Mojave 2007

Spaceward Bound Journal: Zzyzx
3-25-2007

I arrived at Zzyzx at approximately 2:30 pm. Mina, Hemma and I walked around and viewed the local sites. Many new faces and familiar ones from the broadcast arrived. We were assigned our rooms and roommates. I am with Hemma and Mina in a room with another 12 people. This will be interesting as we meet new people from many different places. We have people who have been accepted into the NEAT astronaut program; NASA Teachers from NASA teacher schools and K-12 teachers from different parts of the country. There are scientists and professors here from different parts of the United States, Chile and Spain.

There is a hot air balloon that will be used while we are here to take infrared pictures over lava tubes to look for cave entrances. Soil transaction will take place in various parts of the Mojave looking for organic life. Samples of organisms and minerals will also be removed from cave walls to look for living organisms. We will be looking under rocks, in soil, and caves in for anything living. Get ready to get your hands and knees dirty as an excellent adventure begins.

It all begins with a wonderful dinner that was served to all 100 participants in the patio off the back of the building. This was a wonderful chance to meet some of the interesting and enthusiastic people who have converged into this unique place.

After dinner we were given a brief description of the next week. This is definitely an experience that will not be soon forgotten.

zzyzx housing

hot air balloon over pond

Monday, March 26th

Today we chose which teams we were going to be able to work with. We will be able to stay with one group all week and work side by side with that group, or we will be able to move around from each type of group as long as we can find a place to sit in a vehicle. I was able to sign up for the balloon/cave crew. This group's task is to use infrared thermal imagining to locate openings of lava caves and tubes. The hot air balloon will be used to rise up over the area of the caves and photograph the entrances with the infrared camera. The crew for the cave consists of geologist, Bill Liebman; pilot and Thermologist Jim Thompson ; Crew Chief, Raffy; NEAT Teacher, Mike Marchiondo; the balloon team, and myself.

Thermal Imaging Crew

Chuckwalla - being curious

We traveled out to Cima lava tube to discover if the balloon can be used in the area to take aerial photographs. However, we were unable to use the balloon in this area, so photographs were taken from the ground above the opening of the lava tube with the infrared camera to register the heat images produced in the area. An interesting fact was that the lava surface was approximately 100 degrees F, while the cave entrance was approximately 60 degrees F. The team will take thermal images of the openings of the skylights to see if the imaging remains constant and if not, to see how it changes.

Once arriving at the cave, Bill gave a geological introduction of the volcanic activity in the area, identifying cinder cones and composite volcanoes. There are approximately 30 cinder cones in the local area. The Cima lava tube has a series of skylights and an opening. It is thought the skylights were created when the lava inside the tube hit an obstruction and the pressure inside the tube began to increase. Once this occurred the top of the tube blew open, creating a hole, Vocycles occur in the surface lava that was

released from the cave. The air that is captured in the lava create air holes in the lava of different sizes. Sometimes the holes can elongate and create a stretched out hole.

Cima Lava Tube entrance

Bill Explaining the Geology

Once inside the cave, the skylight releases light into the cave. In Cima Lava Tube there are a serious of three consecutive skylights varying in size. Mineral deposits line the inner lining of the cave. A few bats, a pack rat and a small scorpion are inhabitants of this cave. We will return later in the week with Penny Boston to see if small microscopic life lives here.

Upon leaving the cave, we were greeted by a chuckwalla who was sunning himself on a near by lava outcrop. This was a great photo opportunity the chuckwalla became a star.

Upon returning to the station, journals were written, and sharing of the day's adventures was discussed among the teachers. I discussed the caves with Meg Deppe from Vanguard Middle School and she shared her experience of Soil Transect.

A bell ringing in the distance summoned us to dinner. Once again we were fed like royalty. After dinner we met as a large group and Penny Boston made presentation on her theories and work in caves. We were then dismissed to work in our teacher groups, discussing the day's activities and our future homework assignments.

Tuesday March 27

We were up at 6:00 am to prepare for another great day of research and experimentation. The balloon/cave crew would head out to the Pisgah Lava Flows to explore cave opening and to take infrared images on the ground near cave entrances. We will not be taking out the balloon today because of the extremely unpredictable weather that has invaded the area over night. Predicted thundershowers and high winds for the area with the snow level down to 4000 feet. Wonderful!!!
After being fed a wonderful breakfast and given a sack lunch, (don't forget the lettuce), we head out to the lava tubes.

Arriving at the field of lava, the gear is carried to a nearby lava tube entrance. The air temperature is approximately 50 degree's with winds at 30 mph. Mike, Benjamin and I descend into the cave to take internal cave reading. It is sure nice to be down out of the wind and into a protected area. We descend about 20 feet, to the entrance of the cave. There are definite openings to the left and the right, cool air can be felt blowing up through out the cave. Proceeding any deeper in to the cave with out the correct gear would not be wise at this time. On the surface near the opening, Jim and Dan are helping Bill set up the Thermal imaging camera. They will take readings and set coordinates to the camera with the GPS, along with the air temperature, lava rock temperature, cave air entrance temperature and wind speed.


Thermal imaging crew


Cave entrance

After several images of the cave have been recorded, several of the team members walk out across the field in search of other openings. Meanwhile, the Camera team continued to take images of the flow and located several thermal readings off of various caves that the walking team located.
However, the winds continued to whip through the area, so the gear was packed up in fear that the camera would blow over. So the crew returned to Zzyxz via Kelso Train Station and Kelso Sand Dunes.

Hot showers were welcomed once retuning to the station. And once again we were served a wonderful dinner.

The Biosphere II crew presented the evening program. It was interesting to hear about how the station was built and the premise behind the project. We meet with our teaching teams after the program and discussed the days events and tomorrows adventures. Tomorrow will be Media day and a live broadcast will be presented from Zzyzx on the NASA site. I was asked to be a part of the broadcast. I am so nervous about presenting on camera. I will just have to have faith in Matt and get through it tomorrow.

Wednesday March 28

Today the team was once again up by 6:00am to set up the balloon for media day. The event started off great, sun was shining with very little wind. We began the set up for the cool fill of the balloon and discovered that the fan had a gas leak.

Jim decided to give the motor on the fan a break, so the team ate some breakfast. While we were waiting for the motor to cool, a breeze came up and blew the balloon into a thorn tree. It was a feat to get the balloon out of the tree but as a team we succeeded. I then had to hurry over to the live broadcast. I really wanted to a shower before being

seen on camera, but it was not meant to happen. The live broadcast went very well. Several of the scientists and eight teachers spoke about their experiences here.
After the broadcast, at approximately 10:00 am, I went with Elaine on a soil collection at Radar and Field roads. I found this experience interesting on how the soil is collected. We used sterile scoops and sterile bags to collect the samples. We removed the large rocks from the collection site and then collected 3 scoops of soil at specific locations and placed it in the sterile bags. The samples are then taken back to the lab and DNA will be extracted from the soil.

Collecting Soil samples off Field road near Yermo
Sandy and Linda listen as Elaine give instructions on the correct procedure for collecting samples.

Upon arriving back at Zzyzx, the caving crew was heading out to Cima cave with Penny Boston to collect samples of Therondites (sp). I jumped out of Elaine's car and jumped into Liza's car and went out to Cima cave with them. We had a large group of people heading out to the caving experience.

Once arriving at the cave, we carried equipment for the sample collecting into the cave. Penny explained why we were collecting samples and what she is looking for. We were told we will need to sterilize the metal scraping tool and then locate the Thenordite(sp) and remove a section and place it into a sterile vile with "animal food" inside. I choose a vile with BG-11 which in cyno bacteria 11.

Collecting samples in Cima Lave Tube

nda Collecting samples

Penny Boston explaining the procedure

After the collection on samples, we then returned to the surface where some of the local teachers spoke to the Sun Newspaper and discussed our involvement in the spaceward bound project. As teachers from the local area, we were all in agreement that this area is a great outdoor education area. The hands-on experiments and the knowledge the scientists shared with us on this expedition have been great resources. Teachers will now be able to return to the classroom and recreate some of the same soil transect and lab experiments, asking students the same questions that we have been asking all week, " Is there life in the soil and caves in the arid area of the Mohave desert, and if there is, would this same life exist on Mars?"

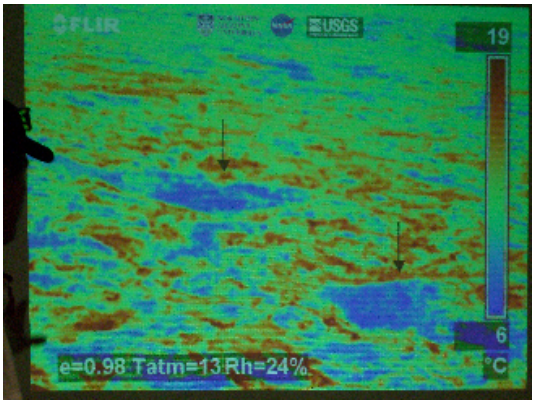
Thursday March 29th

The Cave and Ballooning team left this morning at 4:30 am to head out to Pisgah lava tubes to take Thermal Images of lave tube openings at dawn. Arriving at the lava tube parking area the wind is blowing slightly at 4 miles per hour. The balloon team will still try to launch the balloon to take Infrared photos. Meanwhile, Jut, hiked to the top of cinder cone and began taking aerial photos with the thermal camera. Several others walked out on the lave tubes with radios to report information back to Jut about air temperature and ground temperature. They also walked in directions that Jut thought there maybe Lava tube openings.

Meanwhile on the ground, near the balloon area, the team begins the set up of the hot air balloon for the expedition. The team has a hard time dealing with the slight breeze that is whipping thought the area. However, after 4 team members hold the crown line, while the other two hold the balloon open for the cool start and then the hot start, the balloon takes flight. It is tethered to four vehicles, (what a great car commercial). Jut races down the cinder cone with the camera to jump into the balloon before it takes flight. Jut is able to take aerial photographs while Jim expertly pilots the balloon. This experiment is considered a success. Images were taken from the balloon of lava tube openings as will as from the top of the cinder cone. The heat images given off by the lava opening are visible.

Jason and Dan helping fill the balloon

Taking thermal photo's



Thermal imaging of Lava Tube opening

Thursday Morning Balloon team (we missed you Mike)

Upon returning to the station, I returned to the lab to see how the DNA lab has progressed from the samples that I helped to collect the day before. The lab group was beginning to test samples to see if DNA will be present in the samples collected.

We then all converged on the meeting hall at 4:00pm to discuss the week's experiences and to cover any important information.
Chris McCay discussed the HiRise program, The LCross program, and the EDP programs.

Kristen Goodall introduced the MSL (Mars Science Laboratory) program and the latest information about future research on Mars.
At 7:30, we once again had a wonderful dinner, followed by a discussion of the week's experiments by the scientist. It is fascinating to hear the scientist share their works and ideas with each other. The professional collaboration on such an extensive project was interesting to listen to and to be a part of.

Thursday night and Friday morning we all headed out in various directions. Even though we were all headed for home, we leave knowing that this was not the end to an extraordinarily intense week of science, but is the beginning of exploration and experimentation for the future including Mars.

I would like to personally thank all of the NASA AMES people who made this week possible, the enthusiastic scientist who welcomed us as a research team and not just teachers, all of the wonderful teachers for sharing their experiences and knowledge of teaching and the group of experts in various fields who shared with us their expertise.
Our wonderful Chef and his wife for keeping us well fed all week, (especially the caving and ballooning team).
A very special thank you to Liza, Linda and Deb for all of your support, effort and energy.

Signing off from Zzyxz,

Linda Hoover
Spaceward Bound Teacher: Mojave 2007