

Rama Expedition Leg 03
May 25- June 25, 1980
Chief Scientists: J. Winterer and P. Lonsdale

Thomas Washington RAMA Expedition Leg III, Midway Island-Yokosuka 021440Z June '80. In study area east of Kamchatka after profiling northwest from Midway. Deploying current meter arrays to measure bottom currents believed responsible for sediment erosion and redistribution seen in profiler records. Have started program of deep CTD casts and core stations. Now on station over Aleutian Trench in sight of snowy Komandorski Islands.
Winterer/Lonsdale

Thomas Washington RAMA III 110310Z June '80. Exploring Kamchatka Trench using hydrographic casts, current meters, cores and seismic profiling. Preliminary results from deep casts show influx of Pacific waters to Bering Sea below 3500m, and suggest significant deep flow in Kamchatka Trench. Very good seismic profiles show staircase of normal faults on trench outer slope and possible scrapings of Meiji Plateau basement at base of inner slopes. Seismic digital recording system working well. Good box and gravity cores. Piston coring successful except for pre-trips during heavy weather, sleety weather and rough seas. We are now enjoying clear skies, calm seas and distant views snow-clad mountains Cape Kronotski. Winterer/Lonsdale

Thomas Washington RAMA III, 170705Z June '80. Learning rapidly about deep circulation near junction of Kamchatka and Aleutian trenches as we recover current meters and continue ctd casts. Exciting data for our evolving model includes fast rather steady currents as much as 25 cm/sec near trench axis, and flow in opposite directions on two sides of Meiji Ridge. Expect our analysis of suspended particulates will help reveal geologic roles of these currents. Coring program has yielded samples ranging from volcanic gravel near trench axis on fan of Kamchatka canyon to fine cohesive muds of the sediment drift. Airgun records continue to be of high quality, with 2 to 3 seconds of penetration near base of trench inner walls, and clear delineation of the step-faulted plateau-like basement of the Meiji Ridge. Expect to complete our last transect across Kamchatka Trench at 52 degrees north on June 20 and then start the run toward port in Japan. Winterer/Lonsdale

Thomas Washington 241650Z June '80. Final CTD casts and current meter data helpful in a rather complex picture of deep circulation. Water in far Northwest Pacific Basin below about 5 km moves slowly northward, accelerating to as much as 25m/sec in Kamchatka Trench at the sill formed by the subduction of Meiji Ridge. A counter clockwise gyre in waters 4 to 5km deep erodes the southwest side of Meiji Ridge, turns and exits southward along the west side of Kamchatka Trench. Slow bottom currents flow southeast over thickly sedimented north flank of Meiji Ridge, possible as parts of another cyclonic gyre, water from Pacific flows into Bering Sea over sills at 4km. The sources of other terrigenous sediments on Meiji Ridge except for ice-rafted material are most likely all south of Kamchatka Strait and may underlie both Kamchatka Peninsula and much of Aleutian chain. We have some 15 box, piston and gravity cores to help unravel provenance questions. Good quality seismic profiler records allow mapping of a system of normal faults stepping down Meiji Ridge to the Kamchatka Trench and another older system blocking out the ridge. All signs are that the new digital seismic recording system has worked perfectly. We can now process records to bring out details

of internal acoustic stratigraphy that bear crucially on the long-term history of sedimentation, erosion and faulting in the Northwest Pacific. Along the track to port in Yokosuka, we searched for nakwe channel forces (sic) along the crest of the Hokkaido Rise, and found one fracture zone bounded valley, that is with no channeling or turbidities. Favorable weather and currents gave us time for magnetic survey of Honshu Seamount. The success of this cruise is the result of hard work from an ever-willing and helpful crew under Captain Arsenault and of cheerful and unflagging efforts from all other members of our scientific party. Winterer/Lonsdale