

Cruise Plan

R/V New Horizon
October 3rd-13th
San Diego, USA to Mazatlan, Mexico
Chief Scientist: Jared Kluesner (SIO)
Funded by: UC Ship Funds

Detailed Schedule:

10/01-10/02: Loading
10/03 0800 Depart from MARFAC, San Diego
10/06 Enter Gulf of California (GOC)
10/06-10/12 Rock Sampling in GOC
10/13 0800 Come into port at Mazatlan, Mexico
10/27: Off Loading at MARFAC, San Diego (after Berelson leg)

Cruise Objective

The overall objective of this project is to better understand the geology beneath the central and southern Gulf of California and to determine the age and composition of igneous rocks imaged in 2006 by seismic reflection profiling (see figure 1 and 2). Over the past 6 years, Mexican and U.S. researchers have conducted onshore and marine studies in the Gulf of California, focusing on the rupturing and extension of continental lithosphere and the transition into oceanic spreading basins. Researchers have learned much about the Gulf's geologic history, but the southwest margin remains a geologic enigma. Only 5 rock samples have been collected in this vast (20,000 km²) region, each recovering a different type of rock. Extensive research on-land and on surrounding islands has already occurred, so sampling this submerged crust would provide invaluable information to land geologists (notably Mexican scientists listed as collaborators in this project) and help bridge the geologic gap between marine and land-based research projects.

We have chosen the proposed sample sites based on seismic reflection profiles, multibeam bathymetry, and reflectivity (Figure 2), which we categorized into five zones; (A) around Isla Cerralvo, (B) east of Baja de La Paz, (C) east of Islands San Diego, Santa Cruz, and Santa Catalina, (D) west of Sinaloa, around Lucenilla bank (see figure 2). We plan to collect geologic samples using a 1m-wide rock dredge, sampling rocky fault scarps and steep slopes ranging from 500-2500m depths. Samples will be shared between the U.S. and Mexican research groups, analyzed in U.S. and Mexican labs, and then interpreted in a series of joint-authored research papers. Archival samples of the rocks, for use by unknown future researchers, will be stored at facilities in the U.S. (Scripps Institution of Oceanography) and in Mexico (Centro de Investigacion Cientifica y Educacion Superior de Ensenada ([CICESE], Baja California, and Centro de Geociencia, UNAM, Juriquilla, Queretara).

Daily cruise progress and updates will be posted on www.geoform2009.com. The name of the expedition GEOFORM stands for "Geological Exploration Of the

Formation Of a Rifted Margin". We will be working with San Diego district high schools (specifically Mira Mesa High) providing students the opportunity to witness how sea-going science is conducted and learn about the geologic connection between the local San Andreas Fault System and the Gulf of California. Also, students will be able to track the location of the ship using Google Maps:
<http://maps.google.com/maps/ms?ie=UTF8&hl=en&msa=0&msid=115151533702820083205.000472a1b8c1afc6bbdb2&ll=32.695444,-117.21468&spn=0.091445,0.16634&t=h&z=13>

Figure 1. Map of recent seismic tracks in the southern Gulf of California

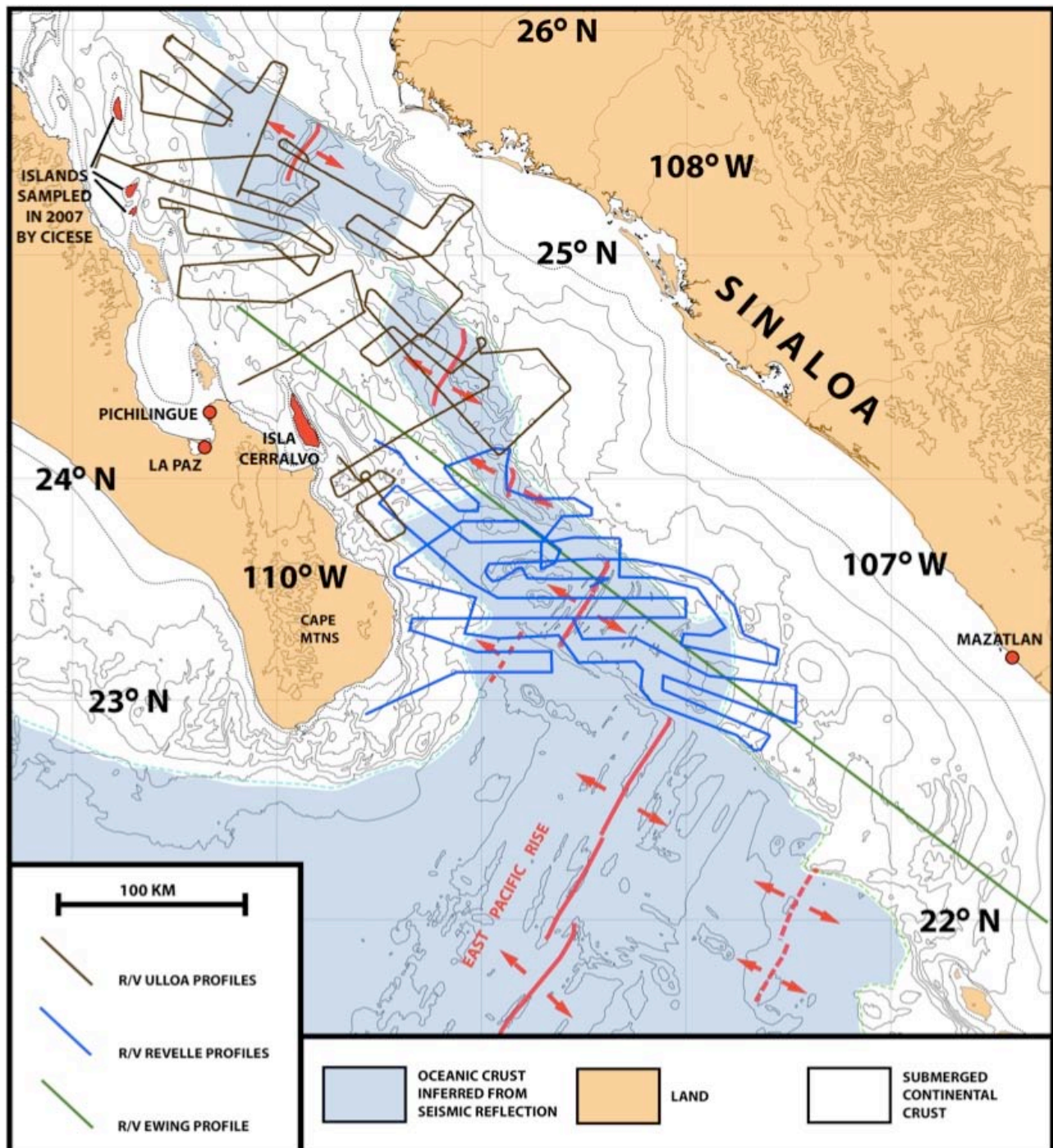
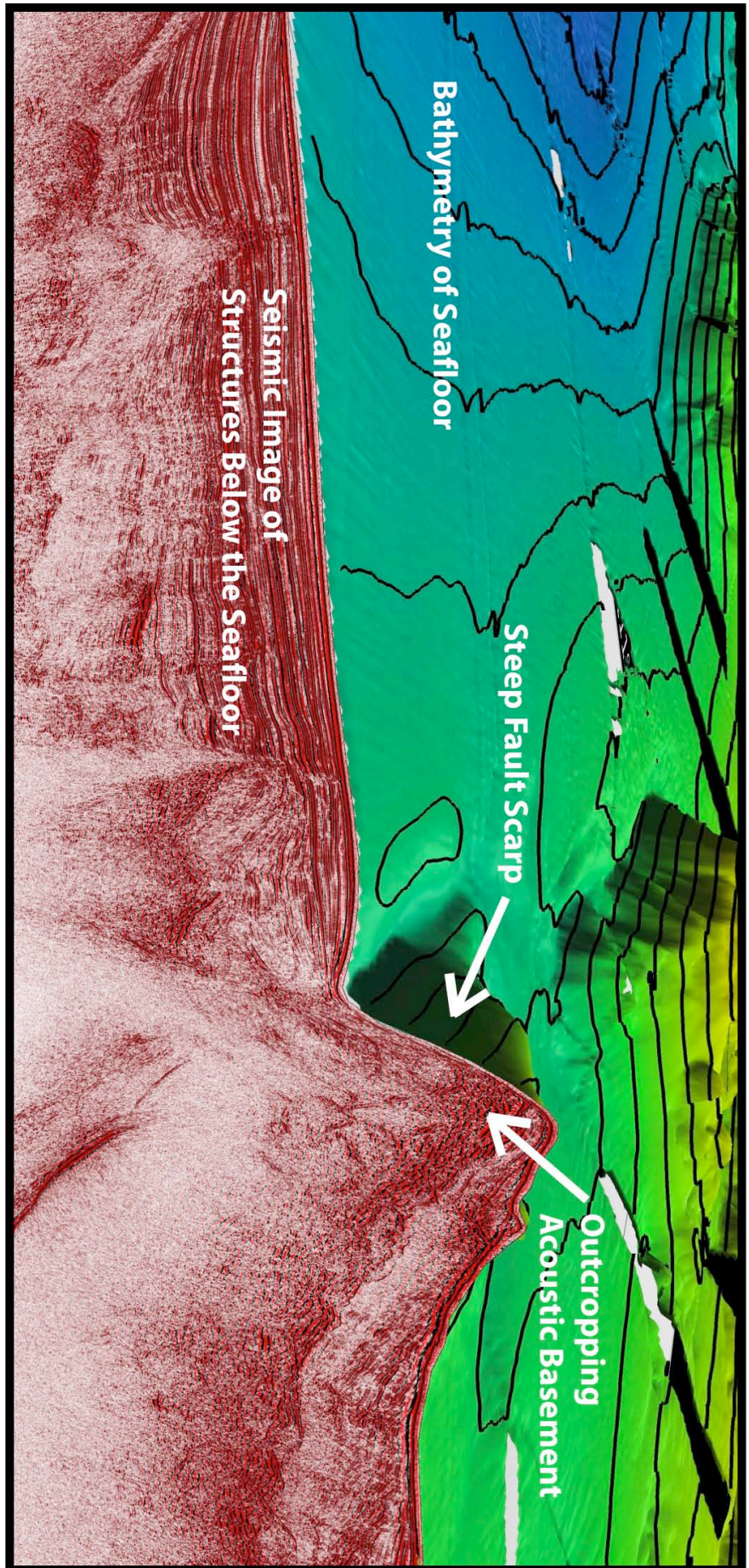


Figure 2. 3D image of western Farallon Basin, Gulf of California. Bathymetry shaded in blue-green with 100-meter contour intervals. Note the seismic profiles imaging the structure below the seabed. Acoustic basement appears to outcrop along one of the steep fault scarps. This is representative of the type of dredging targets marked as black crosses figure 3.



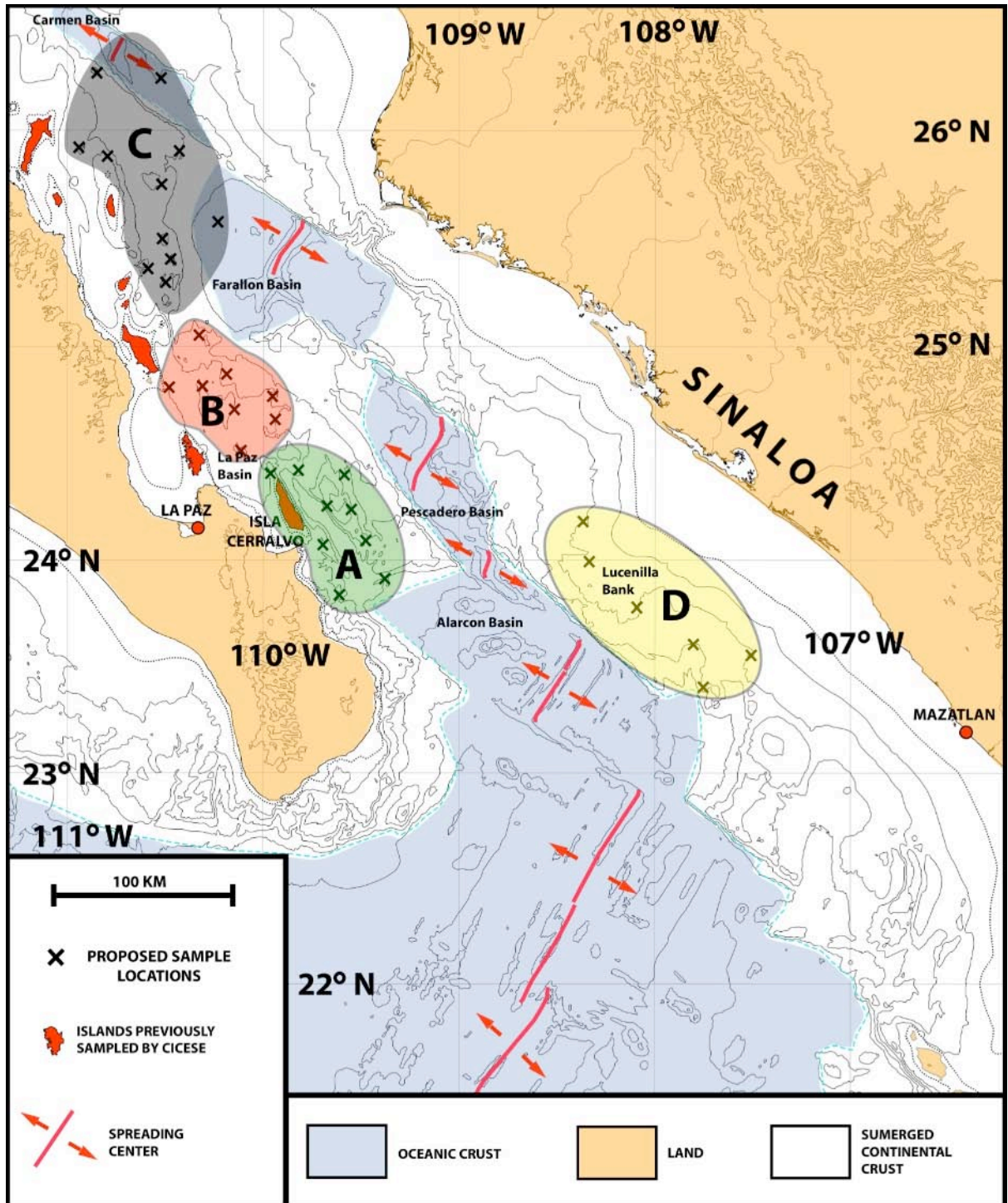


Figure 3. Map of proposed sampling zones and specific dredging targets.