Report on
First International Conference on Mars Sedimentology and Stratigraphy

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Oct. 1, 2010

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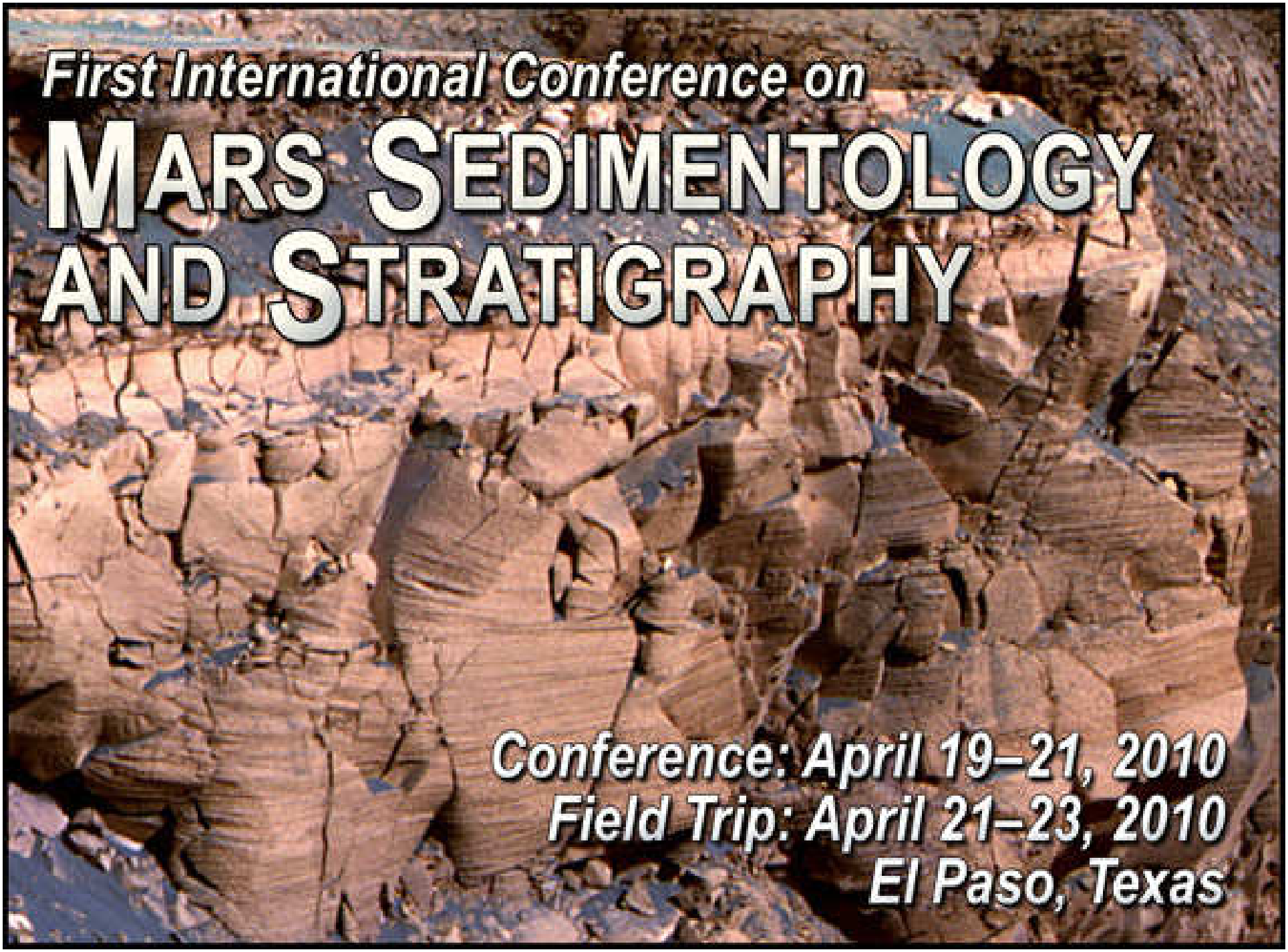

First International Conference on
MARS SEDIMENTOLOGY AND STRATIGRAPHY
Conference: April 19–21, 2010
Field Trip: April 21–23, 2010
El Paso, Texas

First International Conference on Mars Sedimentology and Stratigraphy

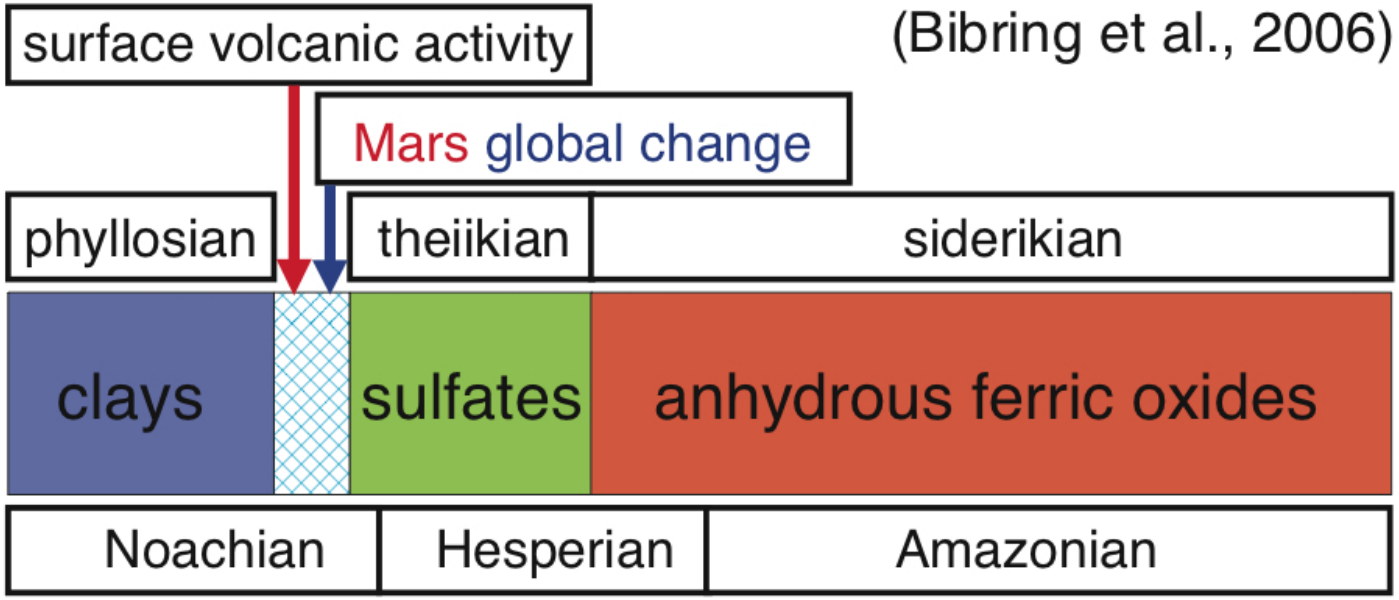
		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	Session	Planetary context	Physical Stratigraphy	Habitability et al.		
	Chairs	Sumner, Gupta	McLennan, Allwood	Grant, Mangold		
Morning	8:00:00 AM	INTRODUCTION	Ori	Sumner	Permian Basin Field Trip	Permian Basin Field Trip (arrives at airport at 3 PM)
	8:15:00 AM	John G.				
	8:30:00 AM		Wilkinson	Allwood		
	8:45:00 AM	Milliken	Metz	Nicoll		
	9:00:00 AM	Andrews-Hanna	Ehlmann	Summons		
	9:15:00 AM	Dohm				
	9:30:00 AM		Discussion + margin	Session Discussion		
	9:45:00 AM	*Coffee Break*	*Coffee Break*			
	10:00:00 AM	Howard	Kocurek	*Coffee Break*		
	10:15:00 AM	Oehler		CONFERENCE DISCUSSION		
	10:30:00 AM		Vasavada			
	10:45:00 AM	McLennan	Edgar			
	11:00:00 AM		Bishop	Field Trip Introduction		
	11:15:00 AM	SESSION DISCUSSION				
	11:30:00 AM		Session Discussion			
	11:45:00 AM			saddle up 11:45		
LUNCH				Permian Basin Field Trip (departs at noon)		
	Chairs	Dromart, Milliken	Kocurek, Ori			
	Session	Mineralogy and Strat.	Crater infill stratigraphy			
Afternoon	1:15:00 PM	Mangold	Gupta			
	1:30:00 PM					
	1:45:00 PM	Le Diet	Irwin			
	2:00:00 PM	Flahaut	Anderson			
	2:15:00 PM	Wiseman	Switzer			
	2:30:00 AM					
	2:45:00 PM	Discussion + margin	Discussion + margin			
	3:00:00 AM	*Coffee Break*	*Coffee Break*			
	3:15:00 PM	Loizaux	Chan			
	3:30:00 PM	Vaniman	Rice			
	3:45:00 PM	Bristow	Grant			
	4:00:00 PM					
	4:15:00 PM	Directed DISCUSSION (led by Tanaka): Geologic time scale	SESSION DISCUSSION			
	4:30:00 PM					
	4:45:00 PM					
	5:00:00 PM					
		POSTER SESSION	OPEN			

AB 8198	Zürich	A01	cancel
LH 195	Frankfurt	A08	cancel
LH 233	München	A11	cancel
AY 918	Helsinki	D71/72	cancel
LH 263	Düsseldorf	A12	cancel
SN 2588	Brüssel	D89	cancel
LH 5328	Brüssel	D89	cancel
BD 5328	Brüssel	D89	cancel
AZ 427	Turin	D80/81	cancel
HU 490	Beijing PEK	A06	cancel
IB 3547	Madrid	A13	cancel
AB 8950	Kopenhagen	C48-57	cancel
OK 519	Prag	D73/74	cancel
BT 214	Riga	A15	cancel
LX 979	Zürich	A00/01	cancel
BA 987	London LHR	A05	cancel
OS 276	Wien	D82/83	cancel
C9 1569	Mannheim	D75/76	cancel
LO 390	Warschau	D84/85	cancel

Post-Meeting Activity

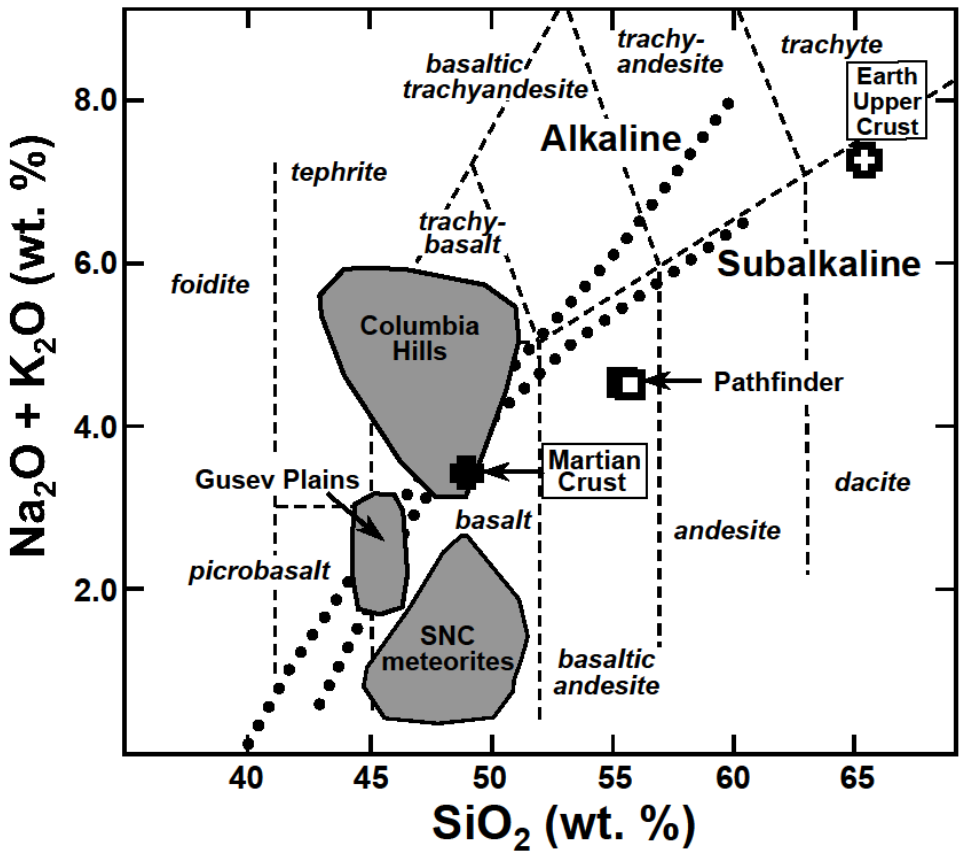
- Writing group of 11 identified at meeting.
- Production of a report on key concepts and outstanding questions identified in the conference output.
- Special issue (John—need more info here)

Q1: What were/are the mechanisms for sediment production on Mars and did these processes or rates vary through geologic time?



One current scenario for the environmental evolution of Mars surface environments through time (after Bibring et al., 2006). The timing of sedimentary rock formation and mineralogy supports this model (Milliken et al., 2010).

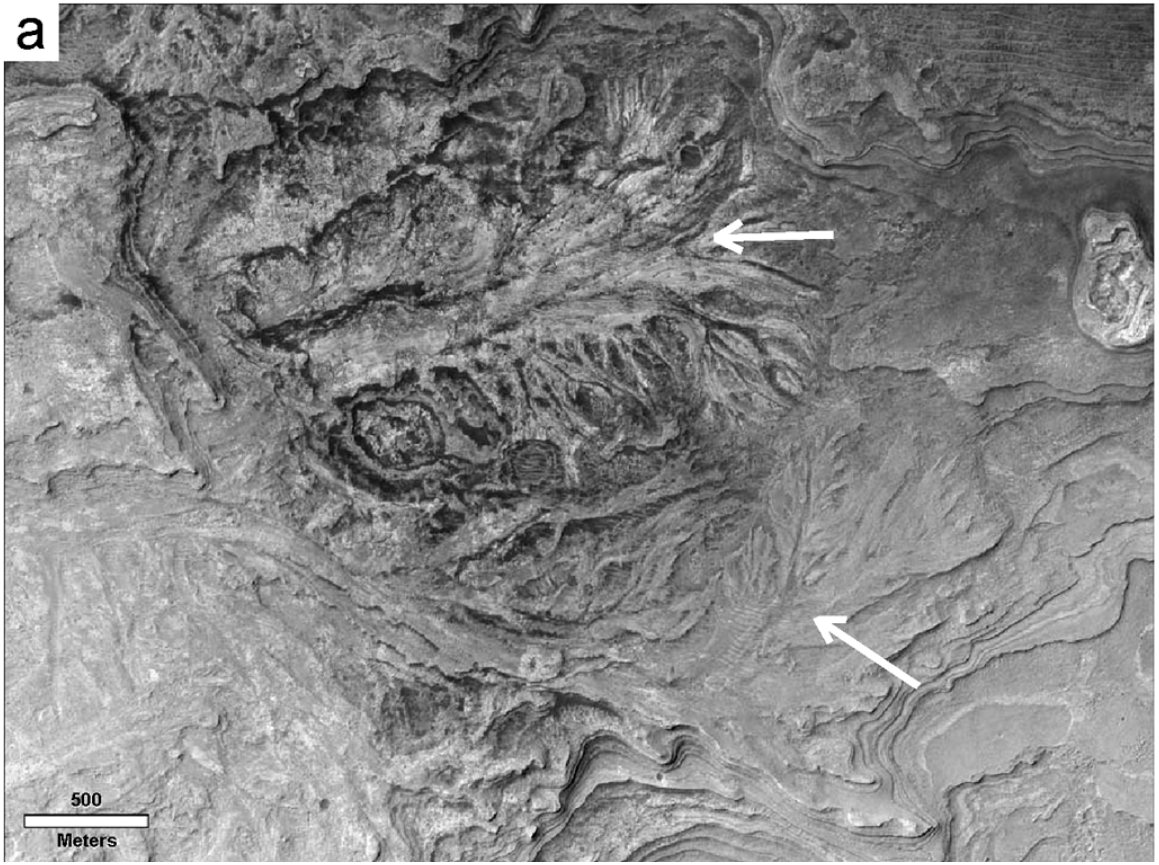
Q2: What is the composition, both mineralogical and chemical, of modern and ancient martian sediments? What were the global geochemical cycles for S and C, and what role did the sedimentary record play in this cycle?



The martian crust is basaltic in character and has a chemical and mineralogical character that fundamentally differs from the "granodioritic" terrestrial upper crust. This difference in turn will have profound implications for the chemical and mineralogical composition of Martian sedimentary rocks and how processes, such as weathering, sorting and diagenesis, will influence these compositions.

Q3: How can we use the stratigraphic record on Mars to extract information on its planetary evolution?

Q4: How did Source-to-Sink sediment transport systems evolve on Mars?

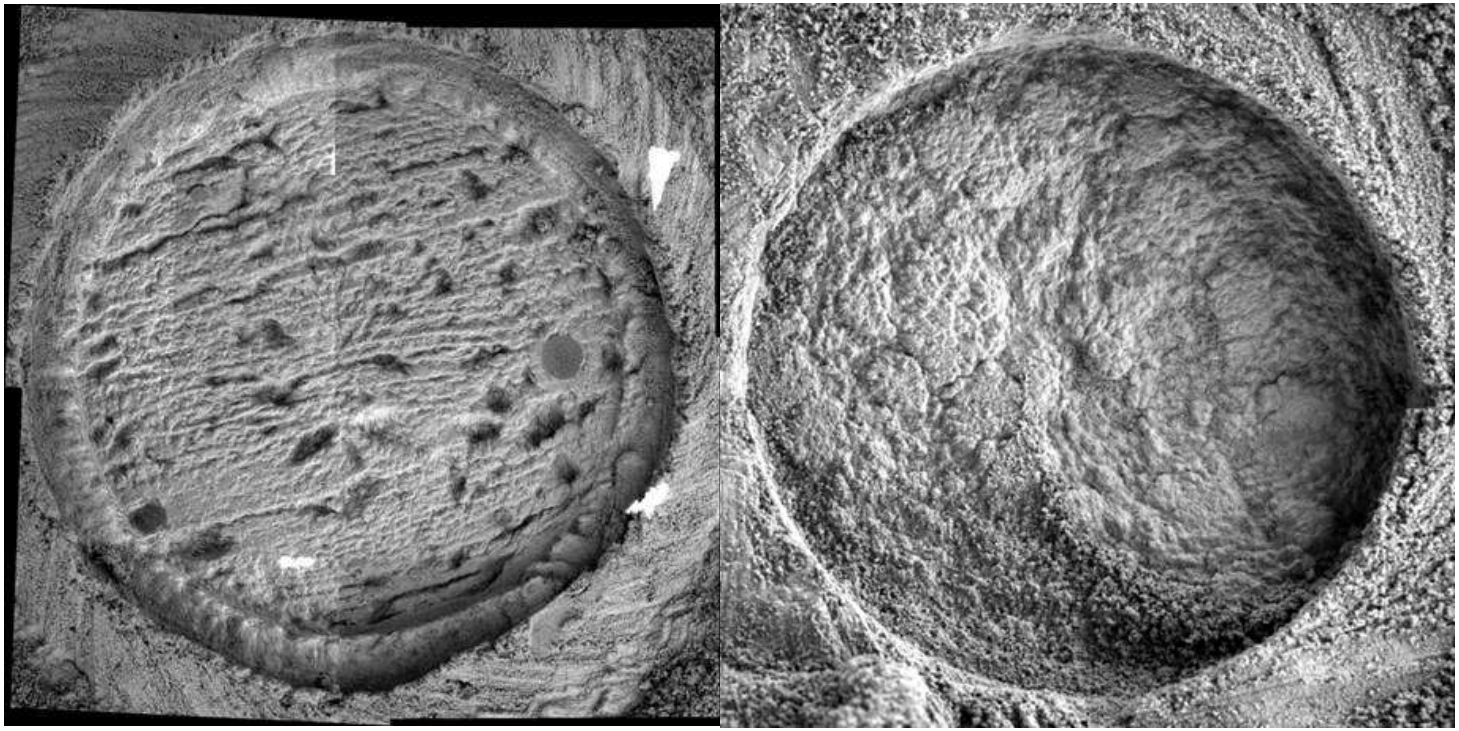


Sub-lacustrine fan systems in Southern Melas Basin, Valles Marineris (Metz et al., 2009).

Q5: What were the mechanisms of sediment accumulation and sediment preservation?

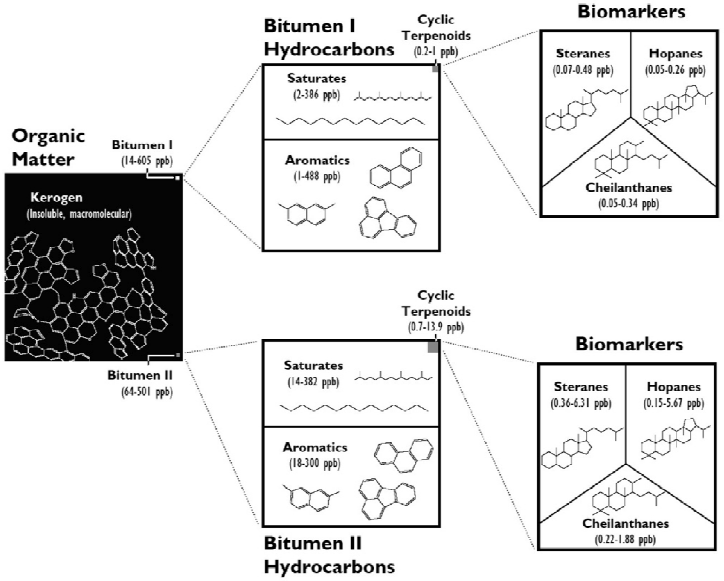
Perspective view of Lower Gale Mound deposits (Milliken et al., 2010). The beds vary vertically in thickness, albedo and texture. The lithology of beds correlates with the stacking pattern of the beds. Units with clay minerals tend to be thin-bedded whereas sulfate-rich units show thicker, possibly amalgamated, bedding.

Q6: In what ways did martian sedimentary rocks become modified after their deposition?



Diagenetic recrystallization of sulfate-rich sediments on Mars. Left; well-stratified sulfate-rich sandstone showing crystal molds after unknown (possibly sulfate) mineral, and hematitic concretions. Right; recrystallization results in homogenization and more coarsely crystalline texture. See McLennan et al., 2005.

Q7: Could the sedimentary record of Mars provide evidence for a former biosphere?



A) Organic molecules sequestered in minerals such as on clay surfaces encased in calcite, as shown here in a 2.6 Ga core from South Africa, are protected from oxidation due to low permeability of the host rocks. B) These organics contain hydrocarbons with very specific distributions of molecular structures that indicate a biological origin as well as provide insights into the ecology of the ancient microbial communities (Waldbauer et al. 2009).

See you at the 2nd International Mars Sed-Strat Conference!