

R/V Ewing 95-10 Scientific Cruise Report, West Woodlark Basin ODP Site Survey
by Brian Taylor, SOEST University of Hawaii, Chief Scientist

The ship departed Kaohsiung, Taiwan on 29 September and arrived Honiara, Solomon Islands on 15 October, 1995. This primarily transit cruise was deviated to the western Woodlark Basin for a site-specific survey in support of Ocean Drilling Program Proposal 447-Rev "Active Continental Extension in the Western Woodlark Basin". The four survey days in Papua New Guinea waters from October 9th through 12th collected multichannel seismic, magnetic, gravity, Hydrosweep and 3.5 kHz data, all navigated by GPS. A track chart of the site survey is attached.

The majority of the survey was devoted to the acquisition of multichannel seismic (MCS) data at a ship speed of approximately 5 knots. We deployed a 196-channel, 4900 m streamer and a tuned 8470 cubic inch 20-airgun array. Line 1 (see shot point map and near-trace monitor record) was shot with the full gun array firing every 20 seconds, recording 16 seconds of seismic data with 12.5-m-spaced common mid points at a nominal fold of 49. Lines 2 and 3 were shot with alternate guns (10 gun half arrays = 4230 cu in) firing every 10 seconds, a record length of 7 seconds, and a nominal fold of 98. The remaining lines (4-16) were shot with half arrays firing every 12 seconds and a record length of 9 seconds. From line 4 through the first half of line 6, the nominal fold is 82. Thereafter we lost electrical continuity with the last 1200 m (48 channels) of streamer, making the active streamer length 3700 m, the number of channels 148, and the nominal fold 62.

The long streamer lengths should provide both good resolution of formation velocities as well as the ability to suppress multiples (using inside mutes while retaining sufficient long-offset data). The pre-existing and seven new north-south MCS lines are now crossed by seven MCS tie lines, providing an interconnected seismic grid with multiple tie points for drill site selection. The structures and stratigraphy observed on shipboard monitor records of the new seismic lines are similar to those observed on pre-existing MCS lines such as Ewing9203-1218.

A non-MCS survey of the summit of Moresby Seamount extended the swath bathymetry coverage of the shallow water areas and provided a grid of 3.5 and 12 KHz echo sounder profiles. Two areally-small, but 10's-of-meters-thick, sediment pockets were identified and subsequently cored, but the cored material (probably carbonate sands) ran out through the fingers of the core catcher during recovery (see summary of bottom sample stations). A piston core successfully recovered ~4 m of foram ooze from the rift basin north of Moresby Seamount. A dredge from the uppermost southern flank of Moresby Seamount recovered a suite of late Pliocene sedimentary rocks equivalent to the Awaitapu Formation of the Cape Vogel Basin and very different from two existing dredges of metamorphic rocks from lower northern slopes of Moresby Seamount. The sedimentary rocks may be from a small rider block above a detachment fault that domes over the top of Moresby Seamount (imaging of which awaits seismic processing, but a similar situation exists on the D'Entrecasteaux Islands) or they may represent the north-dipping reflectors imaged within the seamount and beneath the margin further north.

Immediately following the cruise, the chief scientist flew to Port Moresby where he gave a lecture and report on the results of this and previous cruises at both the University of PNG (Oct. 16th) and at the Petroleum Branch, Dept. Mines and Petroleum PNG (Oct. 17th). At the Petroleum Branch he also gave a seminar to the staff on the Ocean Drilling Program and obtained copies of internal reports that summarize the results of previous commercial seismic surveys and the two dry wells (Goodenough-1 and Nubiam-1) in the offshore Cape Vogel Basin.

R/V EWING 95-10 BOTTOM SAMPLING STATIONS (Western Woodlark Basin)

Piston Core 1: (JD 285/0830) 9°43.00'S 151°34.30'E 3222 m
~4 meter core of light brown foram ooze from the rift basin north of Moresby Seamount.

Piston Core 2: (JD 285/1154) 9°48.75'S 151°32.93'E 357 m

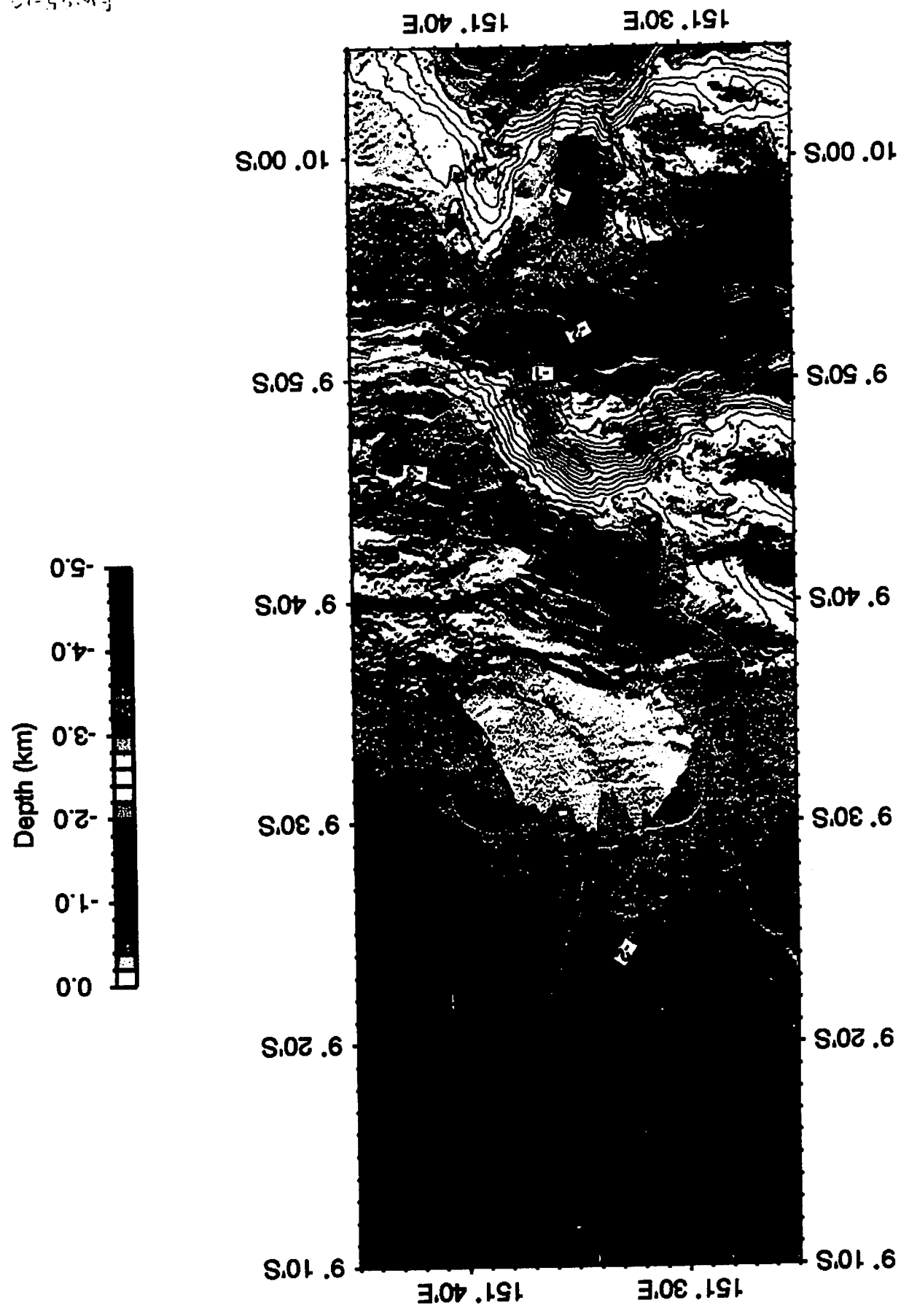
Piston Core 3: (JD 285/1413) 9°50.37'S 151°31.74'E 632 m

Both cores penetrated small sediment pockets on the summit of Moresby Seamount, but only recovered fragments of shells, corals, and sponge spicules caught in grease near the core catcher. (These cores apparently sampled carbonate sands that ran out through the fingers of the core catcher during retrieval.)

Rock Dredge 1: (JD 285/1725) 9°50.95'S 151°34.93'E 1211 m to
(JD 285/1835) 9°50.46'S 151°34.33'E 541 m

Dredge from the uppermost southern slope of Moresby Seamount recovered a bag full of sedimentary rocks (grey to brown lithic calcareous sandstone, brown to grey tuffaceous siltstone, bioturbated mudstone, biomicrite, and rare polymict pebble conglomerate). Initial foraminifera identifications indicate a late Pliocene (N21 = 1.9-3.1 Ma) age and deposition at water depths of 340-800 m. (Equivalent to Awaitapu Formation of Cape Vogel Basin and very different from two previous dredges of metamorphic rocks from lower northern slopes of Moresby Seamount).

EW95-10 Hydrographic
Section on MW9304
MARI DATA



Re: 8. POTENTIAL FUTURE DRILLING: TECP

PROVISORY, November 8, 1995

8.3 West Woodlark Basin (447-rev)

SSP Watchdog: Enachescu

SSP Proponent: none

Target Type(s): Sites ACE-1A, 2A, 4A, 5A: B (passive margin); Site ACE-3A F (barerock?)

This proposal is targeted to a small basin formed by present day active extension. The recent basin formation includes all the variations from continental rifting to seafloor spreading. A low angle detachment zone and a possible metamorphic core complex, the Morsbey Seamount, are to be investigated by drilling. The role of low-angle faulting in continental extension and breakup is one of the most controversial subjects in geoscience world. Five locations are documented, two of each have alternatives. Except for one (3A), these sites are judged as passive margin targets. Site 3A was considered barerock target prior to recent sampling of the mound.

SSP acknowledges that a nearly comprehensive data package has been deposited in the Data Bank including a substantial amount of MCS data. All proposed sites are feasible and strongly documented. The few remaining concerns raised by this and other panels, were addressed during the latest Ewing research cruise, when MCS, gravity, mag, 3.5 & 12 kHz echo saunder, GPS navigation data were collected.

Intersecting lines required for all proposed sites in passive margin settings (sites 1A, 2A, 4A, 5A and B), are now collected. Several single trace monitor lines inspected during the meeting are of excellent quality but do not allow an in depth site survey analysis or the final validation of the scientific objectives of the drilling program.

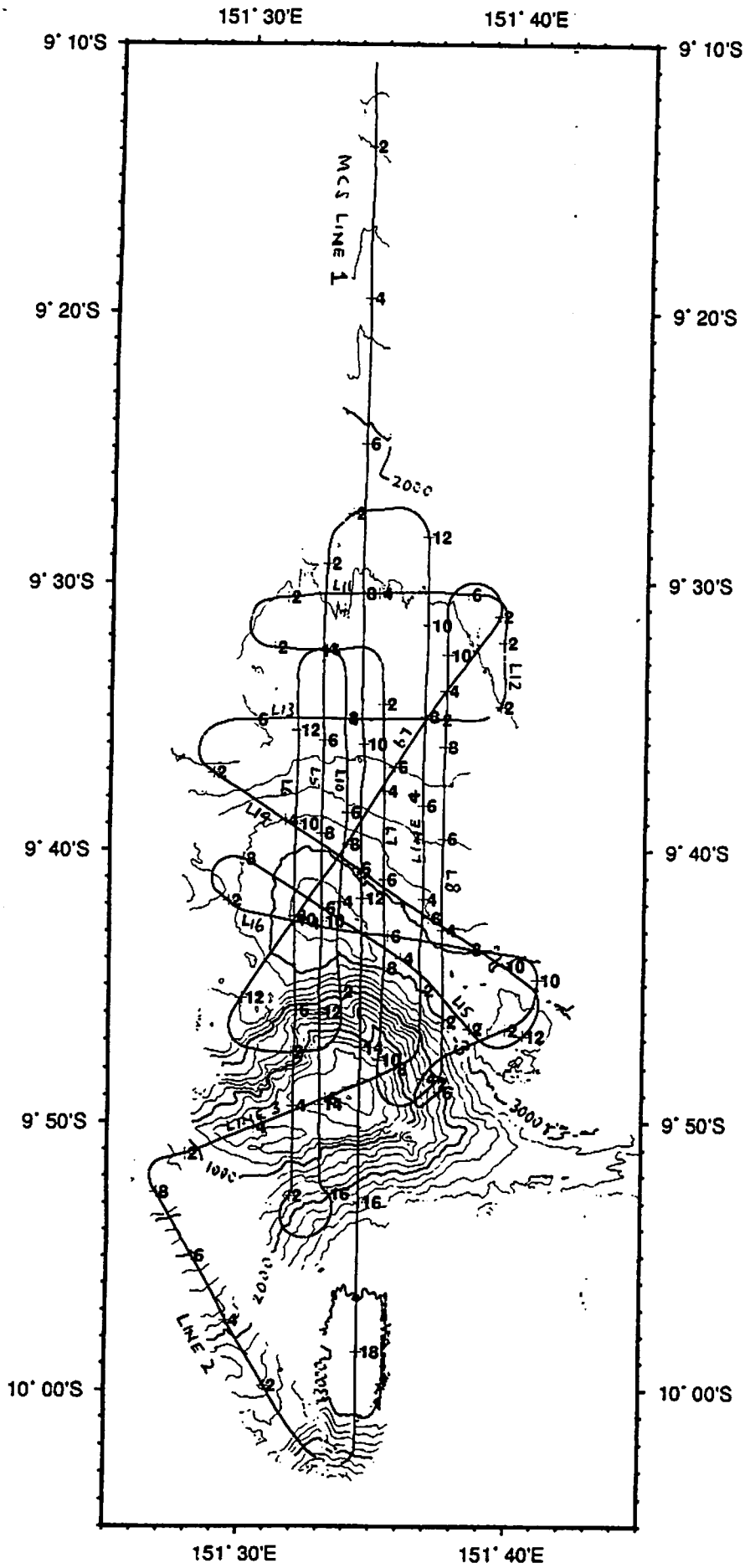
Initially identified as barerock, the Site 3A appeared at least on line 1218 as sedimented. This was reported in our past watchdog reports and the necessity of coring was repeatedly stressed. Coring, therefore considered a crucial requirement by SSP at site 3A, was attempted on and near the crest of the Moresby Seamount. Two unsuccessful piston cores recovered very little sedimentary materials and is estimated that unconsolidated carbonate sand forms the sediments pockets at both crestal sites. Dredging the uppermost southern slope of the seamount resulted in a Pliocene sedimentary sequence consisting of sandstone, mudstones, biomicrite and conglomerate. This was a surprising result, as metamorphic rocks were dredged previously from the northern slope, but agrees with interpretation of stratified rocks within the upper part of the seamount.

Video or photographic data with accurate navigation is needed to clarify the shape and the nature of this site and to better document the scientific rationale of this proposal. This type of data is planned to be obtained during a late fall Aus-Can cruise. Though water current information has been obtained for this region, it is advised that such information should be obtained for the 3A site if the use of HRGB becomes necessary.

Presently the SSP ranks the proposal for site readiness as 1B.

SSP Consensus # 27: SSP reiterates that a nearly comprehensive data package supporting drilling in the West Woodlark Basin (447) now exists in the Data Bank. A few items like final migrated cross lines are soon to be supplied. These lines together with visual and further coring data for site 3A, will complete the data package. Reinterpretation of this site in light of the recent coring results may change its drilling strategy. One of the sites may need PPSP preview.

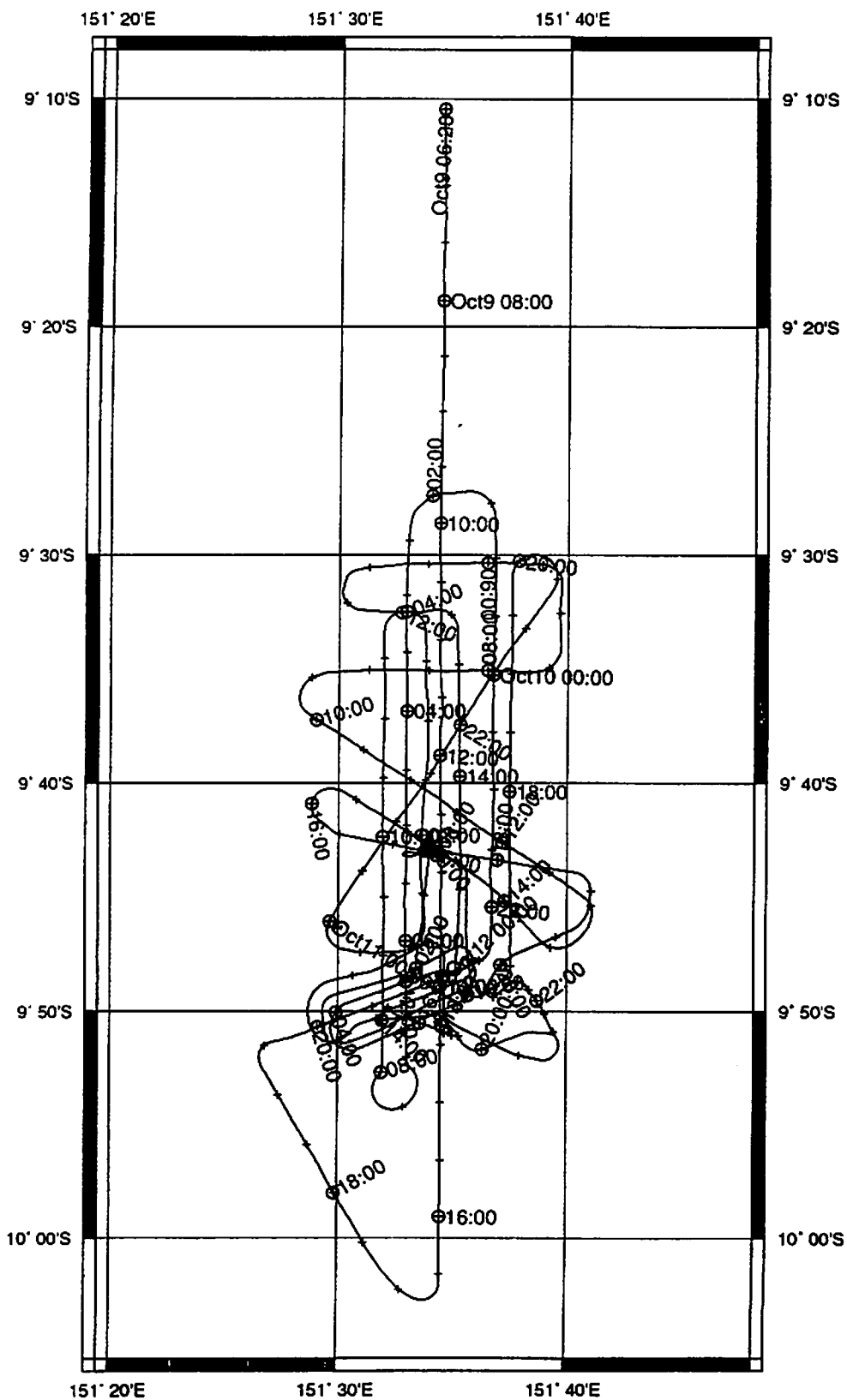
Michael E. Enachescu, Ph. D.,
Exploration Specialist



EW95-10 MCS line #:
 Shot points (annotated
 every 200) and
 Hydrosweep bathymetry

DB-6615

EW-9510 Moresby SMT Survey Track



DB. 6616