

ISOCEAN II cruise plan

June 9 to June 11, 2008

Chief scientist: Yann Bozec, UCSD postdoctoral fellow, ybozec@ucsd.edu

Scientific interest:

The main goal of this cruise is to test the stability of our newly designed mass spectrometer for making ship-based measurements of atmospheric Ar/N₂ and O₂/N₂ ratios, related isotopic tracers, and CO₂ concentration. The atmospheric Ar/N₂ ratio varies because heating and cooling of the upper ocean changes Ar and N₂ solubilities, which drives air-sea fluxes of these gases. Our goal is to use the measurement of changes in the Ar/N₂ ratio, combined with constraints on atmospheric mixing, to remotely sense the large-scale exchanges of heat between the atmosphere and the ocean. This provides an inexpensive complement to observations made by ships, buoys, and satellites. Because the atmosphere mixes rapidly, a modest program of Ar/N₂ observations can potentially constrain the heat exchange integrated over wide areas, such as ocean basins or a hemisphere as a whole.

Work at sea:

We have adapted and ruggedized one of our land-based mass spectrometers. The first goal of this cruise is to test the robustness and stability of our new instrument. Depending on the behavior of our instrument in the first hours of the cruise, the second goal of the cruise will be to acquire data: 1) at a station off the SCRIPPS pier for comparison with our other land-based instrument data (this station will be made twice, on the way out and on the return) and 2) during an offshore transect.

Moreover, the team of Prof. Ohman will deploy and test their Moving Vessel Profiler (MVP) for several hours in the surface water. The deployment of this instrument will need the use of a winch.

June 6: Loading instrument and reference gas cylinders (Crane from MARFAC needed). Setting up instrument and gas cylinders in the lab. Setting up atmospheric gas intake (1/4" inch synflex line will run from one of the highest point on the ship to the mass spectrometer intake in the lab).

June 7 to 8: Access to the ship requested for Yann Bozec. No assistance needed.

June 9: 10 am: Departure

11 am: Station off the SCRIPPS pier, 2-4h depending on the stability of the instrument.

2 pm: Start transect, heading west and then southwest (see chart track below). Data acquisition during transect.

June 10: Start return route, data acquisition during transect.

June 11: Repeat station off the SCRIPPS pier (2-4h); 4pm: back to NIMITZ marine facility.

June 12: Unloading R.V New Horizon.

List of personnel (name, job title, work at sea, employer)

Adam Cox, Assistant Development Technician, setting up the MS system/data acquisition, UCSD-SIO

Ralph Keeling, Professor, UCSD-SIO

Dave Langner, Research Technician/Shipboard Technical Support, SIO
Mark Ohman, Professor, deployment of Moving Vessel Profiler (MVP), UCSD-SIO
Bill Paplawsky, Associate Development Engineer, setting up the MS system/data acquisition, UCSD-SIO
Jesse Powell, Graduate Student, deployment of Moving Vessel Profiler (MVP), SIO
Yann Bozec, Postdoctoral Fellow, setting up the MS system/data acquisition, UCSD-SIO.

Cruise Chart:

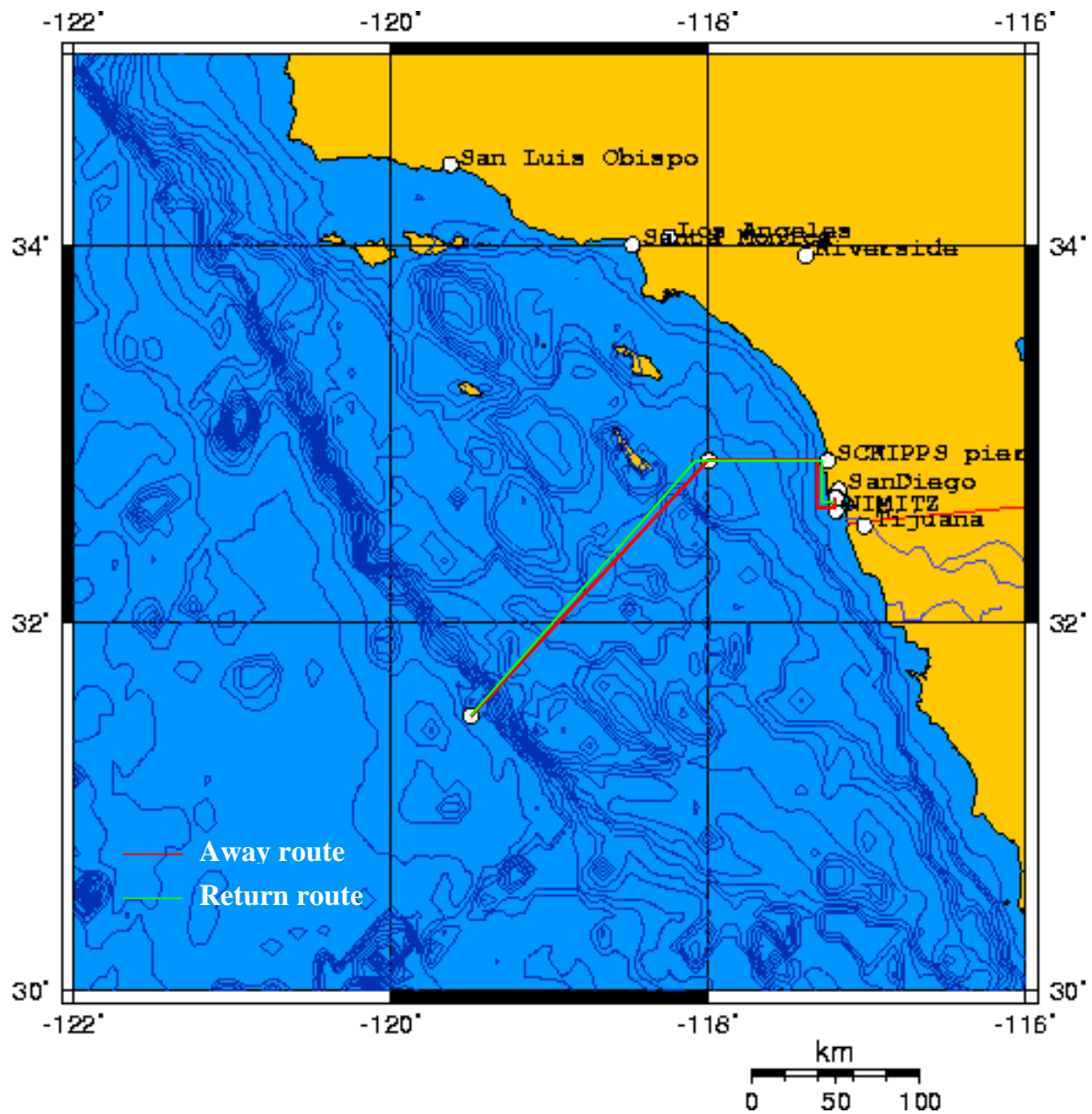


Figure 1: Ship track for the ISOCEAN II cruise, June 9-11, 2008.