...bonal carbon, C^{14} dating, and Pb^{210}. In 24 cores up to 1 ...ter of silty clay lacustrine sediment was identified at ...e lake bottom. Commonly organics occur at the lower ...ntact of the silty clay. Units beneath the lake ...diments were variable and included bedded and laminated ...d, laminated clay, massive clay, bedded sandy loam, ...ried soils, and a few disturbed units interpreted as ...quefaction features. In the three deepest cores the ...-lacustrine deposits included 4.2 m of bedded sand, 4.4 ... of interbedded sand and clay with a buried soil at 0.8 m ...pth, and 6.0 m of interbedded sand and clay with a buried ...il at 0.8 m depth. The sand had horizontal bedding and ...mination, precluding emplacement by liquefaction.

These results are not consistent with an alluvial ...ming hypothesis where fine-grained laminated sediment ...comes coarser grained with depth. They are consistent ...th a variety of fluvial and backswamp environments ...ddenly drowned by the formation of a lake.

...:15 p.m. Whipple, Kelin X. № 12031

...THOLOGIC AND CLIMATIC CONTROLS ON DEBRIS-FLOW FAN SURFACE ...RPHOLOGY, OWENS VALLEY, CALIFORNIA

WHIPPLE, Kelin X., Dept. of Geological Sciences AJ-20, University of Washington, Seattle, WA 98195

Alluvial fans built predominantly by debris-flow deposition (debris-flow fans) ...e an important aspect of the landscape in many steep, tectonically active ...vironments. The morphology of these landforms is controlled by a combination of ...vial and debris-flow processes and varies with source lithology, tectonic regime, ...d climate. This paper discusses morphological differences between debris-flow ...ns on either side of Owens Valley, California. The discussion focuses on ...fferences in surface morphology (on the scale of 10's to 100's of meters) rather than ...ger-scale, morphometric differences (e.g., fan size and slope). Differences in ...rface morphology are ascribed to climatic and lithologic differences between the ...aciated, granitic) basins of the Sierra Nevada and the (drier, unglaciated, ...nsedimentary and metavolcanic) basins of the White Mountains. The processes of ...bris-flow initiation and deposition are discussed in order to establish the physical ...s between source lithology, climate, and fan surface morphology.

The surfaces of the fans below the Sierra Nevada are characterized by many ...ll-preserved abandoned with little relief on levees, narrow, bouldery debris-flow ...annels, and generally smooth low-relief interfluves. The surfaces of the White ...untain fans, however, are dominated by on-lapping wide terraces defined by broad ...verbank debris flow lobes that add relief to interfluves, broad channel-margin levees ...ilt up to levels well above general elevation of the surrounding fan surface, fewer ...andoned channels, and fewer large boulders. These morphological differences are ...dicative of a more efficient fluvial system but shorter channel-shifting intervals on ...e Sierran fans: a condition which leads to fewer overbank lobes and more abandoned ...annels. Whereas climatic differences can explain the enhanced fluvial efficiency ...th higher and more sustained discharges from the glaciated basins of the Sierra ...vada, the reduced longevity of channels on the Sierran fans is probably related to a ...ater frequency of channel-blockage by bouldery high-yield-strength debris flows, a ...flection of the granitic source lithology.

...:30 p.m. Prestegaard, Karen L. № 32251

...NTROLS ON THE MOBILITY OF GRAVEL AND COBBLE PARTICLES IN THE LAKE ...CHIGAN NEARSHORE

PRESTEGAARD, Karen L., Dept. of Geology, Univ. of Maryland, College Park, MD 20742, BRABECK, John, SAIC, Chicago IL, MORAN, Sean, Univ. of Illinois, Chicago, IL 60680-4348

...ny nearshore areas and beaches along the southwest coast of Lake Michigan are composed ...sand with zones of gravel and cobble sized particles. The extent of the coarse sediment zones ...ually is confined within and inland of the breaker zone. This zone of coarse particles expands ...th high wave heights and velocities. Coarse particles are visibly mobile even under conditions ...w velocities and shear stresses. To explain and predict the movement of these particles, we ...nducted a theoretical and field study of the movement of coarse particles in a nearshore that ...mainly composed of sand. In the field phase of our study, we measured near-bed velocities ...the onshore, offshore, and longshore directions at sites located from the swash zone to the end ...the gravel substrate beyond the breaker zone. At these same sites, we collected bedload ...mples to determine bedload transport rate and size distribution in onshore and offshore ...ections. We also collected bed material samples and shallow cores of the substrate. These ...asurements and wave height measurements were made under a variety of wave heights that ...re safe to work in. The effect of the movement of particles on beach morphology was ...nitored by surveying beach profiles on each of the measurements dates and at other times ...provide at least a monthly record for a two-year period.

Field results on the movement of coarse particles were compared with predictions of sediment ...trainment using Shields' criterion and equations that were developed by other investigators for ...terogeneous sediment under unidirectional flow. We found that neither the Shield's criterion, ...r the effects of heterogeneous sediment fully accounted for the mobility of the coarse particles. ...e found, however, that if the entrainment equation of Wiberg and Smith was adapted to include ...celeration forces that are produced by incoming and outgoing waves, the resulting equation ...edicted the mobility of the coarse particles quite well. This approach can be used to predict ...e movement of coarse sediment in nearshore areas under a variety of conditions and perhaps ...n be used to predict changes in beaches due to changing wave conditions. The results of this ...vestigation also suggest that coarse particles will often be too mobile to be used for beach ...abilization.

04:45 p.m. Bierman, Paul R. № 32683

THE EVOLUTION OF GRANITIC LANDFORMS -- FIELD OBSERVATIONS AND COSMOGENIC INSIGHTS.

BIERMAN, Paul R. and GILLESPIE, Alan R., Department of Geological Sciences, University of Washington, Seattle, WA 98195.

The rate and processes by which distinctive granitic landforms such as pediments, inselbergs, and bornhardts evolve have puzzled and intrigued geomorphologists for over a century. Because these are landforms of erosion and because they appear to be long-lived, traditional stratigraphic and short-term process studies have been stymied. As a result, these unusual and picturesque landforms remain poorly understood.

We are currently investigating the evolution of a suite of granitic landforms in the Alabama Hills (Owens Valley, CA), Llano Uplift (Llano, TX), and Stone Mtn. (Atlanta, GA) using a combination of field mapping, petrographic, and isotopic techniques.

Field observation suggests that case hardening is an important factor in the longevity of Alabama Hills landforms. Granitic bornhardts in Texas appear to loss mass primarily by sheeting whereas loss by solution may be the predominant means by which granitic landforms in the humid southeast erode.

We are estimating effective exposure ages (erosion rates) by measuring the concentration of six *insitu* produced cosmogenic isotopes (^{14}C, ^{26}Al, ^{14}C, ^{36}Cl, ^{21}Ne, and ^{10}Be). Initial ^{21}Ne data (B. Hudson, Lawrence Livermore National Lab) suggest that landforms in the Alabama Hills may have effective exposure ages ≥ 0.5 Ma mandating erosion rates ≤ 40 cm/Ma. This extraordinary stability implies that some Alabama Hills topography may be inherited from a time (≈ 6 Ma) before the subsidence of Owens Valley and rise of the Sierra Nevada.

MON pm

SESSION 33, 1:00 p.m.
MONDAY, OCTOBER 21, 1991
GEOPHYSICS/TECTONOGEOPHYSICS
SDCC: Room 17B

01:00 p.m. Meyers, Jayson B. № 25031

Deep Seismic Imaging of the Continent-Ocean Crust Transition, Central West Africa

MEYERS, Jayson B. and ROSENDAHL, Bruce R., Project PROBE, Marine Geology and Geophysics, University of Miami -R.S.M.A.S., 4600 Rickenbacker Causeway, Miami, FL 33149

Seventeen deep-imaging, long aperture seismic reflection profiles record the transition from rifted continental crust to Cretaceous oceanic crust along the West African margin from Cameroon to Southern Gabon. South of 2°N, transitions occur seaward of the shelf break, which may explain the gap between South America and equatorial Africa in plate reconstructions that use the shelf-break for continental fit. NNE-SSW trending fracture zones intersect the margin obliquely and the transition occurs farther seaward on the southern sides of the fracture zones, causing the transition width to increase to more than 100km in the south. As a general rule, profiles subparallel to fracture zones show gradual transitions and relatively flat reflection Moho (two-way travel-time) across the transition zone. Profiles subperpendicular to spreading direction show narrower transitions and possibly offsets in reflection Moho. On one NW-SE trending profile the transition is so abrupt that streched continental and oceanic crust are essentially juxtaposed, with possibly a 2s offset in reflection Moho. Varying scales (20-120km wide, 1-5km thick) of wedge-shaped reflection packages occur within the transition zones along some but not all profiles. Where they occur, these wedges appear to overlap continental crust and either early oceanic basement or transitional crust created during initial break-up. Based upon form, position, and interval velocity character, these wedges may be intermixed volcanic flows and sediments. On intersecting profiles from the area of 1°S, overlapping hyperbolic-like reflections occur in the lower crust at the transition zone. These may be refelctions from magma bodies associated with early-separation underplating.

01:15 p.m. Anselmetti, Flavio S. № 28596

FROM OUTCROPS TO SEISMIC PROFILES: AN ATTEMPT TO MODEL THE CARBONATE PLATFORM MARGIN OF THE MAIELLA, ITALY

ANSELMETTI, Flavio S. & EBERLI, Gregor P., Univ. of Miami, RSMAS-MGG, 4600 Rickenbacker Cswy, Miami, FL 33149; SELLAMI, Souad, Univ. de Genève, 13 Rue de Maraîchers, CH-1211 Genève, Switzerland; BERNOULLI, Daniel, Geological Institute ETH, CH-8092 Zürich, Switzerland.

Synthetic seismic profiles across the platform-basin transect of the Cretaceous/Tertiary Maiella carbonate platform (Abruzzi, Central Italy) help to understand the seismic reflection