

Date: 23 February 1993

To: Aitken, T. L-DEO
Chayes, D. L-DEO
Cox, L. L-DEO
✓ Eaton, G. L-DEO
Hayes, D. L-DEO
Mutter, J. L-DEO
MARSCICO, L-DEO
Science Officer EWING
Captain EWING
Stennett, J. L-DEO
Robinson, W. L-DEO

RESEARCH CRUISE REPORT
R/V MAURICE EWING, LEG EW92-01

"A High Resolution Plate Kinematic Flowline of the Pacific-Antarctic Ridge"

P.I. S.C. Cande, W.F. Haxby and C.A. Raymond
Dates: 15 January 1992 to February 29, 1992
Ports: Lyttleton, New Zealand/Lyttleton, New Zealand

mr

Mercy Garland
Marine Department

Cruise Report: R/V Ewing 9201
Cruise Dates: January 15, 1992 - February 29, 1992
Ports: Started and ended in Lyttelton, New Zealand
Location: See attached track chart

Project Title: A high-resolution plate kinematic flowline of the Pacific-Antarctic Ridge

Grant: NSF OCE91-03573

PI's: S.C. Cande, W.F. Haxby, C.A. Raymond

Description of Scientific Studies

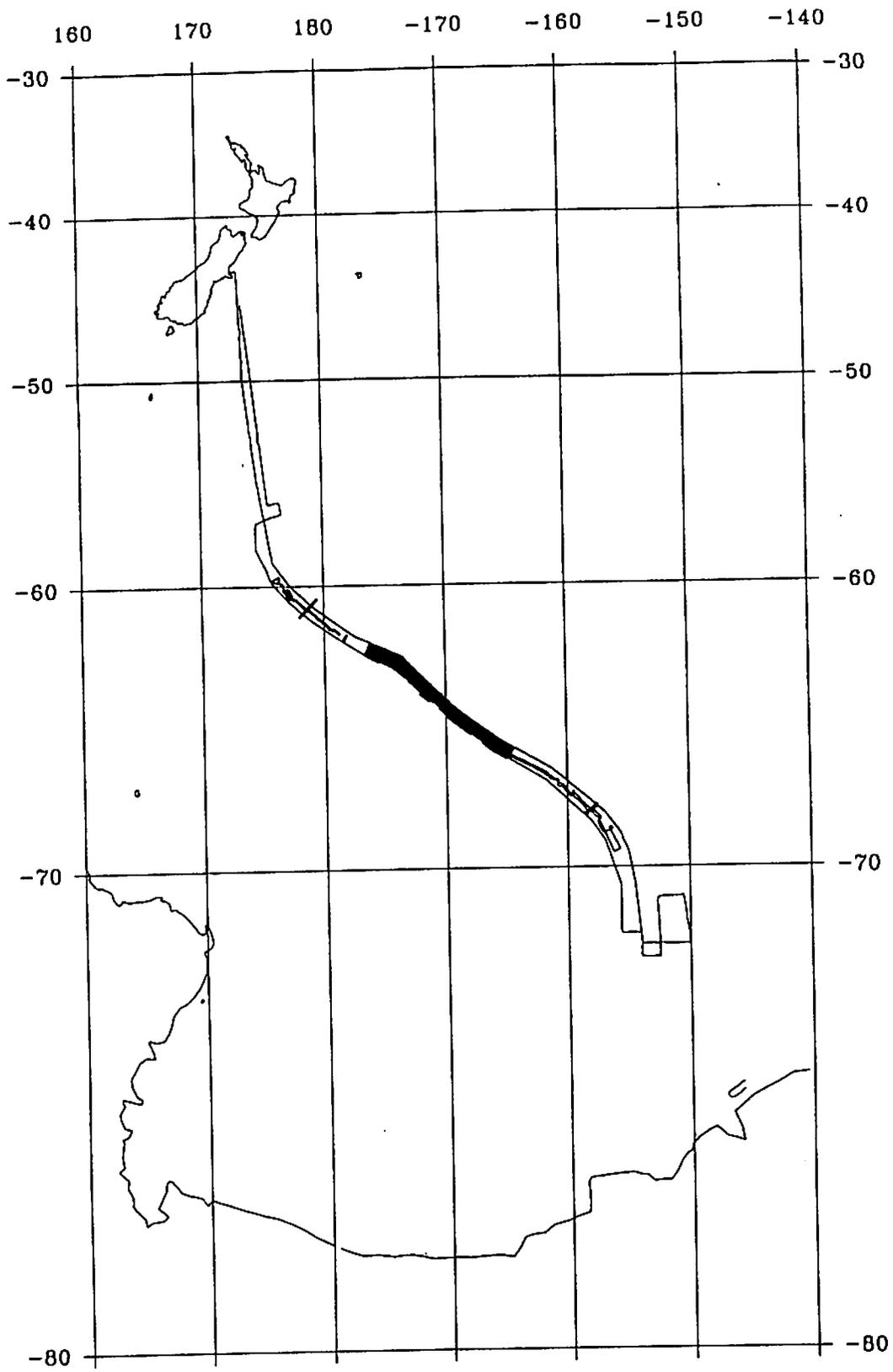
The primary objective of this project is to develop a high resolution plate kinematic history of the Pacific-Antarctic Ridge for the last 65 Million years. The data acquisition phase of the project consisted of a geophysical survey of a high-latitude fracture zone on the Pacific-Antarctic ridge carried out on the R/V Ewing during January and February of 1992. The particular fracture zone that was surveyed, FZ XII in the nomenclature of Molnar et al. (1974), was chosen because of its relative proximity to the pole of opening, which makes it a particularly good recorder of small changes in spreading direction. This is a region where very little shipboard geophysical data has been collected and the track was designed to fill in a critical data gap for studying plate motions.

The survey consisted of a combination of single channel seismics, magnetics, gravity and Hydrosweep, a high resolution swath-mapping system capable of mapping a bathymetric corridor corresponding to twice the water depth. 100% Hydrosweep coverage was obtained over a region 60 km wide and 600 km long centered on the axis of the ridge near 65°S, 170°W. Additional data was collected straddling the fracture zone as far south as 72°S. The Hydrosweep data, in combination with the magnetic anomaly data, provide an extremely detailed record of the spreading history of the Pacific-Antarctic ridge, revealing several major changes in spreading rate and spreading direction. The most detailed record is for the last 15 Million years, corresponding to the region of 100% Hydrosweep coverage. The shipboard gravity data has been compared to the Geosat satellite altimetry measurements in order to study the structure of the young oceanic crust.

Two rock dredges were made on the ridge axis near 65°S, 170°W recovering approximately 200 kg of fresh and slightly weathered basalts.

Scientific Party : EWING 9201

Steven C. Cande, Columbia University, Co-PI
William F. Haxby, Columbia University, Co-PI
Carol A. Raymond, Jet Propulsion Laboratory (Caltech), Co-PI
William B.F. Ryan, Columbia University
Sarah F. Tebbens, Columbia University
Suzanne O'Hara, Columbia University
Dietmar Mueller, Scripps Institution of Oceanography (UCSD)
Brent O'Brien, Victoria University of Wellington (New Zealand)
McNair Wilkinson, Victoria University of Wellington (New Zealand)



EW9201 Lyttelton-Lyttelton Jan 15 - Feb 29