

# TUNES

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
UNIVERSITY OF CALIFORNIA, SAN DIEGO  
LA JOLLA, CALIFORNIA 92093



CRUISE PROSPECTUS  
R/V THOMAS WASHINGTON  
MAY 1991 - FEBRUARY 1992

## **Schedule and Summary**

### **Leg 00**

M. Tsuchiya  
WOCE Test Trip  
San Diego to Port San Luis, California  
May 31- June 1, 1991

This leg will serve as a shakedown for the start of WOCE.

### **Legs 1 & 2**

M. Tsuchiya and J. Swift  
WOCE Hydrographic Program Section P17 C  
Port San Luis to Papeete; Papeete to Papeete  
June 2 - July 11; July 16 - August 26, 1991

Hydrographic and CTD data will be collected along 135°W between 35°N and 15°S. Leg 2 will take the ship down to 35°S then up 150° back to Papeete

### **Leg 3**

L. Talley  
WOCE Hydrographic Program Section P16C  
Papeete to Honolulu  
31 August - 1 October 1991

The ship will continue WOCE along 150° from 17°30' S to 19°N.

### **Leg 4a & 4b**

S. Constable and P. Johnson  
Tiltmeter and Rock Drill  
Honolulu - Kauai Hai - Honolulu  
5 October - 16 October, 1991

This short cruise will be working in and out of West Coast of Hawaii conducting Rock Drill and tiltmeter operations.

### **Leg 5**

H. Staudigel  
Honolulu to Kwajalein  
21 October- 8 November, 1991

JOI/Inc survey and ODF site survey  
Sea Beam and single channel seismics between Honolulu and Kwajalein.

### **Leg 6**

H. Staudigel  
Kwajalein to Guam  
10 November - 7 December, 1991

Sea Beam and dredging will be done on 19 different seamounts and guyots.

### **Leg 7**

S. Bloomer  
Guam to Guam  
11-31 December, 1991

Sea Beam and dredging will be done north of Majuro.

### **Leg 8**

P. Johnson  
Guam to Majuro  
Magnetometer  
4 January - 3 February 1992

The Japanese, Hawaiian, and Phoenix lineations bound the Jurassic Quiet Zone region. A deep-towed magnetometer will survey this region, along with Sea Beam and waterguns.

### **Leg 9**

Transit  
Majuro to San Diego  
6 February - 22 February, 1992

The ship will transit home.

## TUNES Expedition - R/V Washington

## Underway Geophysical Data Collection

Desig. I.D.	Dates	Chief Days	Scientist(s)	Ports
R/V <i>Thomas Washington</i> (1991):				
Leg 1:	31may-11jul (WOCE P17C)	42	Tsuchiya	San Diego - Papeete Sea Beam (transit mode); Gravity (transit mode) Magnetometer (no); Seismic profiler (no)
Leg 2:	16jul-26aug (WOCE P17C) (WOCE P16CS)	42	Swift	Papeete - Papeete Sea Beam (transit mode); Gravity (transit mode) Seismic profiler (no); Magnetometer deployed only on transit between 135W and 150W sections.
Leg 3:	31aug-01oct (WOCE P17) (WOCE P16C)	32	Talley	Papeete - Honolulu Sea Beam (transit mode); Gravity (transit mode) Magnetometer (no); Seismic profiler (no)
Leg 4a: Leg 4b:	05oct-12oct 12oct-16oct	12	Constable/ Johnson	Honolulu - Kauai-Hai - Honolulu Sea Beam (transit mode?); Gravity (transit mode) Magnetometer (yes?) Seismic profiler (no)
Leg 5:	21oct-8 nov	19	Staudigel	Honolulu - Kwajalein Sea Beam (w/SB Proc); Gravity (yes) Magnetometer (yes); Seismic profiler (yes)
Leg 6:	10nov-07dec	28	Staudigel	Majuro - Guam Sea Beam (w/ SB Proc); Gravity (yes) Magnetometer (yes); Seismic profiler (no)
Leg 7:	11dec-31dec	21	Bloomer	Guam - Guam Sea Beam (w/ SB Proc); Gravity (transit mode) Magnetometer (yes); Seismic profiler (no)
Leg 8:	04 jan-03feb92	31	Johnson	Guam - Majuro Sea Beam (w/ SB Proc); Gravity (transit mode) Magnetometer (yes); Seismic profiler (yes)
Leg 9:	06feb-22feb92	17	Transit Leg	Majuro - San Diego

## Contact:

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P. Johnson  
Guam to Majuro  
Magnetometer  
4 January - 3 February, 1992  
Leg 8

The oldest areas of the ocean basins, of approximate age of 150 to 180 million years, are overlain with very low intensity magnetic anomalies. These regions of sea floor have been labeled 'The Jurassic Quiet Zone' (*i.e.*, JQZ), and have previously thought to have been formed during periods of constant polarity of the geomagnetic field. Recent aeromagnetic data over the Pacific Jurassic Quiet Zone has shown that the magnetic anomaly field over this region can be better characterized as 'high frequency, low amplitude', rather than that of a constant geomagnetic polarity. This new observation is consistent with a period of rapid reversals of the geomagnetic field within the 'Quiet Zone'.

In order to investigate this phenomena, and to identify the geological processes involved, we plan to conduct a full-scale geophysical survey of the JQZ. This survey includes deep-tow magnetometer, Sea Beam, and single-channel seismic reflection (watergun) studies of the Japanese, Hawaiian, and Phoenix lineations where they bound the Jurassic Quiet Zone in the western Pacific. The goal of this work is to determine if the source of the JQZ is either geomagnetic field behaviour (*i.e.*, rapid reversals, or low amplitude field intensity) or crustal construction processes (*ie*, a fundamental change in the width of the crustal formation zone, or type of extrusive flow morphology). Towing the magnetometer sensor close to the sea floor, using our deep-tow package, will allow us to determine which of these hypothesis are correct.

**Work Areas:**

Japanese Lineations:	22°N	150°E
Hawaiian Lineations A:	25°N	158°E
Hawaiian Lineations B:	21°N	169°E
Phoenix Lineations:	10°N	171°E

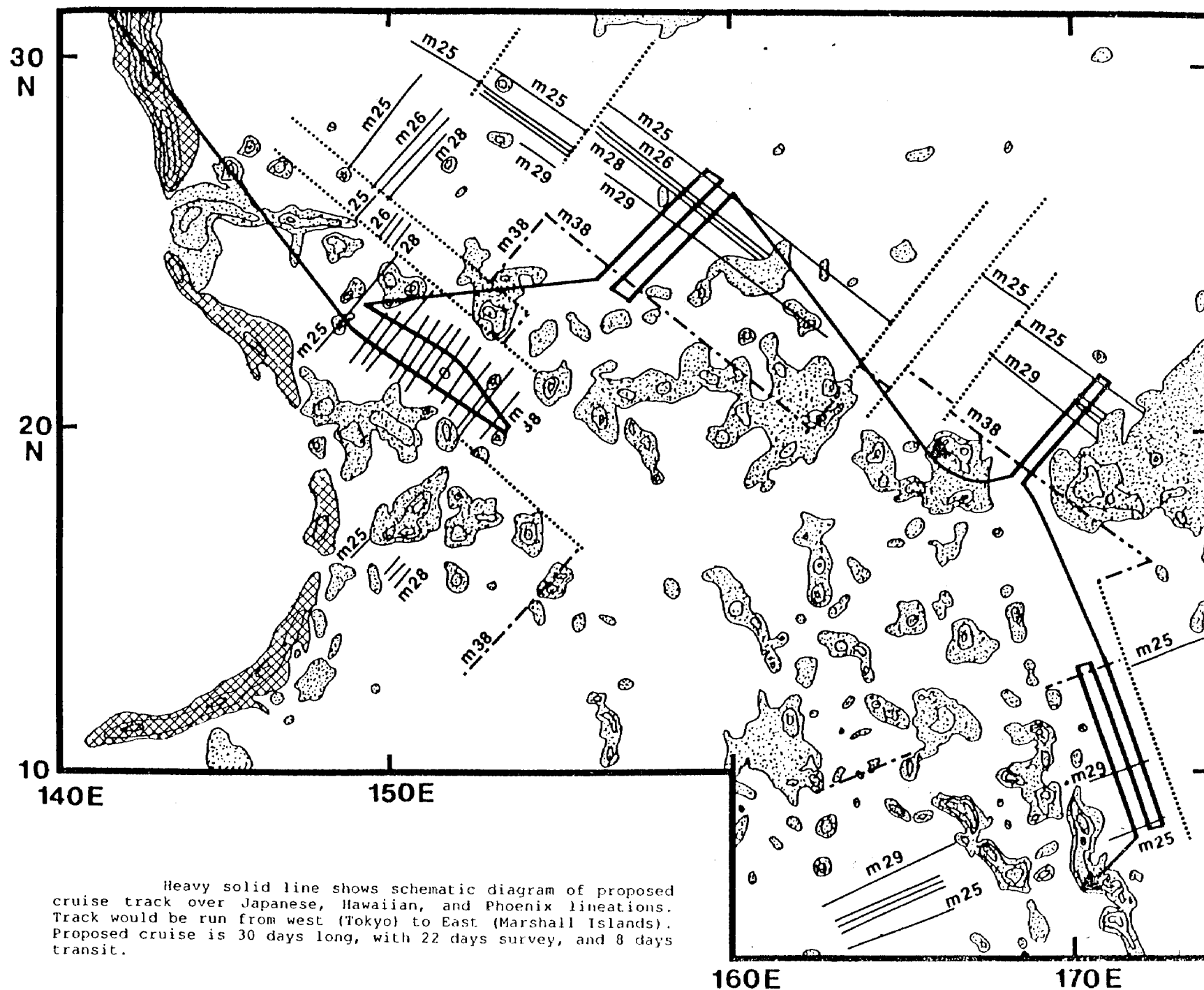


Diagram of proposed UW deep-tow magnetometer configuration, for towing at 4 knots. Use of a 'faired' (streamlined) cable and heavy (>1000 lbs) depressor weight has been shown to be effective in increasing the possible towing speed beyond the present 1 knot D/T capability.

