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To: Pequod.News  
Subj: Conrad Cruise Report-John Toole

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The following cruise report was received October 19, 1982 from John Toole via Curt Collins.

Cruise Report  
R/V Conrad 23/9  
Hawaii to Panama

September 10 to October 13, 1982

Initial planning for this cruise defined three subset experiments to be conducted between Hawaii and Panama. These were a CTD and velocity section along 138W from 5N to 5S, an XBT and CTD section along the equator to 110W and a CTD section along 5S from 95W to the South American coast. Additionally, water samples in the upper 105 m were to be analyzed for nutrient concentrations and productivity with chelation experiments scheduled at selected sites. Data from the cruise was to be analyzed in conjunction with contemporaneous observations from the R/V Researcher in the Eastern Pacific.

The cruise began somewhat slowly. After repeated reassurances from ? LDGO, the ship track was designed with an estimated ground speed of 10 knots. ~~The speed estimate from Conrad's Captain was only 8 knots.~~ (The ship was apparently not consulted on the track beforehand by LDGO.)\*\* The first week was spent steaming to 5N while alternate cruise tracks were formulated. It was decided that because of our investing equipment and personnel preparation time, highest priority would be given to the 138W section, and other work would be completed as time permitted.

XBT's were collected on the rhumb line from 15N to 5N whereupon the XBT recorder expired.\* The work along 18W went well. Velocity profiles to at least 3000 m were obtained in the eight transponder nets deployed for the PEQUOD expe

CTD's to within a hundred meters of the bottom were taken at 5N, 3N, 3S, and 5S with 1000 m CTD's at all velocity profile sites and at 4S. After processing and digesting these data for several days it became clear that the ocean was in an anomalous state. The thermocline was depressed about the equator without the usual doming of isotherms. Rather than finding a strong South Equatorial Current typical of ~~fall~~, eastward surface flow was found all along the section. Finally, SST was elevated (about 28C) during the season of minimum temperature.

The work then turned to the along equator section. The XBT system was still down and so only CTD casts at 5 degree intervals were gathered from 130W to 110W. A profiling current meter was deployed at each station, however, we had difficulty getting the instruments to sink down the wire. It is not clear how valid these data will be. This section was also anomalous. The thermocline did not slope up steeply to the east, the 14C isotherm at 110W was found at the same depth as on 138W (about 210 m). Additionally the ship experienced a set to the east in excess of a knot. The extra ground speed allowed us to extend our work to the east along our proposed track. Thus we headed south from 110W to 5S on 95W, collected CTD's at each latitude crossing, and then east along 5S making casts every 2.5 degrees of longitude.

With time running out, we decided to make a meridional section along 85W while heading to port. Time did not permit working all the way to the coast. The 85W work was motivated by a desire to compare our results with Leetmaa's previous observations along this longitude and his section scheduled 1.5 months after ours. CTD's were collected along 85W from 5S to the equator and then along the rhumb line to Panama. As was seen further west, the thermocline in the east was diffuse and depressed significantly along the section and SST was elevated. Additionally, although the Galapagos front was still in place, SST at the front was a couple of degrees above normal.

The cruise ended on time, docking at Rodman Naval Station in the afternoon of the 13th. In summary, we occupied 39 CTD stations, obtained 3 velocity profiles and dropped 60 XBT's in 34 days while steaming 6300 n. miles. Biological observations were made at 37 of the CTD stations. Indications are that a major event is in progress in the Equatorial Pacific. It is planned that these data will be analysed in conjunction with Perquod's R/V Researcher, and other data as it becomes available.

My thanks to the other members of the scientific party and the officers and crew of the Conrad for their help in collecting these data.

J. M. Toole  
Chief Scientist

*I have enclosed with proposed track sheet some notes on the  
as observed (summarized) before the cruise. J. M. Toole*