U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Geologic and Bathymetric Reconnaissance Overview of the San Pedro Shelf Region, Southern California

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OPEN-FILE REPORT 2004–1049
Sheet 1 of 7, Version 1.0
1978 and 1979 seismic-reflection tracklines

This Open File Report was prepared in support of the Cabrillo (Southern California Bight Regional Investigations - Life, Land, Ocean) project of the Western Region's Coastal & Marine Geology Program.

A compilation of US Geological Survey surveys conducted over the San Pedro shelf area was made to determine areal coverage and quality of pre-existing 3.5-kHz bathymetric, high-resolution, and deep-penetration seismic-reflection data. Maps presented in this report depict: 1) the bathymetry and morphology of the seafloor, 2) the thickness of unconsolidated(?) sediments overlying the youngest observed erosional surface, and 3) the near-surface regional geologic structure and stratigraphy including an analysis of the Palos Verdes Fault Zone.

The maps in this report were primarily developed from data collected during two cruises in 1978 and 1979 (field activity ID's S-2-78-SC and S-2A-79-SC). These two cruises provide sufficient data to present a geologic reconnaissance overview of the San Pedro shelf region. The results of this compilation will be used as part of the planning process to acquire new data to identify offshore earthquake hazards and to correlate the offshore geology with groundwater aquifer systems and onshore geology.

Sheet 1 shows the tracklines of the 1978 and 1979 surveys used in this report. Sheet 2 depicts a plan view image of the seafloor and bathymetric contours developed from multibeam data from Gardner and Dartnell (2002). Sheet 3 shows an isopach map of unconsolidated(?) sediments, a high-resolution seismic-reflection profile section across the mid-shelf which shows a bedrock high and a flat-lying stratigraphic sequence separated by the Palos Verdes Fault Zone, and a seismic-reflection profile across a paleo-valley, cut during a sealevel lowstand, that is associated with the present day San Gabriel Canyon. Sheet 4 exhibits a series of seismic-reflection profiles across the Palos Verdes Fault Zone and illustrates the fault orientation, sea floor expression, and relationship to the structural bedrock ridge to the west. Sheet 5 is a compilation of high-resolution and deep-penetration seismic-reflection profiles illustrating the relatively flat-lying stratigraphic sequence between bedrock highs both offshore south of Palos Verdes and near the coast. Traceable reflectors observed on some high-resolution profiles can be correlated with the identical reflectors on matching deeper-penetration profiles. Additionally, a generalized geologic cross section representative of the San Pedro Shelf is shown. Sheet 6 is an isopach map showing the apparent thickness of the uppermost unconsolidated sediment layer overlying the inner shelf, based on data collected on a survey completed in 1973 (field ID K-2-73-SC). Sheet 7 depicts the distribution of recent and older drainage basins which provided sediments into the ancestral and present day San Gabriel Submarine Canyon (seismic profile and cross-section

S-2-78-SC

(Metadata URL:
http://walrus.wr.usgs.gov/infobank/s/s278sc/html/s-2-78-sc.meta.html)

List of analog data used in sheets 2-5 of this report:

LINE 2 122/1527 - 122/1800
U RT, U LFT, 3.5 RT, 3.5 LFT
LINE 2A 125/1552- 125/1654
U RT, U LFT, 3.5 RT
LINE 5 122/2145 - 122/2300
U RT, U LFT, 3.5 RT, 3.5 LFT
LINE 6 123/0324 - 123/0603
U RT, U LFT, 3.5 RT, 3.5 LFT
LINE 10 123/1216 - 123/1413
U RT, U LFT, 3.5 RT, 3.5 LFT
LINE 15 123/2215 - 123/2340
U RT
LINE 59 125/0630 - 125/1030
U RT
LINE 65 132/0630 - 132/0830
U RT

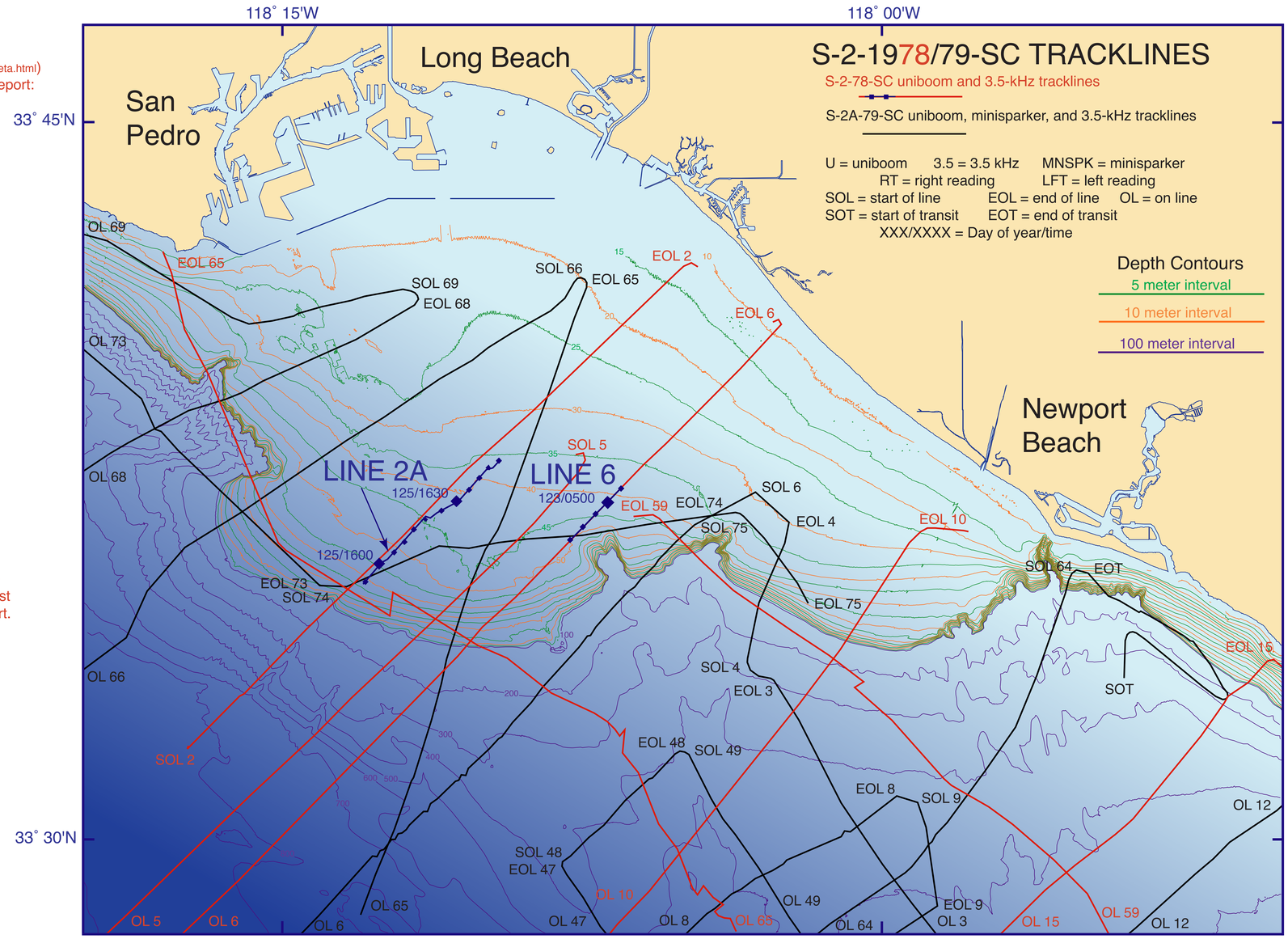
Line 6 is the location of a uniboom seismic line north of the head of San Gabriel submarine canyon showing a paleo-valley cut at a lower stand of sealevel. See sheet 3 of this report.

Line 2A is the location of a uniboom seismic section across a northeast-southwest bedrock high bounded by the Palos Verdes Fault Zone on the northeast side. See sheets 3, 4, and 5 of this report.

Other USGS seismic databases available in this region:

3.5-kHz data
S-1-78-SC
F-1-84-SC,
F-2-84-SC
Y-1-96-SC

Uniboom and sparker data
O-1-69-SC
K-2-73-SC (see sheets 6, 7 this report)
S-1-78-SC



S-2A-79-SC

(Metadata URL:
http://walrus.wr.usgs.gov/infobank/s/s2a79sc/html/s-2a-79-sc.meta.html)

List of analog data used in sheets 2-5 of this report:

LINE 3 099/1330 - 099/1442
U RT, 3.5 RT
LINE 4 099/1453 - 099/1530
U RT, 3.5 RT
LINE 6 099/1545 - 099/1800
U RT, 3.5 RT
LINE 8 099/1939 - 099/2219
MNSPK RT, 3.5 RT
LINE 9 099/2223 - 099/2230
MNSPK RT
LINE 12 100/0730 - 100/0830
MNSPK RT 3.5 RT
LINES 47, 48, 49
104/0730 - 104/0930
U RT, 3.5 RT
TR, LINE 64 105/2130 - 106/0130
U RT, 3.5 RT
LINE 65 106/0630 - 106/0854
U RT, 3.5 RT
LINE 66 106/0859 - 106/1130
U RT, 3.5 RT
LINE 68 106/1700 - 106/1835
U RT, 3.5 RT
LINE 69 106/1838 - 106/2000
U RT, 3.5 RT
LINE 73 107/1130 - 107/1238
U RT, 3.5 RT
LINE 74 107/1242 - 107/1403
U RT, 3.5 RT
LINE 75 107/1406 - 107/1426
3.5 RT

References Sheet 1

(see Sheet 7 for complete reference list)

For bathymetric contours shown here:

Gardner, James V., and Peter Dartnell, 2002, Multibeam Mapping of the Los Angeles, California, Margin: U.S. Geological Survey Open-File Report OF02-162. http://geopubs.wr.usgs.gov/open-file/of02-162/

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