SAN DIEGO ASSOCIATION OF GEOLOGISTS

MEETING NOTICE
WEDNESDAY JUNE 19, 1996

SPEAKER: David Rightmer, SDSU

TOPIC: Implications of lithologically similar domains within the Pliocene Fish Creek Sturzstrom, Anza-Borrego Dessert State Park, California

PLACE: Tickled Trout
Ramada Inn, Hotel Circle
2151 Hotel Circle South
San Diego, CA 92108
(619) 291-6500

TIME: 6:00-Social Hour
7:00-Dinner
8:00-Program

DINNER: Macadamia chicken, rice pilaf, vegtable medley, ceasar salad, rolls, butter, carrot cake, coffee, tea.

COST: $20.00

RESERVATIONS REQUIRED by noon Friday June 14th. Please phone in your reservation to Werner Landry at (619) 236-7251. Leave name, number in party and affiliation. Please call Werner if you need to cancel your reservation. If you have special diet requirements, contact Anne Sturz by Friday June 14th.

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ABSTRACT

Sturzstroms are some of the most stunning events on earth. Large rock volumes fall down a steep slope, shatter and travel distances up to 25 times their vertical drop at velocities up to 280 km/hr.

Perhaps as the result of an earthquake associated with the opening of the Salton trough, an event occurred between 4.3 and 3.4 Ma when a mountain front collapsed in the region of the ancestral Fish Creek Mountains resulting in a large and highly mobile struzstrom. Lack of soil and vegetation together with the rugged topography carved into the Neogene strata in the Anza-Borrego Desert State park allow excellent three-dimensional examination of the sturzstrom breccia sheet.

Specifically, the Pliocene Fish Creek sturzstrom is a volumetrically significant (300×10^6 m^3) deposit of a subaqueous long run-out "landslide." Detail mapping indicates that the mass raced 11 km along the paralic zone of a shallow inland sea, across a shallow marine ledge entered deeper water and finally climbed a prograding fan delta where it ended as a more traditional, bedded, polymictic conglomerate. En route, portions of the sturzstrom deformed the underlying sediments by injections. Sunken sturzstrom masses folded bottom-sediments into spectacular packages (> 35 m thick) which rose diapirically.

The Fish Creek sturzstrom deposit exhibits a curious distribution of major rock types including pegmatitic granodiorite/tonalite, pegmatitic mica schist and gneiss, and pegmatitic leucocratic granite. Although it traveled 11 km from the Fish Creek Mountains to the foot of the Vallecito Mountains, the breccia consists of countless lithologically similar

domains often with abrupt boundaries indicating the little particle-by-particle mixing. Erosion into the breccia sheet reveals that domains are scale independent (mm to km). Typically a domain will consist of pervasively fractured clasts of a given composition that are shattered and separated by an intervening matrix composed primarily of comminuted fragments of the same composition often exhibiting "three dimensional jigsaw-puzzle fabric". The fragments remain spatially connected and allow the observer to visually "put the pieces back together".

Geochemical study of 16 samples using major, minor and REE indicate that plutonic clasts and their surrounding matrix are virtually identical in composition. Log normal distribution plots suggest a chemical affinity between schist clasts and their corresponding matrix; both are similar to Julian Schist average data. Pegmatitic dike clasts contain only 3 elements with similar abundance to those of the surrounding matrix indicating that their respective chemical compositions diverge.

Results obtained from an elaborate point-count procedure requiring up to 22 decisions per grain are consistent with the geochemical data and suggest that both matrix and clasts in a given domain are lithologically similar.

Compelling evidence for a southeast to northwest paleoflow direction is the progressive and irreversible loss of internal sturzstrom fabric. On the apron of the Vallecito Mountains near the toe of the deposit, the jigsaw-puzzle fabric was destroyed as lithological domains were dispersed and the fragments were disseminated throughout the matrix.

David A. Rightmer earned is M.S. in Geological Sciences at SDSU this May. Previous degrees include B.A. in mathematics from UCSB, and an M.A. in mathematics from San Diego State. David has been admitted into the Ph. D., Program in Geological Sciences at the University of California, Riverside and will be continuing his work in Anza-Borrego Desert State Park.

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ANNOUNCEMENTS

* <u>CORPORATE AND INDIVIDUAL SPONSORSHIPS UP! MANY THANKS TO:</u> Joe Corones; Dr. Blayne Hartman and TEG; Hargis & Associates, John Hoobs and Geocon Inc.; Ralph Jeffery and American Geotechnical; Barbara Johnston; Mike Palmer; Robertson Geotechnical, Inc.; Tony V. Sawyer, Consulting Hydrogeologist; Bob Smillie and Group Delta Consultants; David and Jan Steller; Dr. Anne Sturz; Carole Ziegler. **THANKS-THANKS-THANKS-THANKS- THANKS-THANKS THANKS-THANKS THANKS-THANKS THANKS-THANKS!**

Corporate and individual support above and beyond normal membership dues enhances our ability to provide student scholarships, provide complimentary dinners to students at our monthly meetings, and provide extra beverages at the picnic and field trip.

* <u>BOOK OF THE MONTH SALE</u> SDAG publication, *Geotechnical Engineering Cases - San Diego County*, will be offered at the June meeting only (no mail orders please) for the reduced price of **$2.00 per copy**. Now is your chance to restock you personal library, buy unique gifts for friends and relatives, and make room in our inventory for future SDAG volumes. It is a worthy companion volume to the *Environmental Perils* you picked up last month.

* <u>DEADLINE</u> for announcements to be included in the July SDAG newsletter is June 25th, 1996. Please submit your items in writing to Anne Sturz, 6466 Bonnie View Dr. San Diego, CA 92119 or by fax at 619 461-2644.

* <u>SDAG ANNUAL PICNIC</u> will be held on <u>Saturday August 24th</u>. Mark your calendars now.

* <u>SDAG FIELD TRIP</u> will be held in late September. This year will feature Coastal Geology of San Diego County. If you have original work you would like to submit to the guidebook, please contact Tissa Munasinghe, 619 260-4099.

SAN DIEGO ASSOCIATION OF GEOLOGISTS
PUBLICATION ORDER FORM

QTY	TITLE	RETAIL PRICE	TOTAL
_____	COLORADO PLATEAU ROUND-TRIP FLIGHT GUIDEBOOK Shelton, Crowell and Davis (1979)	$4.00	_____
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_____	ANZA-BORREGO/ WSTD PALEONTOLOGY AND GEOLOGY Remeika and Sturz (1995)	$20.00 (s)	_____
	SUBTOTAL		=========
	less discount*		
	TOTAL		_____

ORDERING NOTES:

* 1. Discount off retail price: SDAG members 50%, libraries 20%, retailers 40% except (s) = short discount of 20%.
2. Postage and handling included in retail list price.
3. Prices subject to change without notice.
4. Allow 4 to 6 weeks for delivery. Make checks payable to SDA Mail to SDAG, POB 191126, San Diego CA 92159.

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03/26/96

San Diego Association of Geologists
c/o Werner Landry
Development Services Department
City of San Diego
1222 First Avenue, MS 401
San Diego, CA 92101-4154

Tanges, Susan E.
1465 E. Lexington Ave. #7A
El Cajon, CA 92019