Seismic-reflection profiles, Offshore of Pigeon Point Map Area, California

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1. Two-way travel time, in seconds

2. Approximate depth, in kilometers

3. Approximate depth, in meters

4. Scale 1:50,000

5. ONE MILE = 0.869 NAUTICAL MILES

6. Approximate depth, in meters

7. Trackline map for location. Profile highlights faulted and folded strata beneath continental shelf. Dashed red lines show faults. Magenta symbols show fold axes (diverging arrows, anticlines; converging arrows, synclines). Blue shading shows inferred uppermost Pleistocene and Holocene strata, deposited since last sea-level lowstand about 21,000 years ago. Underlying reflectors reveal structure (not distinctive stratigraphic markers). Dashed yellow line is seafloor multiple (echo of seafloor reflector). Purple triangle shows location of California’s State Waters limit (yellow line on trackline map).

8. Faults in the offshore part of the Offshore of Pigeon Point map area are identified in seismic-reflection profiles (figs. 1, 2, 3, 5, 6, 8, and 9); the combined thickness of Miocene and Pliocene Purissima Formation (Powell and others, 2007; Brabb and others, 1998; Clark and others, 1999) is 0.1 to 0.35 m/ka (Clark and others, 1999), and cumulative lateral slip on the San Gregorio Fault Zone is thought to range from 1.0 to 2.0 Two-way travel time, in seconds.

9. We begin with a discussion of the geologic framework of the offshore part of the Offshore of Pigeon Point map area. The offshore area has a complex history involving tectonics over geologic time, as well as more recent and rapid processes that have modified the seafloor. The geologic framework is characterized by a series of fault blocks that have been uplifted and tilted in response to tectonic forces. The complex geometry of the fault blocks and the overlying sediments has resulted in a variety of seismic expressions, including faults, folds, and multiple reflections.

10. A high-resolution seismic-reflection profile (P10–35, collected in 2010 on survey S–15–10–NC) was used to study the offshore geology. This profile has been enhanced using Subbottom Logger (SBL) software that merges seismic-reflection data with differential GPS-navigation data. After the seismic-reflection data were acquired using a SIG 2Mille minisparker that used a 500-J high-voltage electrical discharge fired 2 times per second, the data were processed to enhance the reflectors and identify faulted and folded strata beneath the continental shelf. Dashed red lines show faults. Magenta symbols show fold axes (diverging arrows, anticlines; converging arrows, synclines). Blue shading shows inferred uppermost Pleistocene and Holocene strata, deposited since last sea-level lowstand about 21,000 years ago. Underlying reflectors reveal structure (not distinctive stratigraphic markers). Dashed yellow line is seafloor multiple (echo of seafloor reflector).

11. The seismic-reflection data were analyzed to identify and map faulted and folded strata beneath the continental shelf. Dashed red lines show faults. Magenta symbols show fold axes (diverging arrows, anticlines; converging arrows, synclines). Blue shading shows inferred uppermost Pleistocene and Holocene strata, deposited since last sea-level lowstand about 21,000 years ago. Underlying reflectors reveal structure (not distinctive stratigraphic markers). Dashed yellow line is seafloor multiple (echo of seafloor reflector).

12. We now examine the study area in more detail. The offshore part of the Offshore of Pigeon Point map area is characterized by a complex geologic history involving multiple fault blocks and tilted blocks. The offshore area has a variety of seismic expressions, including faults, folds, and multiple reflections. The offshore area is characterized by a variety of seismic expressions, including faults, folds, and multiple reflections. The offshore area is characterized by a variety of seismic expressions, including faults, folds, and multiple reflections. The offshore area is characterized by a variety of seismic expressions, including faults, folds, and multiple reflections. The offshore area is characterized by a variety of seismic expressions, including faults, folds, and multiple reflections.

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