINANT FAUNA	FACIES
2670- 2940	Middle Miocene, upper Lillburnian, Neogene Zone 10 ? Planktonics include <i>Globorotalia peripheroronda</i> Benthics include <i>Anomalina almendarensis</i> <i>Alabamina australiensis</i> <i>Ellipsoidina abbreviata</i> <i>Bolivina dilatata</i> <i>Melonis pompilioides</i> var. <i>Tritaxilina mexicana</i> <i>Uvigerina canariensis</i> (typical) <i>Uvigerina woodringi</i> (common)	Upper Abyssal Zone
2940- 3390	Middle Miocene, lower Lillburnian, Neogene Zone 9 Planktonics include <i>Praeorbulina circularis</i> <i>Sphaeroidinellopsia disjuncta</i> Benthics include <i>Bathysiphon</i> sp. <i>Ellipsoglandulina multicostrata</i> <i>Glandulina laevigata</i> (0.9 mm) <i>Globocassidulina cuneata</i> <i>Karreriella bradyi</i> <i>Karreriella subcylindrica nana</i> <i>Melonis simplex</i> <i>Planulinoides biconcava</i> (rare) <i>Pleurostomella alternans</i> (rare) <i>Osangularia culter</i> (0.5 mm) <i>Vulvulina pennatula</i> var.	Abyssal Zone

WELL DEPTH (in feet)	AGE AND DOMINANT FAUNA	FACIES
3390- 3540	Lower Miocene, Clifdenian, Neogene Zone 8 Planktonics include Praeorbulina curve Praeorbulina glomerosa Globigerinoides sicanus Benthics as above	Abyssal Zone
3540- 3650	Lower Miocene, Clifdenian, Neogene Zones 8 and 7 ? Planktonics as above plus Globigerinoides transi- torius Benthics as above plus Ellipsoglandulina exponens	Abyssal Zone
3650- 3670	Lower Miocene, Altonian (?), Neo- gene Zone 6 Planktonics include Globigerinoides alti- aperturus	
3670- 3730	Lower Miocene, Altonian or Awamoan, Neogene Zone 5 Planktonics include Globoquadrina binaiensis	Abyssal Zone
3730- 3740	Lower Miocene, Awamoan, Neogene Zone 5 Planktonics include Globigerina ciperensis atypica	
3740- 4040	Lower Miocene, Awamoan, Neogene Zone 5 Planktonics include Globoquadrina dehiscens praedehiscens	

WELL DEPTH (in feet)	AGE AND DOMINANT FAUNA	FACIES
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Benthics as above plus
Osangularia culter (large)
Anomalina pompilioides ?

4040-
4100

Lowermost Miocene or Upper Oli-
gocene

Planktonics include above plus Abyssal Zone
 **Globoquadrina tripartita* ?

Benthics include

**Cibicides mexicanus*
Lenticulina orbicularis
Pleurostomella alternans
 (large)

Pullenia bulloides
 **Vulvulina advena* ? (Oligocene-
Eocene)

*Note: There are apparently some reworked Oligocene specimens in this zone indicating the well may have penetrated the Oligocene. The dominance of Lower Miocene forms and the lack of a typical assemblage from the Paleogene suggests a Lower Miocene age, just above the volcanics.