



Geological Society of Nevada Southern Nevada Chapter Newsletter

February 2006

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Using Images in the Thermal Infrared Spectrum

SPEAKER: Maxwell Blanchard, Planetary Scientist

DATE: Thursday, February 23, 2006

LOCATION: LFG Rm. 102

TIME: Social half-hour at 6 pm
Meeting business at 6:30 pm
Talk at 6:45 pm

SPONSOR: None

Geological Society of Nevada, Southern Nevada Chapter

University of Nevada, Las Vegas
4505 Maryland Parkway, Box 4010, Las Vegas, NV 89154-4010
<http://geoscience.unlv.edu/GSN/gsnsc.htm>

***Hello Everyone!** First, we would like to thank Brett McLaurin for a great talk, "The role of faulting in evaporite karst development, southern Nevada," which he presented with less than a day's notice, after Jerome McCartney had to cancel. A special thank you to Jeremy C. Wire and Geoconsultants, Inc. of San Jose California, for sponsoring the refreshments. We are very grateful for your support!*

There are a lot of exciting things coming up. Maxwell Blanchard will be speaking at our next meeting, February 23, on how to utilize infrared imagery in geology. In March, one of the UNLV Geoscience department's newest faculty members, Adam Simon will be speaking. The spring field trip to Lake Mead is fast approaching. This field trip could be a great chance to encourage new memberships, so tell a friend! We would also like to encourage everyone to become more involved in GSN by becoming an officer. Nominations are due by the March 23 meeting. Becoming a Chapter officer is a great resume builder!

I would like to thank Robyn Howley and the other members of the GSN Southern Nevada Chapter for giving me the opportunity to edit the newsletter. I will try to continue to produce the same quality publishing that Robyn has provided in the past. Please send any suggestions or comments to lora.griffin@unlv.edu.

-- Lora Griffin

ANNOUNCEMENTS

UNLV Recycles

Nominations for Officers

Key officer positions are open. Melissa Hicks, secretary, is at ExxonMobil in Houston and Robyn Howley, chapter president, announced at the last meeting that she will be stepping down. Please have nominations in by March 23, 2006. An e-mail ballot will be sent to all chapter members in May and the new officers will start in June.

We encourage anyone who wishes to participate in GSN to consider being an officer. GSN is a wonderful organization to be involved with and being an officer is a great way to network with many local and national scientists and companies. The elected president will also spend a year seated on the GSN Board of Directors and will have the opportunity to direct the future of GSN.

PARKING

For information on parking at UNLV please visit the UNLV parking services website at <http://parking.unlv.edu>. This site also includes maps of the campus and directions. We want to make sure that everyone has a place to park for our meetings.

A SPECIAL THANK YOU

We would like to thank chapter member Patrick Haynes for letting us sample some of the Nephelite minerals he collected. Remember not to get them wet!

MEMBER NEWS

Joseph Kula, our chapter vice president, will be heading to New Zealand for one month in February to finish his dissertation research. We wish him a safe journey!

On January 25, 2006 the UNLV Rebel Recycling Program announced that the university recycled 632 tons of materials in 2005. About 466 tons of paper products, 1.2 tons of aluminum, 7.1 tons of plastic and more than 1156 tons of scrap metal.

The Rebel Recycling Program picks up material throughout the university but they also have large bins where the public can drop off their recyclable material. Items that are accepted include: aluminum, plastic (#1 & #2), steel/tin, mixed paper, paperboard, and cardboard. The "Drive Up and Drop Off" station is located just off Flamingo Rd. behind the large solar panels and near the Boys and Girls Club. Just drive up and place your separated material into the correct bins! For more information visit <http://www.unlv.edu/facilities/recycling/> and for a map visit <http://www.unlv.edu/facilities/plancon/map.html>.

ROAD CONSTRUCTION

Swenson Avenue

The Clark County Water Reclamation District (CCWRD) will be working on Swenson Avenue from Kitty Hawk, just off Paradise Road, to Tropicana Avenue beginning February 7 through March 3. This pipeline rehabilitation project will cause delays in traveling to campus using these routes.

CCWRD recommends that travelers use alternate routes. Approaches from Flamingo or Harmon should be less congested. For additional information, including traffic updates, call the CCWRD's project hotline at 853-1333.

STUDENT-RUN SYMPOSIUM

The First Annual UNLV Geology Student Symposium is scheduled for Friday and Saturday, April 21 & 22, 2006. Graduates and undergraduates alike are being encouraged to participate by submitting abstracts for posters or talks presenting current research. Local and national scientific companies are also being asked to attend and potentially recruit future employees.

The first day of this mini-conference will include poster presentations, talks and plenty of time to interact with representatives from companies and organizations interested in the potential of UNLV geology students. The second day, there will be a field trip exploring local geologic formations. For those who may not be prepared to present research at this time, there are still plenty of ways to get involved. Help with correspondence, fundraising, program design, set-up & breakdown, refreshments & food, web design, and the post-conference party is still needed.

We encourage businesses looking for future scientists to attend the symposium. We are also looking for sponsorship from the scientific community. If you are interested in any of these or just want more information please contact Wendy Barrow at wendyj@unlv.nevada.edu.

ADS & SPONSORS

GSN is a non-profit organization and our chapter relies on meeting sponsors and advertisements to keep our chapter up and running. If your business would like to sponsor social hour at one of our southern Nevada chapter meetings or place an ad in our newsletter please contact Robyn Howley.

UPCOMING EVENTS

February 23 - Meeting - Maxwell Blanchard

March 30 - Meeting - Adam Simon
Officer Nominations Due

April 27 - Meeting - Jon Price *tentative*

April 29 - *Tentative* Spring 2006 Field Trip -
"Geologic History of the Lake Mead Region"

May 25 - No Meeting
Officer Elections (e-vote)

UPCOMING GSN RENO SEMINARS

February 17 - John Dilles, OSU, "Petrology and Structural Geology Setting of the Eocene El Abra-Fortuna Batholith, Chile, and Origin of Porphyry Copper Deposits"

March 17 - Michel Houseman, World Minerals "Diatomite Geology and Economics, with Specifics on Deposits near Fernley, Nevada"

April 21 - Adam Simon, UNLV, "Experiments in Economic Geology"

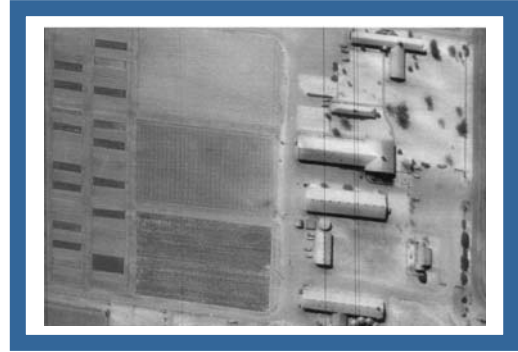
The Geological Society of Nevada meets these evenings as well. Contact gsn@mines.unr.edu for reservations.

Using Images in the Thermal Infrared Spectrum

Maxwell Blanchard, Planetary Scientist

Abstract

This lecture will discuss the principles of interpreting thermal infrared imagery & explain some common infrared scanning systems. The portion of the electromagnetic spectrum that is commonly used for thermal infrared imagery is 8 - 14 microns wavelength. Because this wavelength range is beyond the visible spectrum (i.e. 0.4 - 0.7 microns), it is not possible for humans to see objects that are emitting energy in the infrared wavelengths.



Thermal infrared image of plowed fields & farm buildings.

Fortunately, there are many sensors, used in astronomy & planetary science, that are sensitive to energy in this part of the electromagnetic spectrum & it is possible to use a scanning system to detect the incoming infrared energy from the object and produce images. These images are essentially temperature maps of the object & reveal small temperature differences across the object's surface. The energy is converted into temperature using the Stefan-Boltzman relationship.

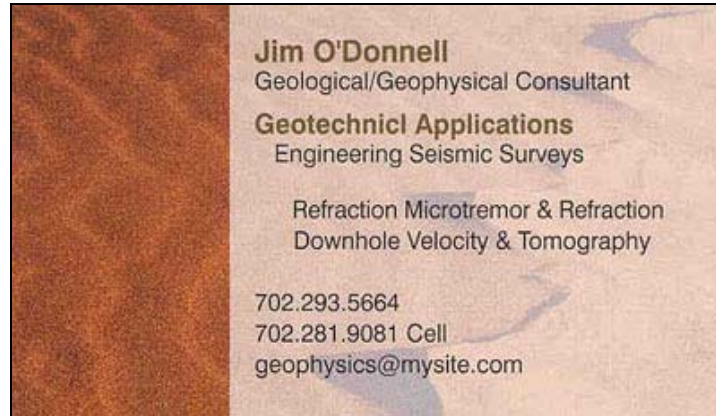
Thermal infrared scanners have been used in spacecraft, aircraft, & ground equipment to produce images of surface features observed on Earth, planets, moons, asteroids & comets. In order to interpret a thermal infrared image, it is necessary to understand those characteristics of the object that influence the surface temperature of the object at the time of image acquisition.

If a geologist is observing soil or rock in a stratigraphic, structural, or hydrologic setting, the surface temperature is mostly determined by: (1) albedo in the day time, when heat flows into the soil or rock due to the incident solar radiation, & (2) thermal diffusivity in the night time, when heat flows outward to the night sky. Whether an image is acquired during the day or night, the parameters that effect the object's albedo & thermal diffusivity must be understood before a geologist can make a meaningful interpretation. Because thermal diffusivity varies with an object's thermal conductivity, specific heat & density, it is possible under some conditions to correlate surface temperatures with soil moisture.

Speaker's Background

Max Blanchard was educated at San Diego State, San Jose State, & Stanford Universities. He is a licensed geologist in the state of CA & has a Credential from CA for teaching in community colleges. He has published over 90 papers and his past employers include: NASA-Johnson Space Center (space scientist), NASA-Ames Research Center (research scientist), San Jose State University (adjunct professor), General Dynamics-Convair (design engineer) & the Department of Energy (scientist & deputy project manager). While at Ames he conducted research in geochemistry and mineralogical analyses of cosmic dust and meteorites; as well as multi-spectral remote sensing, focusing mainly in the thermal infrared portion of the electromagnetic spectrum. He is currently employed at CCSN, West Charleston Campus, as an astronomy instructor.

PAID ADVERTISEMENTS

A business card for Jim O'Donnell, Geological/Geophysical Consultant. The card has a vertical brown textured bar on the left side. The text is on a light tan background.

Jim O'Donnell
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