

Figure 1. Comparison of figures 7 c and 6 a from papers I and II respectively.

point on control blots was also from the perspective of understanding the motivation, not that they are not important. Why would anyone need to use the same control blot, when there are so many available, especially when they are all expected to look similar, indicating that the same amount of protein was loaded in all the slots. I went to the library and looked at about 12 control blots from different *JBC* papers (such a waste of time!) and at least two looked very similar to the naked eye! Maybe Siddharthan can look at 100 control blots, especially generated from a single gel apparatus, and establish their similarity or otherwise and publish a paper, perhaps with the help of undergraduates! I had mentioned that a

brief report was sent in the first instance, although we had all the analysis. I had also indicated that I was in the process of compiling all the data to be submitted to DBT, New Delhi as required. I have done this almost a month ago and it has all the analysis amounting to 118 pages. It is uncharitable to propagate that the committee took its job lightly. I believe in the innocence of people until proven guilty. The detractors would like to have it the other way around.

Siddharthan has chosen to comment on my letter to *Science* in 1998. That was written in a totally different context of India being targeted for sanctions after the Pokhran nuclear test. I was trying to explain the euphoria in India, despite my

own aversion to nuclear tests, as due to a feeling of alienation and discrimination, especially among the scientific community. I do not think it is correct to quote sentences out of context. At that time I had received close to 500 e-mails (mostly NRIs), with 98% totally agreeing with my views. Two letters criticized me for being a cry-baby. That should satisfy Siddharthan!

I can only state that openness, honesty, credibility of Indian science, etc. need not be the prerogatives of a chosen few, who can vehemently proclaim the same. After interacting with the scientific community in various ways for over 40 years without any axe to grind, it is a sad day for me that a couple should preach me on these virtues, using this episode as a pretext. I guess scientists should never take things for granted or cease to learn! I wish Rahul Siddharthan the very best!

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NEWS

MEETING REPORT

Lunar and planetary science*

The 38th Lunar and Planetary Science Conference (LPSC) was attended by planetary scientists from diverse fields. More than 1500 participants from 24 countries were present. The conference comprised of 43 sessions on different themes spread over five days. Two poster sessions in the evening also covered a variety of topics.

With several nations, including India, preparing to launch lunar and planetary missions and both USA and Europe seriously considering the setting up of scientific

bases on the moon and mars, conferences such as LPSC are increasingly assuming greater significance. The focus this year at LPSC was clearly on Mars, with nearly a third of the sessions devoted to the red planet. Currently, three orbiting spacecrafts (Mars Express, Mars Reconnaissance Orbiter (MRO), 2001 Mars Odyssey) and two rovers (Mars Exploration Rovers) are studying the red planet. Further, with two high-profile missions (Phoenix, Mars Science Laboratory) to be launched soon, Mars is the most extensively explored planet at present.

In a special session on MRO, John Mustard (Brown University, USA) reported detection of phyllosilicate assemblage with unaltered olivine-bearing

lithology on top at Nili Fossae. This observation, based on high spatial (~25 cm/pixel) and spectral (few nanometres in the 0.3–3.92 μm range) resolution, provides an important constraint on the timing of aqueous activity on Mars. This area was studied based on earlier results obtained from OMEGA instrument on-board Mars Express. The same capabilities were also put to good use for evaluating possible landing sites for the Phoenix mission, scheduled for launch in August this year. Presentation by M. P. Golombek (JPL, USA) dealt with the size frequency distribution of rocks in the candidate landing sites, for identifying areas relatively free of boulders to facilitate safe landing of the Phoenix mission. K. D.

*A report on the 38th Lunar and Planetary Science Conference held at the South Shore Harbour Resort and Conference Center, Houston, USA between 12 and 16 March 2007.

Seelos (Johns Hopkins University, USA) presented results from CRISM Spectrometer onboard MRO, looking for locations rich in surface ice among the Phoenix candidate landing sites. This is important keeping in view the goal of Phoenix to determine the history of water and habitability potential in the ice-rich soil in Martian arctic regions. Analysis of data from radar instruments, MARSIS on Mars Express and SHARAD on MRO, presented by R. J. Philips (Washington University at St Louis, USA) in the session on 'Mars polar layered deposits', revealed subsurface of the order of kilometres beneath ice-dust deposits on the north pole.

There were three sessions dealing with diverse topics in lunar science. In the session on 'Lunar remote sensing, space weathering and impact effects', Peter Schultz (Brown University) proposed that Procellarum on the lunar nearside is a system of faults and not an impact basin. Based on laboratory experiments, he suggested that it formed as a result of off-axis antipodal effects of the South Pole Aitken Basin Formation on the far-side. He also provided field evidence in the form of documented spots of possible gas escape on the moon, defining the boundary of Procellarum! In the same session, Lindsay Keller (Johnson Space Centre, USA) presented space weathering studies carried out on a lunar rock using focused ion beam technique to profile a

thin (nanometre to micrometre) coating on the rock without disturbing its micro-structure. It is important to understand space weathering since it modifies the optical properties of the material, making it difficult to reliably estimate the composition of lunar surface materials by remote sensing.

Two noteworthy presentations discussed the possible occurrence of small quantities of water in lunar rocks, which are otherwise thought to be bone dry. Peter Isaacson (Brown University) presented results from spectroscopy of lunar soils that show water absorption feature near $3\text{ }\mu\text{m}$ even at 300°C (Figure 1). In the session on 'Lunar interior and differentiation', Alberto Saal (Brown University) presented work carried out on lunar picritic glasses from Apollo 15 and 17 sites, to quantify their volatile contents using SIMS and reported the occurrence of magmatic water in lunar basalts. This has implications for the models of lunar evolution that consider melts as anhydrous in nature. Both these reports hold significance in view of plans to set up lunar bases where water can serve as an extremely important resource. However, both these observations need confirmation from future work. With four remote sensing missions (Change, Selene, Chandrayaan-1 and LRO) scheduled to be launched before the end of 2008, future LPSCs will have a fair share of sessions devoted to lunar science.

The session on 'Asteroid spectral observations' had many interesting presentations. Jessica Sunshine (University of Maryland, USA) reported the possible occurrence of refractory-rich asteroids that would make them the earliest accreted bodies in the solar system. The spectral signature of spinel has been used to look for such bodies, since spinel is abundant in Ca–Al-rich refractory inclusions that are present in primitive meteorites and are considered as the first solids to form in the solar system. Interestingly, the observed spectral signature is due to aqueous alteration of spinel and may help in studying aqueous alteration processes also in such asteroids. In the same session, E. Heggy (Lunar and Planetary Institute, USA) made an interesting presentation on the feasibility of radar sounding of chondrite asteroid bodies based on laboratory measurement of dielectric properties of chondritic meteorites. The results indicate that the dielectric constant increases with increasing iron content (LL, L and H chondrites).

In the session on 'Asteroids and deep impact – Structure, dynamics and experiments', the issue of formation of ponds – smooth deposits – on asteroids was discussed. First seen on 433 Eros and more recently on Itokawa, formation of ponds has been a topic of speculation. A new formation mechanism, that of thermal erosion of boulders, has been proposed by Dombard *et al.* (Johns Hopkins University, USA) based on the diurnal cycling of surface temperatures on Eros. The authors tried to complement this suggestion by comparing the occurrence of boulders and ponds across the surface of the asteroid. They concluded that additional factors like slope and elevation further affect the formation of these interesting deposits.

Special sessions on Titan, Enceladus, Saturnian satellites and Icy satellites discussed new observations of these faraway members of the solar system. Particularly interesting were the presentations on Enceladus discussing its geologically active nature, including the recent observation of water jetting out from its south pole. Interestingly, the heat output from the south pole alone is $\sim 3\text{--}7\text{ GW}$, much more than that can be accounted by radiogenic heating. G. C. Collins (Wheaton College) made a presentation on the possible occurrence of a sea on the south pole of Enceladus based on detailed modelling of its heat flux.

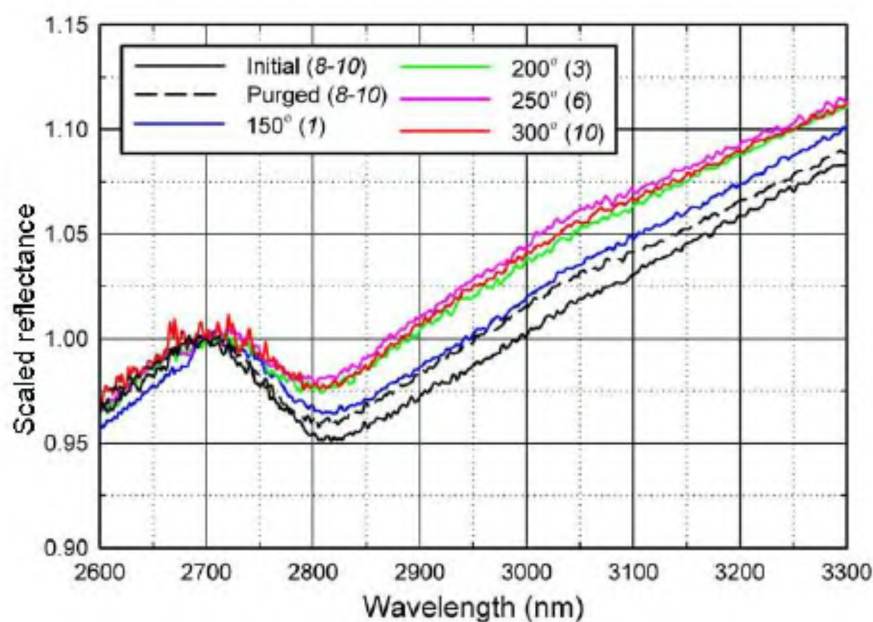


Figure 1. Spectral variation in the water absorption band near $2.8\text{ }\mu\text{m}$ in lunar soil 15041 ($20\text{--}44\text{ }\mu\text{m}$ fraction) as a function of temperature (Isaacson and Pieters, 2007).

In the session on 'Impact cratering from experiments and models', K. Wunnernman (Humboldt University, Germany) discussed hydrocode (iSALE) modelling results to determine the effect of porosity on production of impact melts in sedimentary targets. The results indicate that pore spaces absorb shock waves causing higher temperatures at lower pressures. However, the possible role of water present in the pore spaces needs to be ex-

plored. The presentation by Gwendolyn Bart (University of Arizona, USA) looked at distinguishing distant secondary craters from primary craters of similar size by exploring the inverse relation between impact velocity of projectile and size of the ejected boulders. Secondary craters are produced by low-velocity projectiles and consequently produce larger boulders compared to a primary craters of the same size formed at much higher

velocities. Proper identification of primary craters is important to improve the precision of age estimation of planetary surfaces based on crater counting.

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MEETING REPORT

Biosafety and biosecurity of Asia*

Biosafety and biosecurity have received tremendous public interest since the incident on 11 September 2001. The concept of the biosafety and biosecurity is also gaining momentum in Asia. Considering the growing importance of biosafety and biosecurity and the imperative need of the region and nations to protect and manage various institutions, national interests and natural resources, an International Conference on 'Biosafety and Biosecurity Asia 2007' (BBA-2007) was organized to look at the current status of development and technology in the field of biosafety and biosecurity and to develop a roadmap for a national plan on the same. BBA-2007 was held as a joint initiative of eleven agencies and the departments of the Malaysian Government, and Protamp Conferences Sdn Bhd.

The two-day conference mainly focused on current status of biosafety, emerging needs, biosecurity, immediate challenges and proven threats, life sciences and bioterrorism, and approaches in biosafety and biosecurity management. More than 400 delegates from various countries and international organizations worldwide participated in the conference. There were four sessions, two plenary lectures and 16 invited speakers from the US, UK, Australia, Singapore, Japan, Switzerland, Norway and Malaysia.

The Malaysian Prime Minister, Datuk Seri Abdullah Ahmad Badawi empha-

sized in his speech sent to the BBA-2007 conference, that Asia needs to develop effective mechanisms to detect rapidly any possible biosafety and biosecurity threats to protect nations in the region from possible bio-disasters. The PM had also mentioned that globalization in the area of biotechnology is increasingly intensifying the international trade of biotech products; and this trend in biotechnology industry is creating a situation in which a terrorist group could possibly acquire biological agents, equipment or weapons through various approaches. The PM mentioned that in this modern age, infectious diseases have ignored geographic and political boundaries. By emphasizing the scope of biosafety and biosecurity, he elaborated on the future challenges in biosafety and biosecurity. Finally, he urged the Asian countries and other countries around the world to put in place necessary measures or systems to strengthen their management and control on biological materials, agents and pathogens in various processes, from storage and usage to export.

In the first session on biosafety there were four invited papers. Nor Shahidah Khairullah (Infectious Diseases Research Centre, Malaysia) elaborated on emerging needs to avail biosafety and summarized issues such as management of biosafety, laboratory-acquired infections, laboratory accidents, SARS outbreaks in the region, bio-risks, and priorities related to protect employees and their families.

Identifying biosafety priorities in health and security, Terence Taylor (International Council for the Life Sciences,

USA) discussed the importance of collaboration at local, national, regional and international levels to meet biosafety challenges at the respective levels. He stated that advances in life sciences and associated technologies may be used for malign purposes. He also touched upon enhancement of biosafety by promoting development of standards using best practices, and codes of conduct.

Chua T. Mean (NUS, Singapore) presented an in-depth overview on regional biosafety challenges in Asia. He highlighted the risks associated with handling of hazardous agents and infectious diseases. He mentioned that the Asian region is the hotbed for incubation of several emerging diseases such as Nipah, SARS and Avian influenza. He also discussed issues related to laboratory and facility design, engineering, maintenance and administrative commands to counter key challenges of bio-contaminants in Asia.

Malcolm R. Dando (Department of Peace Studies, UK) spoke on the 'Conformance to the BTWC: an agenda for action for research institutes, universities and industries'. He reviewed the present state of awareness in the life sciences community in the context of the process of strengthening the biological and toxin weapons convention (BTWC), which clearly stated the importance of awareness raising and codes of conduct for life scientists for national implementation of the convention.

The second session of the conference focused on safety and security of food, agriculture industries, and life sciences and bioterrorism. Alan Edwards (Austra-

*A report on the International Conference on 'Biosafety and Biosecurity Asia 2007' held at PWTC, Kuala Lumpur, Malaysia during 21-22 May 2007.