

Figure 2. View looking southwest toward Loma Sea Valley and Coronado Bank. A detachment fault along the east side of the Coronado Bank initially formed the Loma Sea Valley. Shepard and Dill (1966) observed that the sea valley "...is somewhat unique in that its axis has a drainage divide." Multibeam data shows a series of steps within the Loma Sea Valley axis that are probably the result of structural pull-aparts (small grabens) caused by relatively recent strike-slip movement along the Coronado Bank Fault Zone (Holly Ryan, USGS, oral communication). Step A drops more than 80 m (see profile below for V-V') whereas step B drops more than 100 m. Although Loma Sea Valley is a prominent trough that heads on the continental shelf, it has not been a major conduit for sediment deposition in the San Diego Trough (Covault and others, 2006; Sliker and others, 2005). The vertical exaggeration is 2x and the distance across the bottom of the image is approximately 6 km.

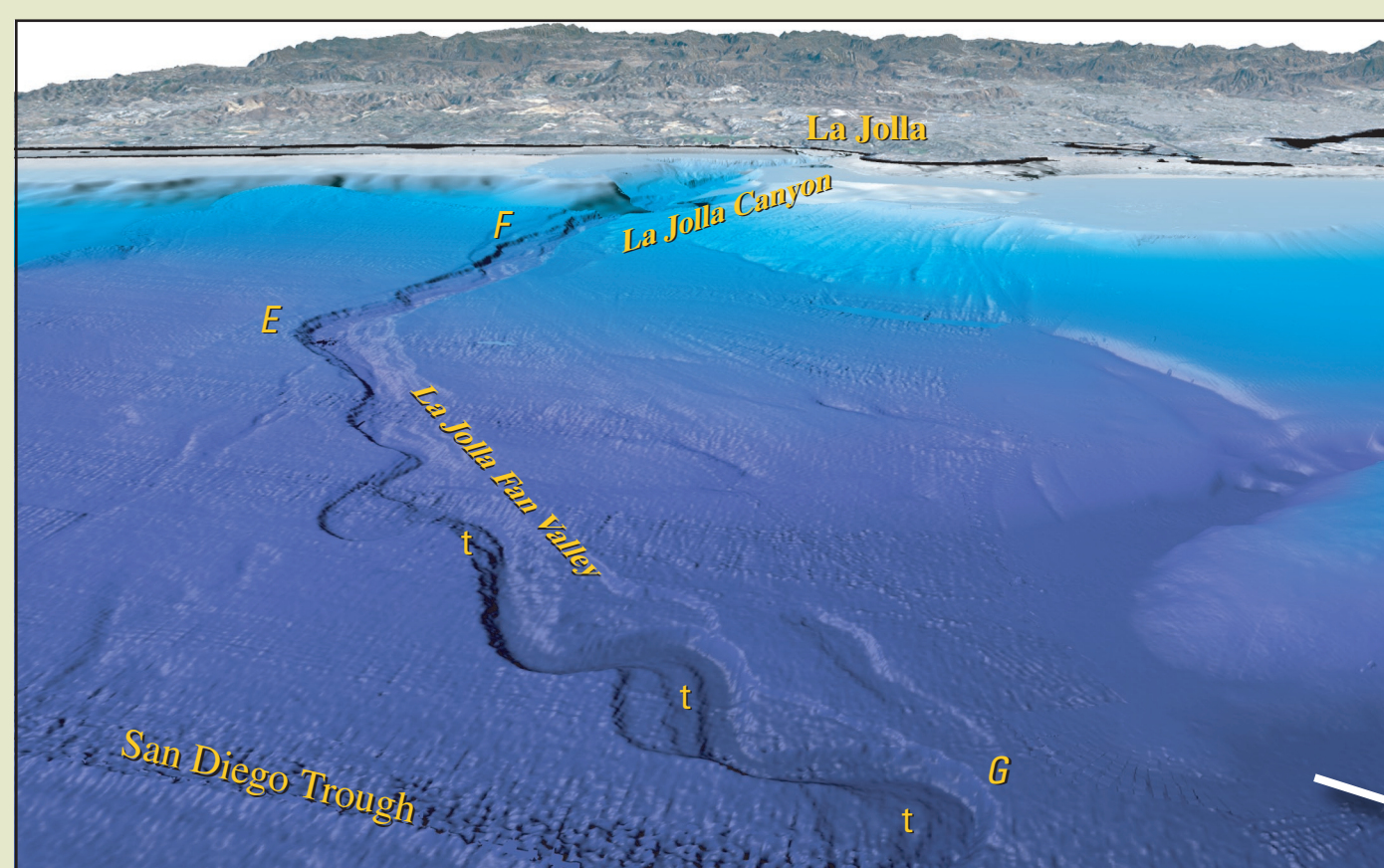
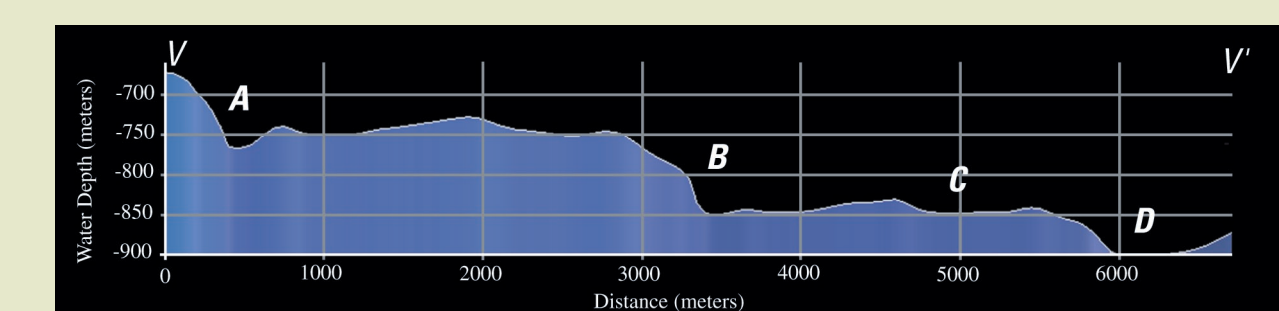


Figure 3. View looking east over the La Jolla Fan Valley that extends from La Jolla Canyon in the background. The canyon trends west-northwest in a relatively straight line across the mainland shelf and slope, where it reaches the apex of La Jolla Fan at approximately 500 m water depth. The La Jolla Fan Valley continues westward from the base of the slope until it makes an approximate 45 degree turn to the southwest at E in 700 m of water depth. The depth of incision of the fan valley decreases from about 80 m at F to about 35 m at G as it flows into the San Diego Trough. The La Jolla Canyon is fed by sediment moving along the coast in the Oceanside littoral cell (see http://coastalchange.ucsd.edu/st1_thenandnow/). The La Jolla Canyon-Fan system is more active now during the present high stand of sea level than during the last glacial low stand because the littoral cell is no longer intercepted by the Carlsbad Canyon, which is now stranded on the middle shelf (fig. 1). Headward erosion within the upper La Jolla Canyon as sea level rose during the Holocene has resulted in erosional deepening of the fan valley that has left prominent terraces within it (t). The line of rough sea floor at the bottom of the image is a data collection artifact. The vertical exaggeration is 2x and the distance across the bottom of the image is approximately 10 km.

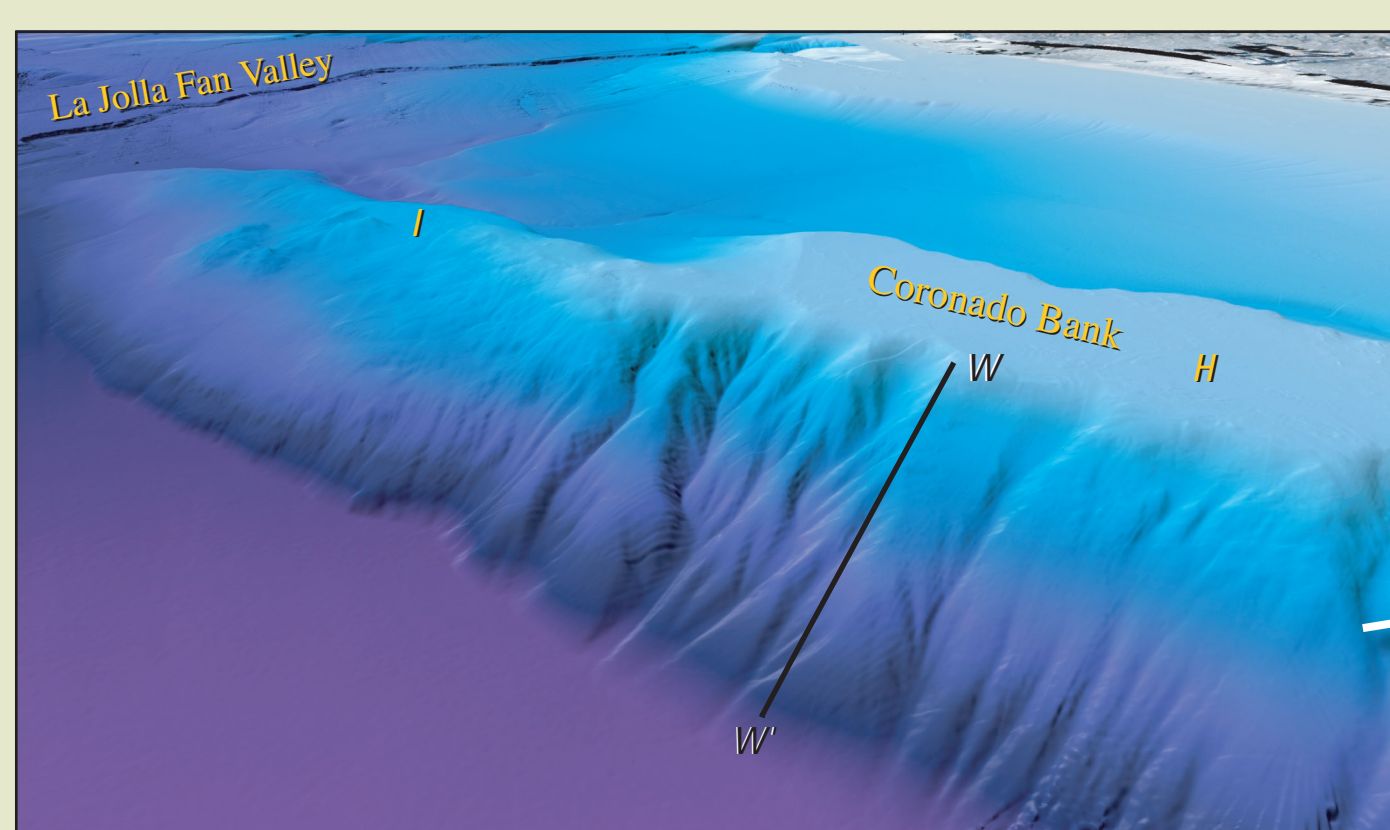


Figure 4. View looking northeast over Coronado Bank. The La Jolla Canyon and Valley system are in the background. The vertical drop from W to W' is about 1,020 m (3,347 ft). For comparison, the average depth of the Grand Canyon in Arizona is about 1,220 m (4,000 ft) and the Empire State Building in New York City is 443 m (1,453 ft) to the top of the lighting rod. Coronado Bank is underlain by sedimentary rock of Miocene to Cretaceous age (Greene and Kennedy, 1986; Vedder, 1987) that has been locally faulted and rotated (see seismic-reflection profiles available at <http://pubs.usgs.gov/of/2005/1084/>). The east (back side in this image) of the Coronado ridge is bounded by the Coronado Bank Fault Zone. The flat top of the bank toward the southeast (at H) indicates this region was eroded by wave action during lower sea levels, whereas the part of the bank toward the northwest at W has always remained below sea level. The vertical exaggeration is 2x and the distance across the bottom of the image is approximately 10 km.

Perspective Views

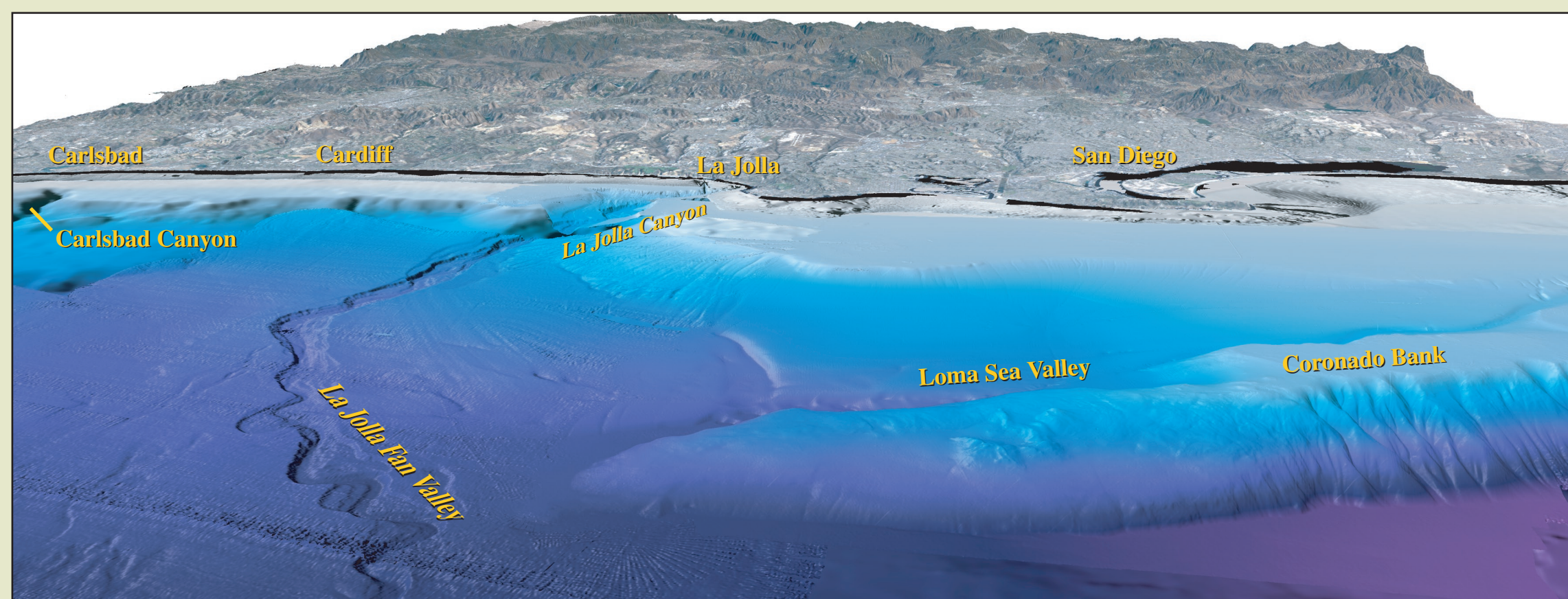
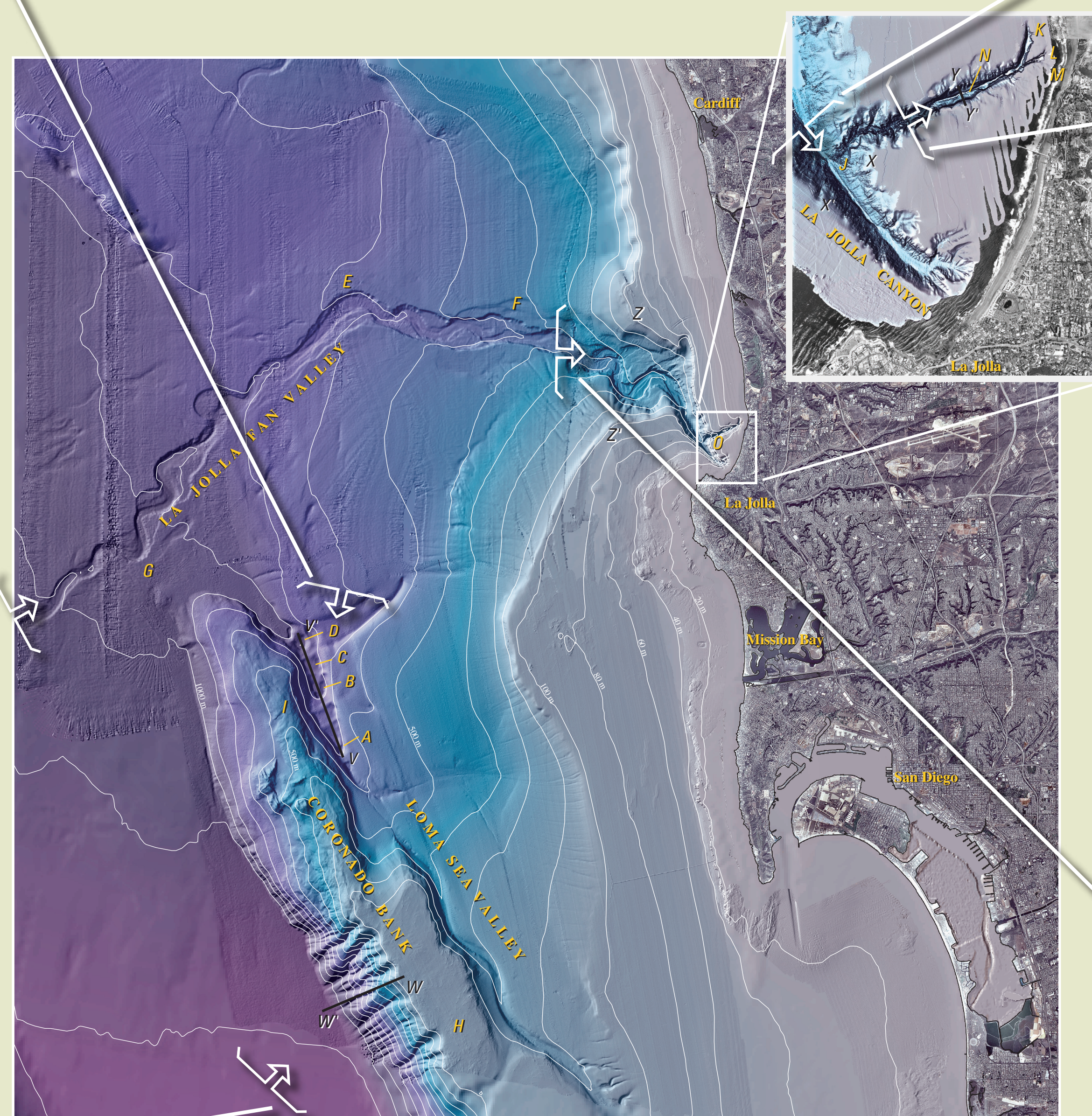


Figure 1. Panoramic view toward the east of the San Diego continental margin. The La Jolla submarine canyon and fan with its meandering turbidite channel dominate the northern (left) part of this image. The head of the Carlsbad Canyon incises the shelf at the far left in this image, but unlike the La Jolla Canyon it does not extend into the shallow water close to the beach. A ridge that is capped by the Coronado Bank to the south occupies the right foreground of the image and is separated from the San Diego shelf by the Loma Sea Valley. The vertical exaggeration is 2x and the distance across the bottom of the image is approximately 33 km.



See sheet 1 for author affiliations, map projection information, and a clean version of the map.

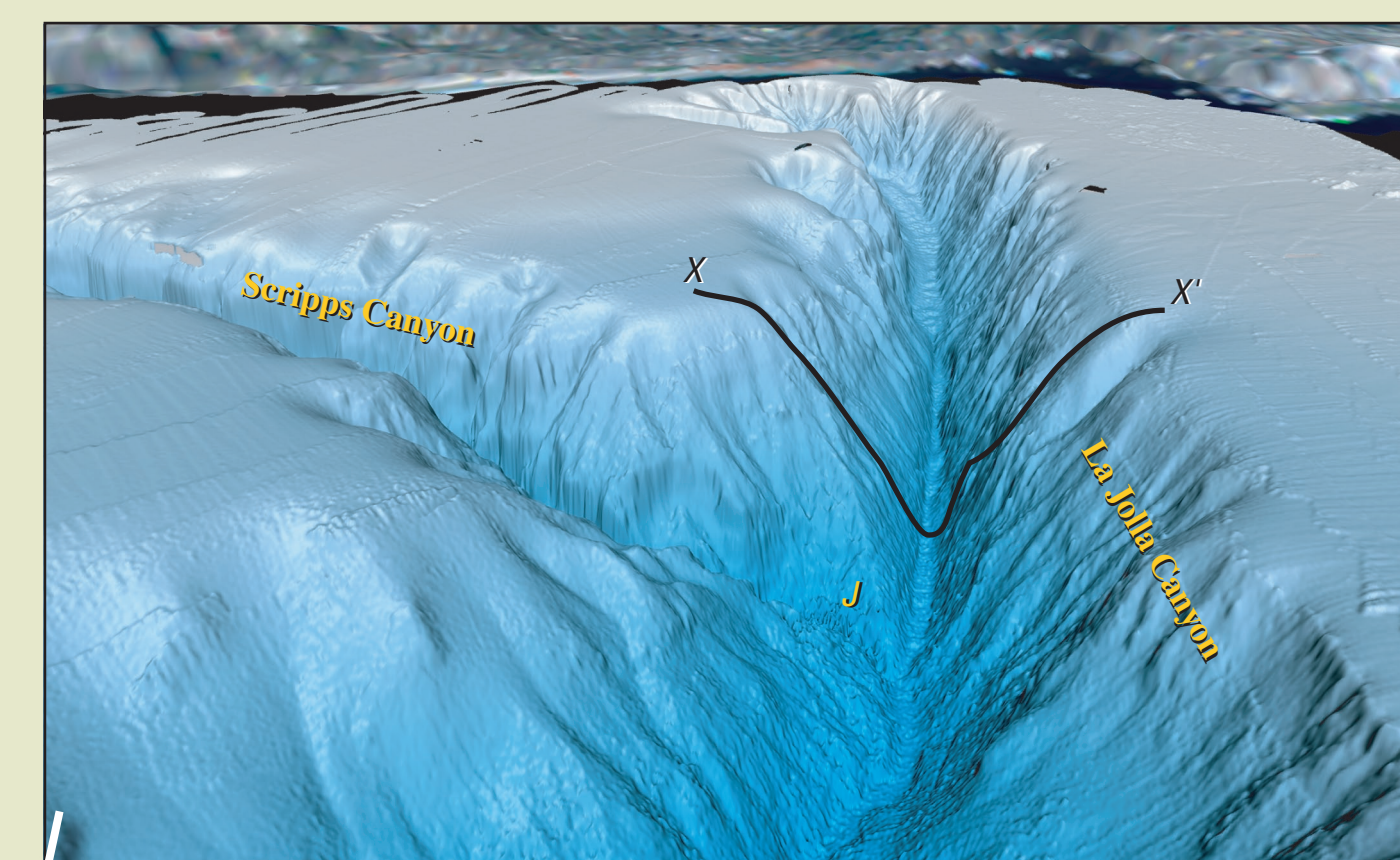


Figure 5. View looking southeast at the confluence of La Jolla Canyon (right) and Scripps Canyon (left). The La Jolla Canyon begins less than 225 m from shore at La Jolla Beach and is more than 200 m deep where it joins Scripps Canyon. Bedforms along the floor of La Jolla Canyon indicate that the system is still an active conduit for sediment moving from the coast to the deep basin. There is no river or stream that enters the coast at the head of the canyon, but sediment moving parallel to the beach in the littoral cell is intercepted at the canyon head and then moves down the 6 degree gradient of the canyon. The floor of Scripps Canyon is approximately 30 m shallower than La Jolla Canyon and forms a hanging tributary where the two meet at J. The vertical exaggeration is 2x and the distance across the bottom of the image is approximately 900 m.

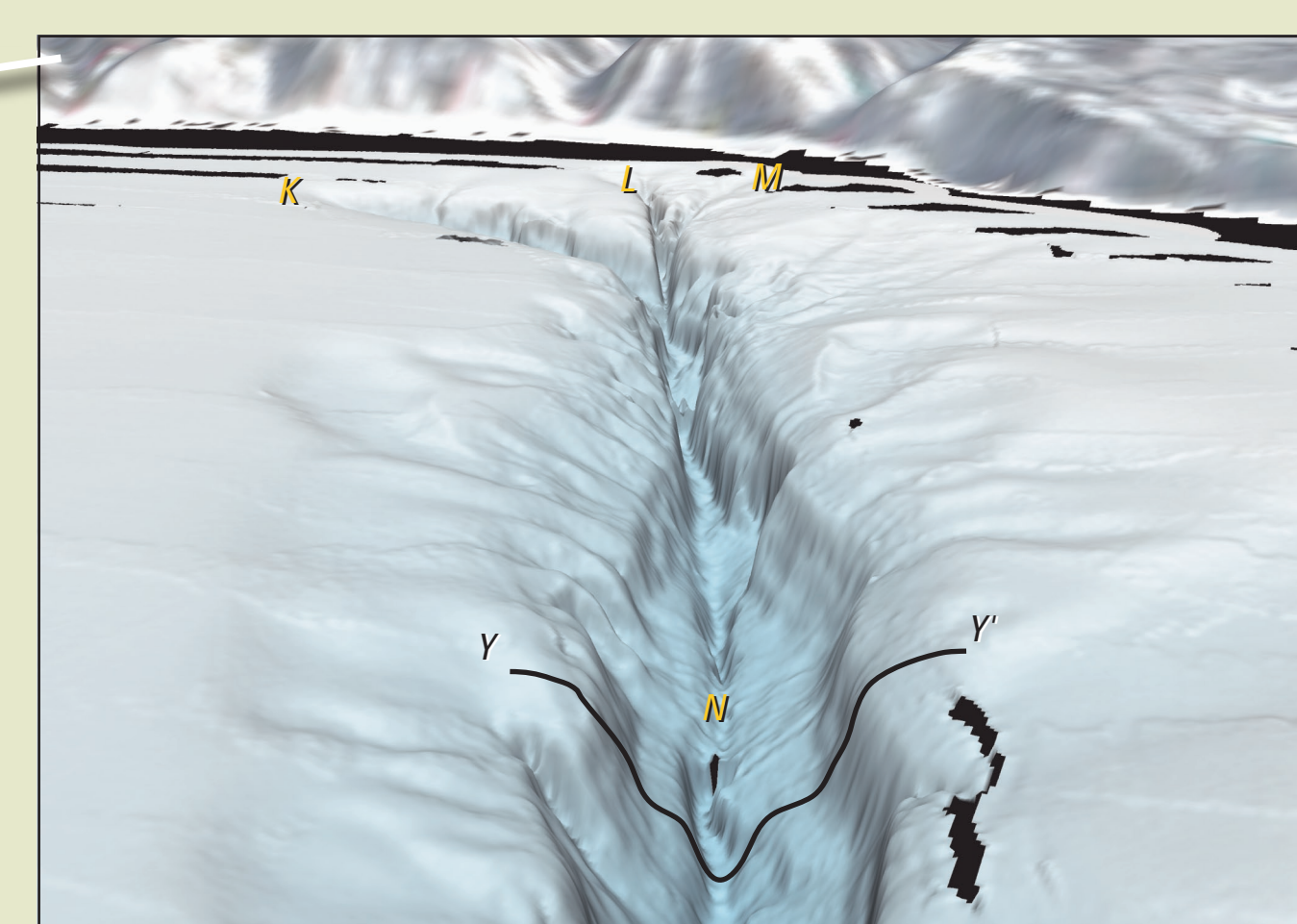
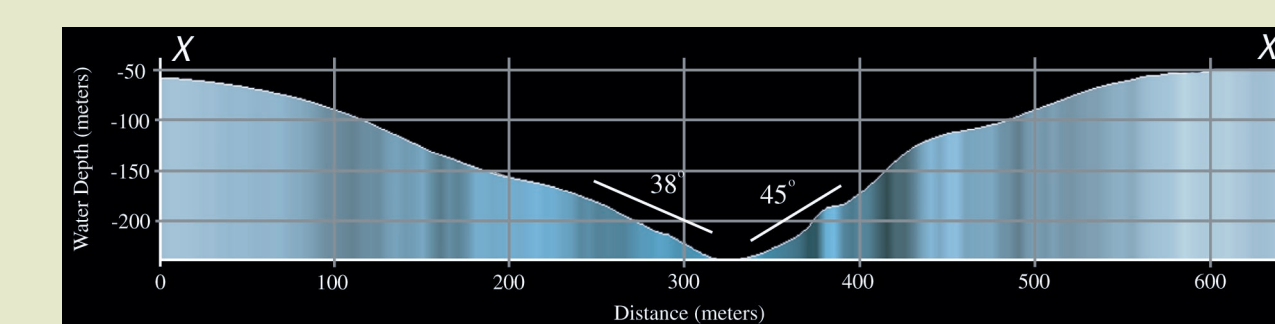


Figure 6. View looking northeast (upslope) along the axis of Scripps Canyon, which is 1.6 km (1 nautical mile) long before it joins with the La Jolla Canyon (not shown in this image; see fig. 5). This canyon has three main branches at its head: North (location K), Summer (location L), and South (location M) (see Shepard and Dill, 1966). Numerous landslides have occurred along the steep canyon walls. One landslide perhaps formed the break in the axial profile at N. To highlight the features of this part of the canyon, this view was generated with no vertical exaggeration and an illumination azimuth and angle different than all the other images on this map. This view has an illumination azimuth of 260 degrees at a 45 degree angle. The distance across the bottom of the image is approximately 600 m.

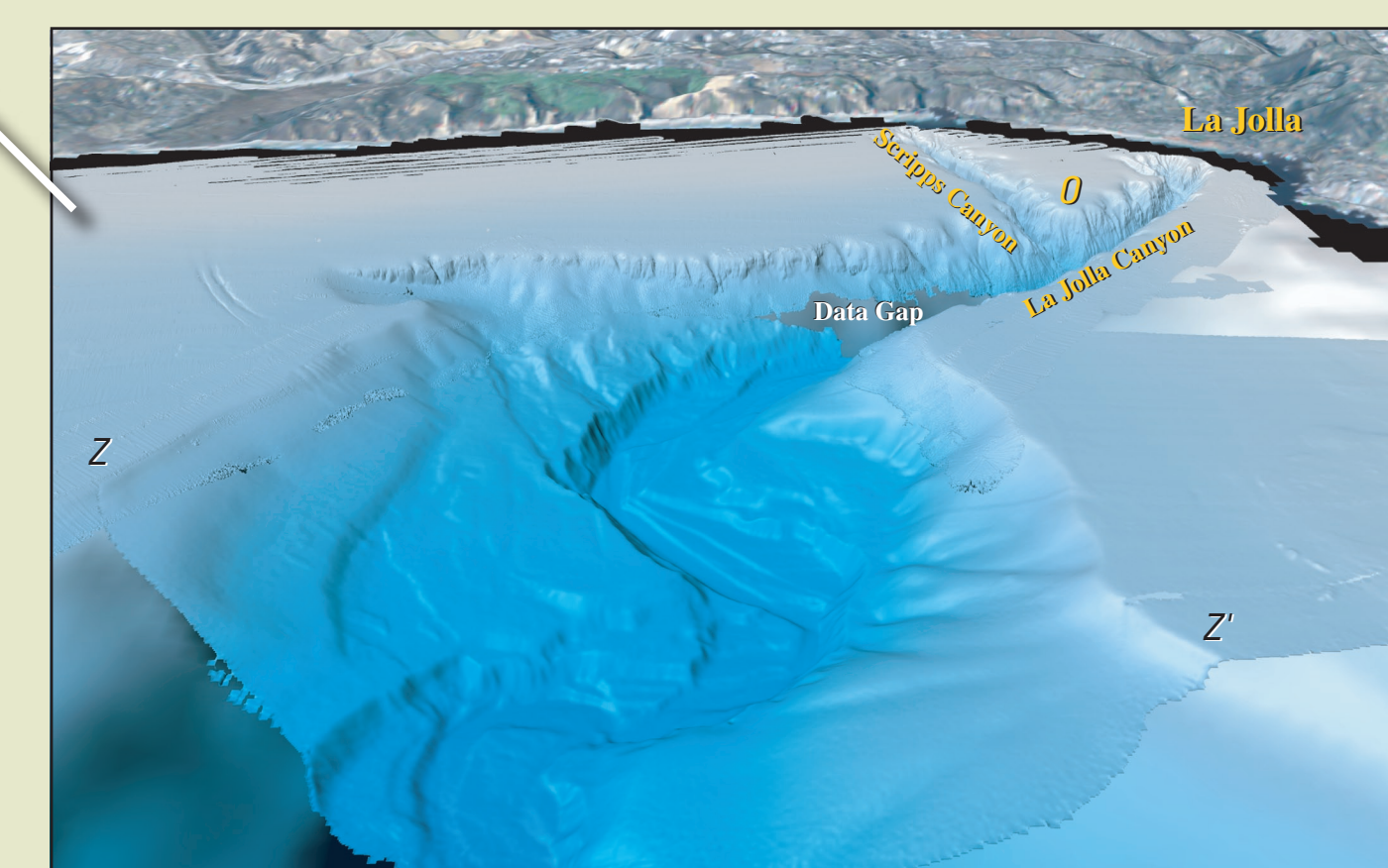
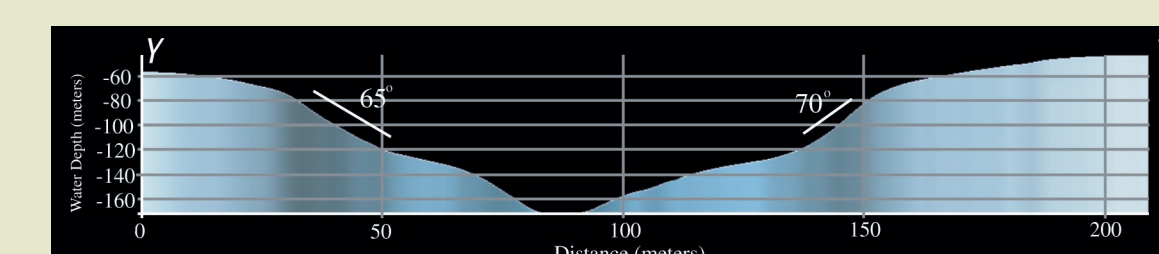


Figure 7. View looking east toward the head of La Jolla Canyon. The canyon widens from about 700 m where Scripps Canyon (entering from the left) meets La Jolla Canyon at O to about 5.4 km toward the bottom of this image between Z and Z'. A series of terraces along the canyon walls between location O and the lower left edge of this image indicates that erosion has increased the canyon depth probably as a result of sea level rise since 18,000 years ago. The profile between Z and Z' is the widest and deepest (350 m) section of the entire canyon system because the canyon narrows again where it crosses the continental slope and feeds the La Jolla Fan Valley. The vertical exaggeration is 2x and the distance across the bottom of the image is approximately 5.3 km.

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Multibeam Bathymetry and Selected Perspective Views Offshore San Diego, California

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