

DISCUSSION

This shaded-relief bathymetry map of the Offshore of Bolinas map area in northern California was generated from bathymetry data collected by Fugro Pegasus, by California State University, Monterey Bay (CSU-MB), and the U.S. Geological Survey (USGS) during the 2006–2010, using a combination of 200–600 and 400–1000 Hz Reson 7125, and 244kHz Reson 8101 multibeam echosounders, as well as 408-kHz Sea SWATHplus and 250-kHz EG&G Sidescan Interferometric systems. The bathymetry data were collected as part of the Bolinas Canyon Hydrographic Survey (BCHS) by the U.S. National Oceanic and Atmospheric Administration (NOAA), and from only the bathymetry data were collected these mapping missions combined to collect bathymetry data from about the 10-m isobath to beyond the 3-mautical-mile (5.6-km) outer limit of the State of California.

During the mapping missions, an Applus POS MV (Position and Orientation System for Marine Vessels) was used to accurately position the vessel. The POS MV system uses a combination of motion sensors such as heave, pitch, roll, yaw, position accuracy (± 2 m, pitch, roll, and heading accuracy, $\pm 0.02^\circ$), heading accuracy, $\pm 0.5^\circ$, or less), in-depth, sound-velocity profiles were collected with an Applied Microsystems SVP-1600 echosounder, and a Coda Octopus MB3000 motion sensor. The POS MV system also collects receiver (CANV) data, and Fugro Pegasus used GPSfix data (GPS data with real-time kinematic corrections). Soundings were corrected for vessel motion using the Applus POS MV data, for variations in water-column sound velocity using the AM SVplus data, and for variations in water height (tides) using vertical-tide data from the GPS receivers.

Processed soundings for the different mapping missions were exported from the acquisition or processing software as XYZ files and bathymetric surfaces. All the surfaces were merged into one overall 2-m-resolution bathymetric-surface model and clipped to the boundary of the map area. An illumination having an azimuth of 300° and from 45° above the horizon was then applied to the bathymetric surface to create the shaded-relief imagery. Bathymetric contours were generated at 10-m intervals from the merged 2-m-resolution bathymetric surface. The merged surface was smoothed using the Focal Mean tool in ArcGIS and a circular neighborhood that has a radius of between 20 and 30 m (depending on the location). The contours were generated from this smoothed surface using the Spatial Analyst Contour tool in ArcGIS. The most continuous contour segments were preserved; smaller segments and isolated island polygons were excluded from the final output. The contours were then clipped to the boundary of the map area.

The onshore-area image was generated by applying the same illumination (azimuth of 300° and from 45° above the horizon) to 1-m-resolution topographic-lidar data collected by Earth Eye in 2010 for San Francisco State University and the U.S. Geological Survey (available at <http://ned.usgs.gov/>).

EXPLANATION

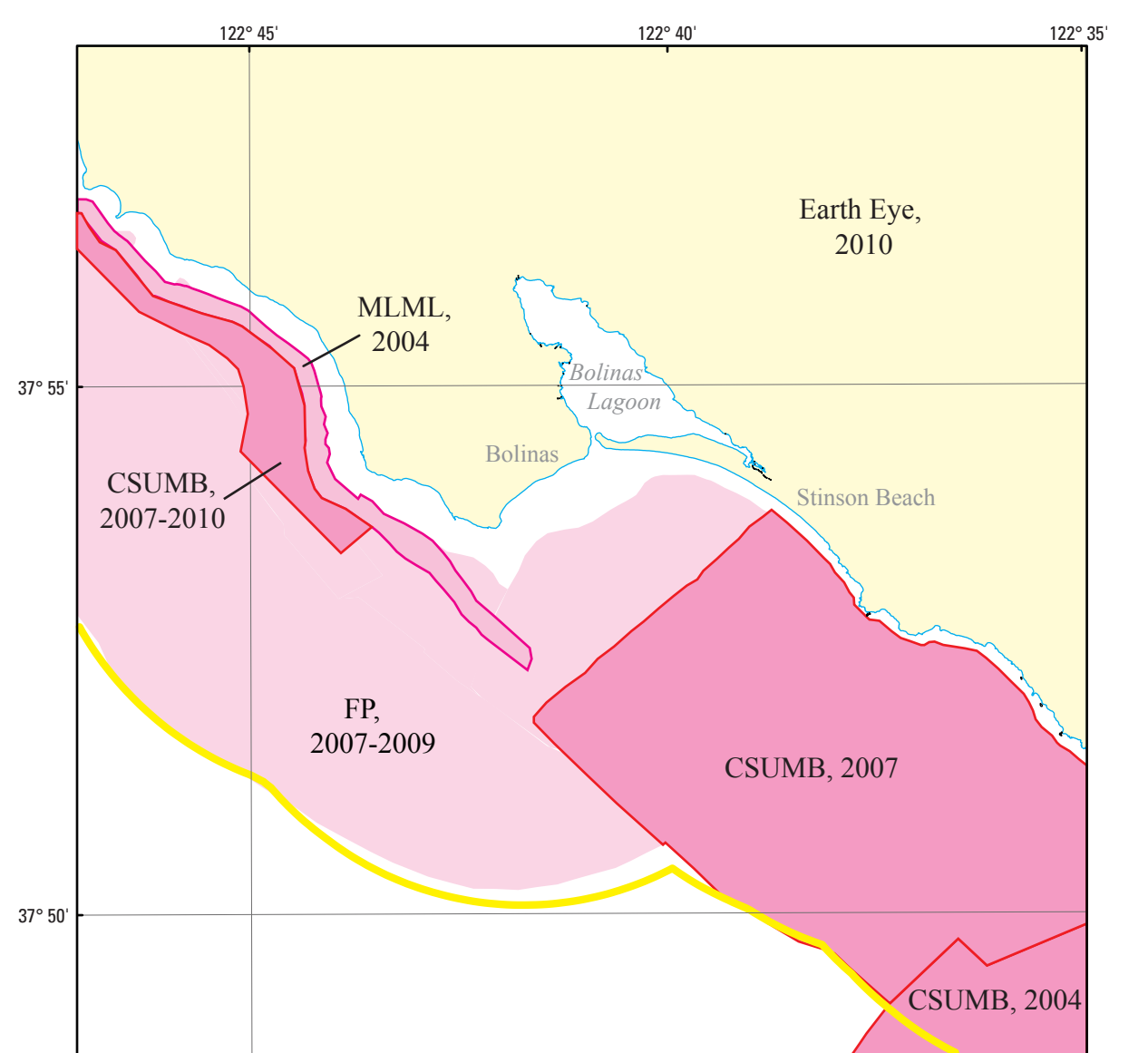
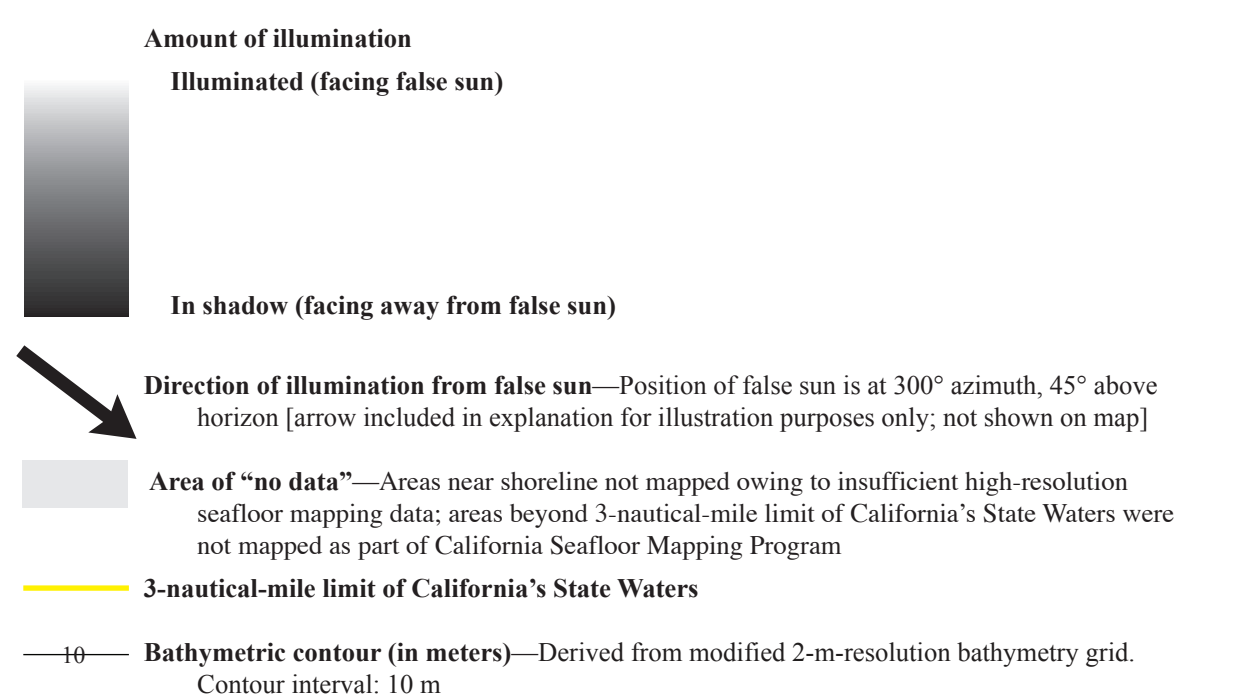


Figure 1. Map showing areas of multibeam-echosounder and interferometric surveys (pink shading) and onshore topographic-lidar surveys (yellow shading). Also shown are data-collecting agencies (CSUMB, California State University, Monterey Bay, Seafloor Mapping Lab; FP, Fugro Pelagos; MML, Moss Landing Marine Laboratories) and dates of surveys if known. Yellow line shows limit of California's State Waters.



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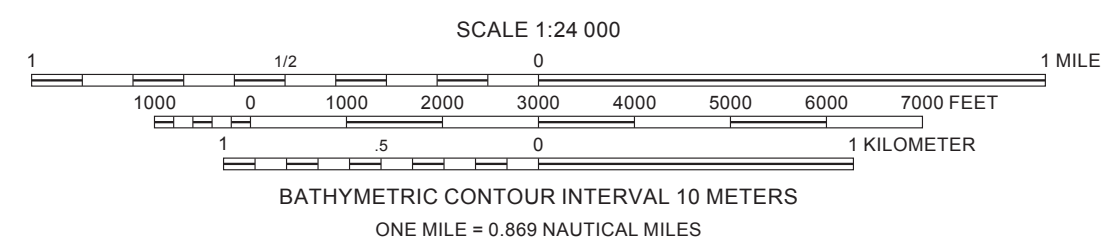
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Shaded-Relief Bathymetry, Offshore of Bolinas Map Area, California

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Shaded-relief bathymetry by Peter Dartnell, 2012 (data collected by Moss Landing Marine Laboratories, 2004; by California State University, Monterey Bay, Seafloor Mapping Lab, 2004–2010; and by Fugro Pelagos, 2007–2009). Bathymetric contours by Mercedes D. Erdey, 2012
GIS database and digital cartography by Nadine E. Golden
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