SDAG

Meeting Announcement

Wednesday August 24th, 2022

HAPPY HOUR- 6:00 PM **DINNER** - 7:00 PM **MEETING** - 8:00 PM

MARINA VILLAGE 1936 Quivira Way, San Diego, CA 92109

MEMBERS: $35.00 **STUDENTS:** $25:00 **NONMEMBERS:** $40.00

INCLUDES: MEXICAN STREET TACO BUFFET + SOFT DRINK

CASH BAR: BEER

TITLE:

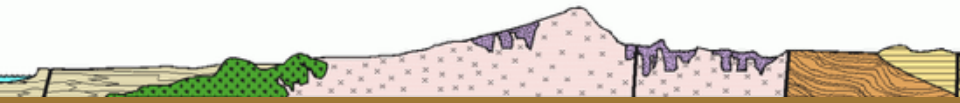
A 3-in-1 One-Stop Wonder at Scripps Coastal Reserve, La Jolla, California: Fate of Beach Sand, Ripples in a Beach Flume, and Pleistocene Marine Terrace.

Mario V. Caputo PhD

Pacific Section SEPM

(Society for Sedimentary Geology)

Managing Editor



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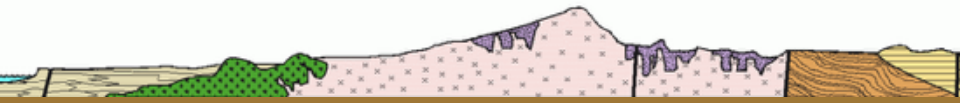
MARIO V. CAPUTO
Biographical Highlights

In the early 1970s, Caputo and fellow undergraduate geology students at SDSU were groomed for BSc degrees by some of the finest geoscientists on the west coast. With a solid foundation in sedimentology built by Pat Abbott, Caputo aspired to study Jurassic sedimentary rocks on the Colorado Plateau with Ron Blakey for an MSc degree at Northern Arizona University. After 4 years with Mobil Oil Corporation in the early 1980s, he resumed formal training in classical geology at the Colorado School of Mines and at the University of Cincinnati for a PhD degree. In 1993, he resigned his tenure as associate professor of geology at Mississippi State University and as adjunct instructor at the Mississippi University for Women and Millsaps College to return to California. He is a four-time recipient of the Outstanding Educator Award during his 18 years at Mt. San Antonio College; was recognized for outstanding contributions to the SDSU Department of Geological Sciences in 2013; and received the Baylor Brooks Honored Alumni Award from the SDSU alumni and geology department in 2015.



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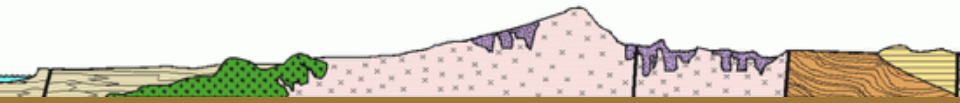
MARIO V. CAPUTO
Biographical Highlights

His published field work relates to architecture and paleogeography of Jurassic eolian and marginal marine strata of southern Utah; architecture and petrology of Quaternary eolian limestones, San Salvador Island, the Bahamas; and paleoecology of Pleistocene invertebrates on marine terraces of Palos Verdes Hills. He just completed the 2nd edition of Geologic Disasters Workbook with NAU's emeritus professor of geology, Dave Best. Steve Rowland, emeritus professor of geology at University of Nevada, Las Vegas and he published the discovery of Pennsylvanian vertebrate trackways in eolian rocks in the Grand Canyon. Last November, Caputo found new eolian structures and insect burrows, and never-before-discovered vertebrate leg bones preserved in Pennsylvanian eolian sandstones in the Grand Canyon. Work continues with Rowland on strata that interrupted eolian sedimentation in the Jurassic Aztec Sandstone at Valley of Fire State Park in Nevada. He continues to serve the Pacific Section, Society for Sedimentary Geology (SEPM) as managing editor.



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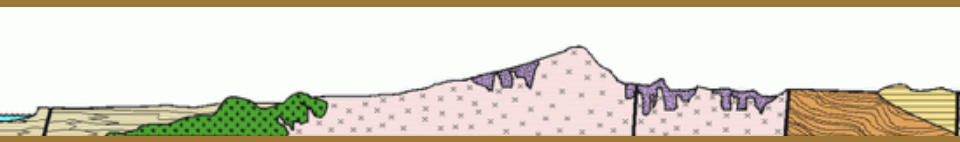
ABSTRACT

Many of you are familiar already with the topics published by others and summarized in this oral delivery. However, consider this presentation as an audition for a One-Stop Wonder field trip for SDAG. At 3 locations around the Scripps Institution of Oceanography (SIO) are geologic features that are integral parts of the natural history of San Diego. Each can be thought of as "wonders" of a composite one-stop wonder.

Location 1, at the top of the staircase that leads to the SIO campus, offers a view of the spacious beach extending from the Scripps pier south to La Jolla Shores. Not visible from this viewpoint but relevant to the discussion are broad, sandy beaches that continue northward to the Dana Point headland in Orange County. The wave-driven, southerly transport of sand for this part of the California shore is maintained in the Oceanside cell, which is supplied with sand partly from streams and mostly from weathering and erosion of sea cliffs. From this nearshore stream of sand, waves, tides, and wind are able to build extensive beaches south to the La Jolla headland (Point La Jolla on maps) at the southern limit of the Oceanside cell. Marveling over the broad beaches to the north, visitors wonder why there are only small sandy cove beaches around the La Jolla headland and rocky beaches along western Point Loma peninsula to the south.



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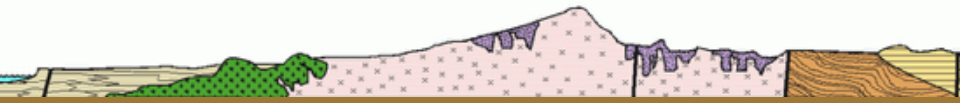
A submarine canyon system, known for decades by SIO scientists, is the principal cause for the sand deficit at those locations. Scripps Canyon, the northern branch of the canyon system, lying directly seaward of SIO, captures much of the sand in the Oceanside cell and funnels it offshore as submarine flows or turbidity currents. Sand that bypasses Scripps Canyon continues south to build the beach at La Jolla Shores and is finally captured by La Jolla Canyon, the southern branch of the canyon system. The final obstruction to the journey south for any sand making it past La Jolla Canyon is the La Jolla headland.

Location 2 is on the beach a short walk north from the Scripps pier at Scripps Coastal Reserve. Here, effluent sea water from SIO buildings above cascades onto the beach at the base of the sea wall and flows seaward to create a natural flume. In the flume, one can follow the flowing water while it interacts with fine-grained sand and sculpts the flume bottom with bedforms: transverse, lunate, linguoid, and rhomboid ripples. As the ripples migrate downcurrent, one can further watch them disappear as the flume current accelerates or reappear as the current decelerates. Often when ripples disappear at high flow velocity, they are replaced by streaks and sheets of sand, several grain diameters thick, as bedforms known as plane beds. Highest flow velocity and shearing force create antidunes, the ultimate bedform, marked by small waves that break and migrate upcurrent with the antidunes. For students to witness here the live water-sand interactions is the essence for understanding architecture and interpreting hydrodynamics of sedimentary rocks.



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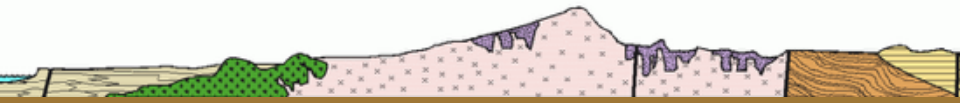
ABSTRACT

Lastly, Location 3 at the Scripps Coastal Reserve is on the north side of a short, boulder-armored headland of Eocene Scripps Formation several meters north of the flume. Preserved in the cliff-rock a few meters above the beach is a profile of the upper Pleistocene Nestor abrasion platform or marine terrace, one of the first elevated fossil beaches described in the early 1900s. Following the ancient beach surface landward along the disconformable contact between the Eocene Scripps Formation and Pleistocene strata above, one can discern the steep slope of a Pleistocene sea cliff and the shoreline angle formed by the intersection of the plane of the sea cliff and with the plane of the beach surface. The Pleistocene shoreline angle was formed by wave erosion at mean sea level at that time. Its present-day elevation is used to calculate the amount of neotectonic uplift or subsidence that had occurred along the coast since the level of the worldwide ocean during late Pleistocene time. Gravelly sandstone lying on the Pleistocene beach surface was deposited on an intertidal to subtidal beach as evidenced by cobble- and boulder-sized clasts with circular cavities bored by infaunal pholad
clams that inhabit this shore zone.



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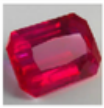

Ruby

GEOBRUGG

Leighton 60th Anniversary

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