Acoustic Backscatter, Offshore of Salt Point Map Area, California

By
Peter Dartnell, Mercedes O. Erdøy, and Rick G. Kvitka

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EXPLANATION

Backscatter Intensity: AL

- High
- Medium
- Low

- Area of Note: Areas with higher backscatter intensity due to significant hard or rough bottom material.
- Bathymetric contour as reference: Contour lines indicate depth and seafloor topography.
- Limit of California's State Waters Map Series—Offshore of Salt Point, California: U.S. Geological Survey Open-File Report 2015–1098, pamphlet 37 p., 10 sheets, diaries and onshore topographic data (yellow shading). Also shown are data-collecting agencies (CSUMB, California State University, Monterey Bay, Seafloor Mapping Lab; FP, Fugro Pelagos) and dates of surveys if known.

The USGS has been developing a national bathymetric data center since 1997, with the goal of digitizing all U.S. bathymetric data and making it available to the public. This map was printed on an electronic plotter directly from digital files. Dimensional calibration may vary between electronic plotters and between X and Y directions on the same plotter, and paper may change size due to atmospheric conditions; therefore, scale and proportions may not be true on plots of this map.

The acoustic-backscatter imagery from each different mapping system and processing method were merged into their own individual grids. These individual grids, which cover different areas, were displayed in a GIS to create this map, on which brighter tones indicate higher backscatter intensity, and darker tones indicate lower backscatter intensity. The intensity represents a complex interaction between the acoustic pulse and the seafloor, as well as characteristics within the shallow subsurface, providing an indication of seafloor content, bulk density, and seafloor roughness; and some biological cover. Harder and rougher bottom types such as rocky outcrops or coarse sediment typically return stronger intensities (high backscatter, lighter tones), while softer, smoother seafloors return weaker intensities (low backscatter, darker tones).

The differences in backscatter intensity that are apparent in some areas of the map are due to the different frequencies of the mapping systems, as well as different processing techniques. Note that the parallel lines of the acoustic backscatter imagery are the result of a mosaication process used to make a single high-resolution image that covers more than the area imaged by a single acoustic survey. The mosaics were created by stitching together adjacent images that overlap by about 25%, and then applying spatial smoothing to remove noise and reduce the effects of spatial discontinuities.

The acoustic backscatter data collected by Fugro Pelagos in 2007 and by California State University, Monterey Bay, Seafloor Mapping Lab in 2007 and 2010, were postprocessed using CARIS 7.0/Geocoder software. The SWATHplus backscatter data were postprocessed using USGS software (D.P. Finlayson, written comm.)—Derived from modified 2-m-resolution bathymetry grid.

The multibeam-echosounder backscatter data were postprocessed using CARIS 7.0/Geocoder software. The SWATHplus backscatter data were postprocessed using USGS software (D.P. Finlayson, written comm.) that normalizes for time-varying signal loss and beam-directivity differences. Thus, the raw backscatter intensities are radiometrically corrected (including despeckling and angle-varying gain adjustments), and the position of each acoustic sample was geometrically corrected for vertical-position data from the KGPS receivers (CNA V) data, and Fugro Pelagos used KGPS data (GPS data with real-time kinematic corrections); in addition, sound-velocity profiles were collected with an Applied Microsystems (AM) SVPlus sound velocimeter plus bathymetric sidescan-sonar system. These mapping missions combined to collect acoustic-backscatter data from about the 10-m isobath to beyond the 3-nautical-mile limit of California's State Waters.

The process involved the following steps: Data were collected by a combination of 200-kHz and 400-kHz Reson 7125 and 244-kHz Reson 8101 multibeam echosounders, as well as a 468-kHz SEA SWATHplus bathymetric sidescan-sonar system. These mapping missions combined to collect acoustic-backscatter data from about the 10-m isobath to beyond the 3-nautical-mile limit of California's State Waters. The acoustic-backscatter imagery from each different mapping system and processing method were merged into their own individual grids. These individual grids, which cover different areas, were displayed in a GIS to create this map, on which brighter tones indicate higher backscatter intensity, and darker tones indicate lower backscatter intensity. The intensity represents a complex interaction between the acoustic pulse and the seafloor, as well as characteristics within the shallow subsurface, providing an indication of seafloor content, bulk density, and seafloor roughness; and some biological cover. Harder and rougher bottom types such as rocky outcrops or coarse sediment typically return stronger intensities (high backscatter, lighter tones), while softer, smoother seafloors return weaker intensities (low backscatter, darker tones).

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