

Oklahoma Geology Notes

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The University of Oklahoma MEWBOURNE COLLEGE OF EARTH & ENERGY

Shales Moving Forward: OGS Workshop Highlights Challenges Faced Exploiting Unconventional Gas Shales

Carl H. Sondergeld, OU Mewbourne School of Petroleum & Geological Engineering

The thematic OGS shale workshop was held in Norman on July 21, 2011. This was the third in a series of workshops focusing on shales. Attendance was in excess of 250 people representing academic and industry demographics. The workshop was coordinated and hosted by Ms. Michelle Summers and the Oklahoma Geological Survey staff (Tammie Creel-Williams, Sue Britton Crites and Jane Weber) at the Moore-Norman Technology Center. **Prof. Carl H. Sondergeld** from the Mewbourne School of Petroleum and Geological Engineering coordinated and organized the technical agenda. Two vendors set up displays and demonstrations of their latest technologies. The vendors were FEI, the manufacturer of high end dual beam Scanning Electron Microscope (SEM) imaging systems and FIT (Fluid Inclusions Technologies) who markets wellsite and laboratory hydrocarbon analysis of gas contained within fluid inclusions.

Dr. Randy Keller, Director of the Oklahoma Geological Survey welcomed the attendees and provided introductory remarks to initiate the workshop. Eight invited talks were given by **Michael Ming**, Secretary of Energy for the State of Oklahoma (shown below, right, along with **Carl Sondergeld**, left); Mr. Richard Newhart, team leader for the East Texas-Louisiana region of EnCana; Mr. Craig Caldwell, geologist for Cimarex Energy Co.; Mr. Neil



The Survey's got a piece of the Rock, er, log... Many thanks to the generosity of the Bill Dawson Family, who donated this beautiful petrified wood specimen (OGS geologist Rick Andrews for scale). Originally purchased by William N. Dawson from a collector in Tulsa, he then put it at his retirement home in Tulsa. OGS would also like to thank Cindy Dees, Williams Auction Co., and Dan Kissinger, OU Facilities Management, who were both instrumental in helping make this donation and delivery of said two-ton (not exaggerating, folks) donation happen.



Shales Moving Forward..., continued from p. 1

Stegent, Technology Manager with Pinnacle, a Halliburton Service; Mr. Jeff Noe, Chief Engineer with Microseismic Inc.; Mr. Rick Lewis, Petrophysical Technical Manager for Unconventional Resources at Schlumberger, OKC; Dr. Mark Curtis, postdoctoral researcher the Professor Mewbourne School of Petroleum and Geological Engineering; and Dr. Carl Sondergeld, Professor Mewbourne School of Petroleum and Geological Engineering.

Six graduate student posters were available for viewing during breaks and lunch. These covered cutting edge research including nanoindentation, shale permeability, NMR imbibition, and hydraulic fracturing.

The mix of speakers was designed to cover multiple aspects of shale resource plays, assess experiential learning to date and address challenges. Mr. Michael Ming lead off with a well received framing of the role and importance of natural gas, specifically unconventional shale gas, in the energy budget and economy of the US. He stressed approaching the problems as systems which could be framed as an optimization problem. It was clear that natural gas has enormous potential to decrease our dependence on foreign oil as well as address the pollution and environment concerns. There remain political, inertial, logistical and technical challenges before natural gas can play its ultimate role as a bridging fuel to the future.

Mr. Richard Newhart followed with a balance discussion of what we know and don't know about the Haynesville shale play and a discussion of EnCana's experience in exploiting the Haynesville shale play. The Haynesville play has overtaken the Barnett as the leading shale gas producing play. The deep, overpressured environment sets the Haynesville apart from other shale gas plays. Lateral placement, lateral length, stage spacing and water management above and below ground are areas being researched. Studies indicate more proppant leads to better stimulation and that sand proppants are preferred. Frac water flowback is almost nonexistent. In fact shutting the wells in after fracture stimulation often leads to better performance.

Mr. Craig Caldwell discussed a lithostratigraphic approach used by Cimarex in guiding the placement of laterals and in defining where in the deep Anadarko Woodford wells should be drilled. The approach uses logs calibrated with core data. The variables of importance in the lithostratigraphy scheme are quartz and clays. The approach stressed by Mr. Caldwell was to use the mechanical-lithology correlations to guide lateral steering and placement. The message which resonated was the more clay in Anadarko Woodford, the worse your well performance will be. He was defining, for those listening, a new and central role that geologists play in these resource plays.

Mr. Neil Stegent followed with a call to engineers to do more than look over the section line at what your neighbor is doing to drill and stimulate wells. He stressed going back to the basics of engineering when faced with decisions of proppant size, composition and frac design. You have to know something about your shale to make educated choices. Shale composition becomes a strong decision guiding factor. Good practices require some measure of performance. One tool available in analyzing stage performance is microseismic mapping. It also is used to evaluate frac containment.

Mr. Rick Lewis shared his vast experience in petrophysical analysis of shales. His perspective brought us down from the global view presented by Mr. Mike Ming, from the field view presented by Mr. Newhart, from the geological layers perspective described Mr. Caldwell, to the nano-dimensions of the pores which control storage and delivery in shale gas systems as discussed by Dr. Mark Curtis. Rick would bring real dimensional perspective to the table; e.g. the permeability of shale lies somewhere between brick and concrete. Logs need fine sampling to deliver the variation in shale systems. Type logs reveal the similarities and differences between the major North American shale plays. Organic maturity is a critical parameter in shales plays but can only be obtained through core analysis. The role of gas adsorption becomes critical when one views the dimensions and surface areas revealed by SEM images of ion-milled surfaces. He stressed knowing the mechanical stress profile within

In This Issue. . .

Shales Moving Forward: OGS Workshop Highlights Challenges Faced Exploiting Unconventional Gas shales	1
14 th Anniversary of OGS STATEMAP Program	4
OGS Participates in CO ₂ Sequestration Assessment Project	5
OGS Geologists at OU's New Field Camp - A 2011 Report	6
OGS Quarterly Earthquake Report 2011— 2 nd Quarter	8
Oklahoma Geological Survey Receives Grant for Data Preservation	10
10 th Annual OSAGE Oil & Gas Summit and Lease Sale	10
GEM Launches Boy Scout Merit Badge Project	11

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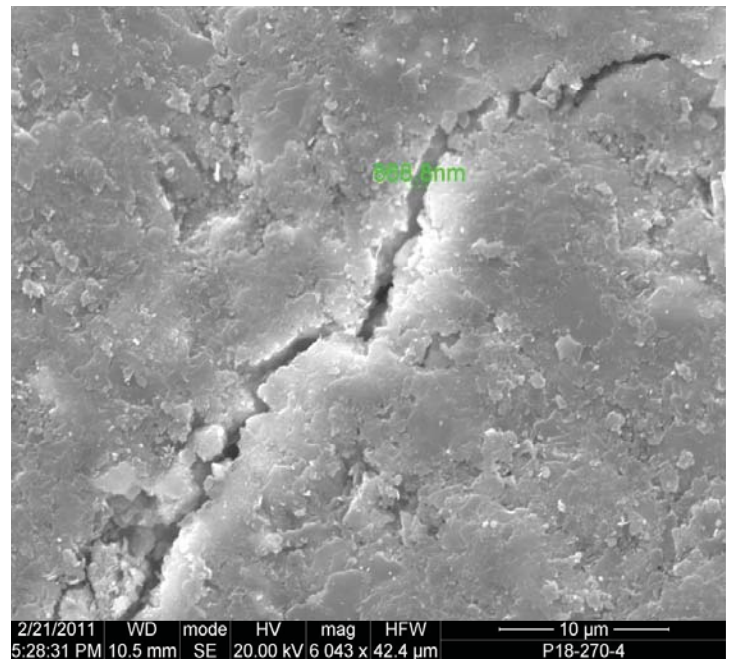
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the shales when placing laterals and gave examples of production improvements when this was done correctly.

Mr. Jeff Noe reviewed the historical development of fracture mapping and the overwhelming shift to microseismic methods. There are basically two strategies to mapping hydrofractures: 1) downhole monitoring in available, not optimally located wellbores, and 2) surface monitoring with large arrays of multicomponent geophones. Each approach has advantages and disadvantages as Jeff noted. He is associated with a company that takes the surface array monitoring approach which allowed him to elaborate more on the progress and developments of this technology. Two major advances are the use of buried arrays to reduce noise and permanent buried arrays with multiarray stages whose placement are guaranteed for 10 years.... I believe this is what I heard. Data densities require the use of downhole optical fibers rather the standard 7 conductor cables. Array such as these are in place in the Bakken and the Haynesville. They provide the ability to map hydrofractures and other event activity across the entire field. Remote reporting to a central site facilitates allows real-time monitoring.

Dr. Mark Curtis described the process of ion-milling and the integrated process of ion-milling and imaging which is referred to as "slice and view." Slice and view enables volumetric rendering of the shale micro- and nano-structure. From these images, pore structure and connectivity can be evaluated as well. These images have over the last 5 years changed the conceptual role of organics from being passive adsorbers to active gas containers. Mark presented two and three dimensional renderings of various shales revealing the details of the complex microstructure, the relative importance of phyllosilicate and organic based porosity. Comparing and contrasting images from various shales, common features in organic rich shales were defined as well as contrasting microstructures which give rise to performance differences in various shale plays. Mark showed the complexity and surface area development within the kerogen from various shale plays. He concluded with even higher resolution STEM (Scanning Transmission Electron Microscopy) imaging showing the dimensions and complexity of the pore space between clay platelets in the Haynesville shale. Coupled milling and imaging capabilities are crucial to developing our understanding of shales.

Dr. Carl Sondergeld wrapped up the workshop with a description of SEM and microseismic studies of hydraulic fracturing laboratory experiments. Controlled laboratory experiments allow us to vary field parameters, conditions and lithologies and examine the interactions when a hydrofracture is initiated. Using a high density



Scanning Electron Microscope (SEM) image of the complex fractures created during the hydraulic fracturing process.

sensor array, acoustic emissions (lab scale microseisms) associated with the hydraulic fracturing were recorded, located and analyzed. Locations define the fracture quite well and are consistent with the physical location of the visible fractures. Observations support the knowledge that fractures follow the maximum principal stress direction when applied stresses are large. The direction becomes unpredictable and the network more extensive when the applied stresses are low. Focal mechanism analysis indicated the fracturing is dominated by shear failure and not mode I tension cracking as assumed in current models. Coring the induced fractures revealed a complexity which parallels that observed in field scale mine back experiments. Fractures are not planar but display numerous stair step offsets and jogs which are consistent with the shear failures interpreted from focal mechanism analysis. Visible damage decreases as does the width of the fracture with distance from the initiation site. Anisotropy and stresses change the initiation direction of hydraulic fractures.

The variety topics and considerations of various scales highlight the challenges we face in exploiting unconventional gas shales. Universal take-aways were:

1. all shales are *not* the same; therefore, knowledge of your shale is necessary for optimal exploitation
2. nanoscales are important because they control storage and delivery
3. we have taken the first step in the 12 step program and openly admit we don't know a lot about shale.

14th Anniversary of OGS STATEMAP Program

Thomas M. Stanley (PI STATEMAP) AND Julie M. Chang (OGS Geologist III)

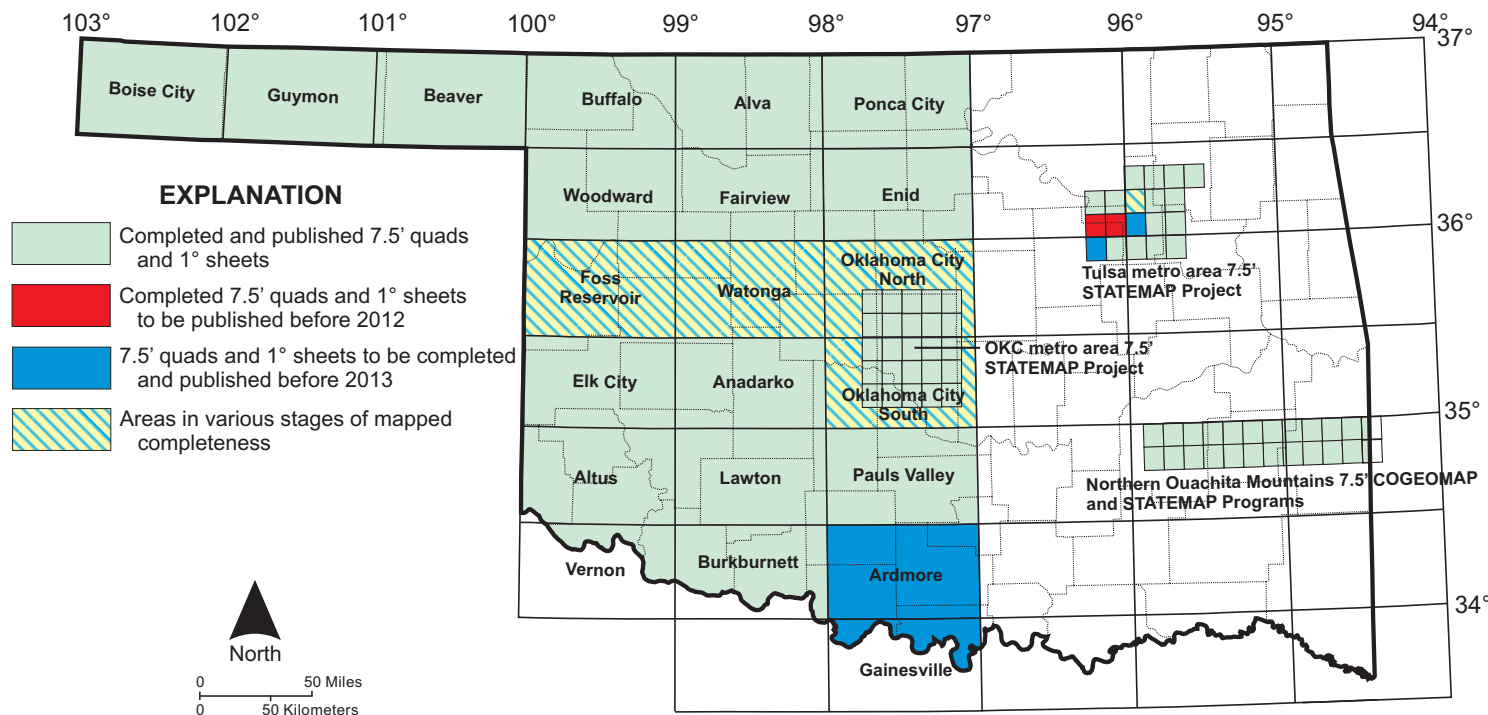


Figure 1. Index map showing status of 7.5' and 1° geologic maps, starting from inception of the COGEOMAP/STATEMAP program in Fy1985 and including the current year.

This year marks the 14th anniversary of the Oklahoma Geological Survey's STATEMAP program. To date, the OGS has completed over 41 detailed 7.5' geologic maps at a scale of 1:24,000, and completed 16 reconnaissance geological maps at a scale of 1:100,000, available on our web site online, and in both hard copy and digital format upon request. The purpose of STATEMAP is two-fold: 1) detailed mapping at 1:24,000 scales in and around concentrated urban areas and their expanding suburbs; and 2) complete and make available to

the public geologic maps in areas that require modern, digital maps at 1:100,000 scale. These smaller scale geologic maps will also be used in ongoing compilation of the new 1:500,000-scale geologic map of Oklahoma.

For the past eight years, detailed mapping has concentrated in the Tulsa Metro Area, but this area is near complete. Plans are currently in the works to shift OGS mapping endeavors to other parts of the State. Some of the proposed new mapping projects include: 1) detailed mapping around the

Lawton Metro Area; 2) a series of detailed maps along the I-44 corridor between Tulsa and Oklahoma City; 3) detailed mapping of the Broken Bow area, southeast Ouachita Mountains; or 4) detailed mapping thin-section analysis of the sedimentary facies within the Ogallala aquifer of the Oklahoma Panhandle.

Reconnaissance mapping will continue as planned by completing at least one, 1° sheet annually, moving from the northwest to the southeast across Oklahoma.

Created by the Oklahoma Territorial Legislature in 1890, the University of Oklahoma is a doctoral degree-granting research university serving the educational, cultural, economic and health-care needs of the state, region and nation. The Norman campus serves as home to all of the university's academic programs except health-related fields. The OU Health Sciences Center, which is located in Oklahoma City, is one of only four comprehensive academic health centers in the nation with seven professional colleges. Both the Norman and Health Sciences Center colleges offer programs at the Schusterman Center, the site of OU-Tulsa. OU enrolls more than 30,000 students, has more than 2,400 full-time faculty members, and has 20 colleges offering 163 majors at the baccalaureate level, 166 majors at the master's level, 81 majors at the doctoral level, 27 majors at the doctoral professional level, and 26 graduate certificates. The university's annual operating budget is \$1.5 billion. The University of Oklahoma is an equal opportunity institution.

OGS Participates in CO₂ Sequestration Assessment Project

Rick Andrews, OGS Geologist

For the fiscal year of July 2010 – 2011, the Oklahoma Geological Survey (OGS) participated in the USGS National CO₂ Sequestration Assessment Program (CORSAs). Several projects were undertaken and finished as deliverables in July of this year:

1. Structure contour map depicting the top of the Arbuckle Group in Oklahoma (Fig. 1) (PDF File). This is an original map completed from our recently compiled Arbuckle database. The Arbuckle Group and its many limestone and dolomite formations is a principal CO₂ sequestering target since the carbonate strata consistently have exceptional porosity and permeability at all known depths in the state. The Arbuckle crops-out in several Provinces in southern and north-eastern Oklahoma but is otherwise extensive throughout the subsurface. Being one of the oldest sedimentary rock groups in Oklahoma, it has mostly igneous/metamorphic rock beneath and usually thousands of feet of impervious strata above. Therefore, the Arbuckle is an ideal sink for high-volume CO₂ storage.

2. Structure contour map depicting the top of the Hunton Group in Oklahoma (PDF file). This map was modified from that of Rottmann (*OGS Special Publication 2000-2*). The Hunton Group includes several carbonate formations composed of limestone and dolomite. The map clearly shows the areal extent of the Hunton

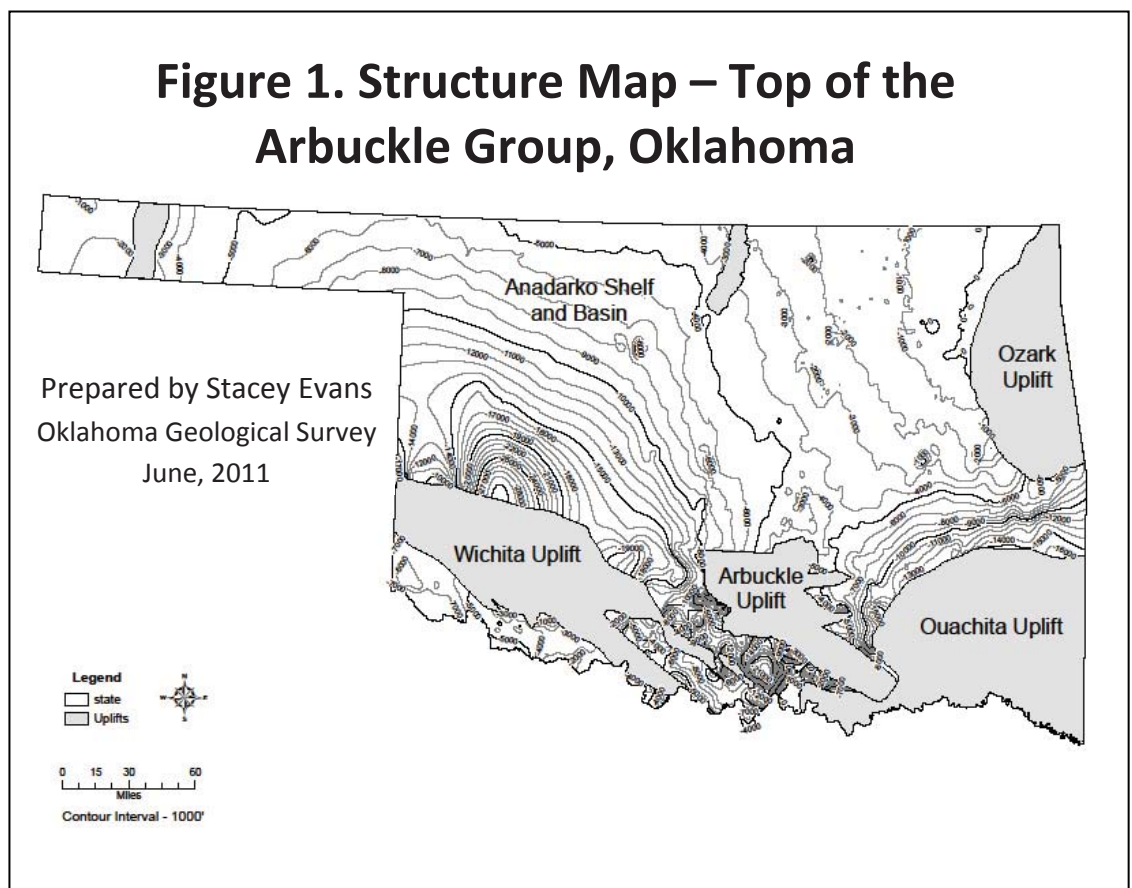
and its subsurface depth within any of the sedimentary basins in Oklahoma. Locally, any formation within the Hunton Group may have good porosity development and lateral/vertical seals that make them excellent storage compartments for CO₂ sequestration.

3. Isopach map of the Hunton Group (PDF file). This map was also modified from Rottmann data (*OGS Special Publication 2000-2*). It depicts the gross thickness of all strata comprising the entire Hunton Group. It is not representative of a net thickness having a certain minimum porosity. Nevertheless, this map can be used to portray the principal areas in Oklahoma where the Hunton is present and potentially thick enough to be conducive for additional reservoir

appraisal relevant to CO₂ sequestration.

4. An extensive database having subsurface formation tops of the Arbuckle and Basement rocks in Oklahoma (MS Excel file). This information was retrieved from *OGS Special Publication 2006-1* (Campbell and Weber, 2006) and IHS Energy Data. It includes all pertinent header information, test data, core, mud, and logging parameters. These data may be important elements in reservoir evaluation for CO₂ sequestration. From this data, the Arbuckle structure map (Fig. 1) was completed. This database is dynamic in that it will be continually updated and revised to reflect new data and quality checking of existing data.

Figure 1. Structure Map – Top of the Arbuckle Group, Oklahoma



OGS GEOLOGISTS AT OU'S NEW

Neil H. Suneson and Tom M. Stanley, OGS Geologists

For the fifth year, OGS geologists Neil Suneson and Tom Stanley helped run OU's undergraduate geology majors' capstone course - GEOL 4136 - better known as "Field Geology" - near Cañon City, Colorado. This summer was a little different, because OU now has their own, brand-new and positively first-class, camp on the flanks of the Wet Mountains. Named the **Bartell Field Camp** in recognition of the generous support of OU alumni Denny Bartell and his wife Dixie, we hesitate to call it a camp - "resort" might be a better word, given the facilities and setting. Although what we do at camp is definitely not the sort of thing most people would do at a resort.

Much of this year's five-week program was similar to last year's when the OU students attended

Oklahoma State's field camp across the valley, but not everything was the same. Instead of having a day-long orienteering session at Red Canyon Park, we visited the infamous Mixing Bowl. The students were not supposed to know that they would be back here to map, but word got out. The students measured a thicker section at Grape Creek than in previous years, including the lower Paleozoic Harding Sandstone, Fremont Dolomite, and more of the Fountain Formation than in previous years. The students did not visit the section at Gnat Hollow, the Harding trace fossils at Indian Springs, or measure all the Ralston Creek sections. Our students have little idea what they missed. We also worked with the geophysics students who were taking their three-week capstone course and had a great time showing

them how a "typical" day of mapping worked. We chased the range-front fault both north and south of camp.

The field trips this year were also different. Instead of looking at and con-

trasting the syn-tectonic Laramide sections near Cañon City and Colorado Springs, we examined the structure and mineral deposits of the southern part of the Mosquito Range northeast of Salida with Dr. Chet Wallace, who has published geologic quadrangle maps of that area for the Colorado Geological Survey as part of their STATEMAP program.

As part of our always popular Pikes Peak trip, we visited the Teller pegmatite where a couple of students found some beautiful fluorite and an outcrop of the Florissant lake beds along a county road where everyone collected excellently preserved late Eocene plant and insect fossils. This outcrop really was a great discovery. We shortened our tour of the CCV gold mine this year and included some Pleistocene glacial geology as part of our trip to Leadville. Most impressive were the two "whamouts" along U.S. Highway 24 between Buena Vista and Leadville. And this summer, for the first time in three years, our mineral collecting on the mine dumps up in the mining district was in picture perfect weather. There still was lots of snow on the ground, but the sky was clear and the temperature mild. And the students found lots of good mineral specimens.

Partway through field camp this year officials from OU, alumni, and friends gathered at camp for an official dedication, including Denny and Dixie Bartell, OU Provost Nancy Mergler, Curtis Mewbourne, and CPSGG Director Doug Elmore. The students enjoyed the day "off" and the opportunity to talk with working geologists who attended OU's field camp years and years ago. The food and drink were superb and



Measuring the section at Grape Creek, with upper six students standing carefully on the Glen Cairn (light-colored rocks) - Muddy (dark-colored rocks) contact. The contact is marked by a thin conglomerate and represents a change from shallow marine below to fluvial above. (Photograph by Neil Suneson, OGS.)



FIELD CAMP – A 2011 REPORT

the view was magnificent. All our visitors agreed that the new Bartell Field Camp is a fantastic facility.

We had a great group of OU students (*plus one from the University of Tennessee, Knoxville*) to kick off an improved program and break in the new field camp.



The OU (plus one) students on a Pinedale moraine above Twin Lakes Reservoir. The Collegiate Range and continental divide are in the background. (Photograph by Neil Suneson, OGS.)



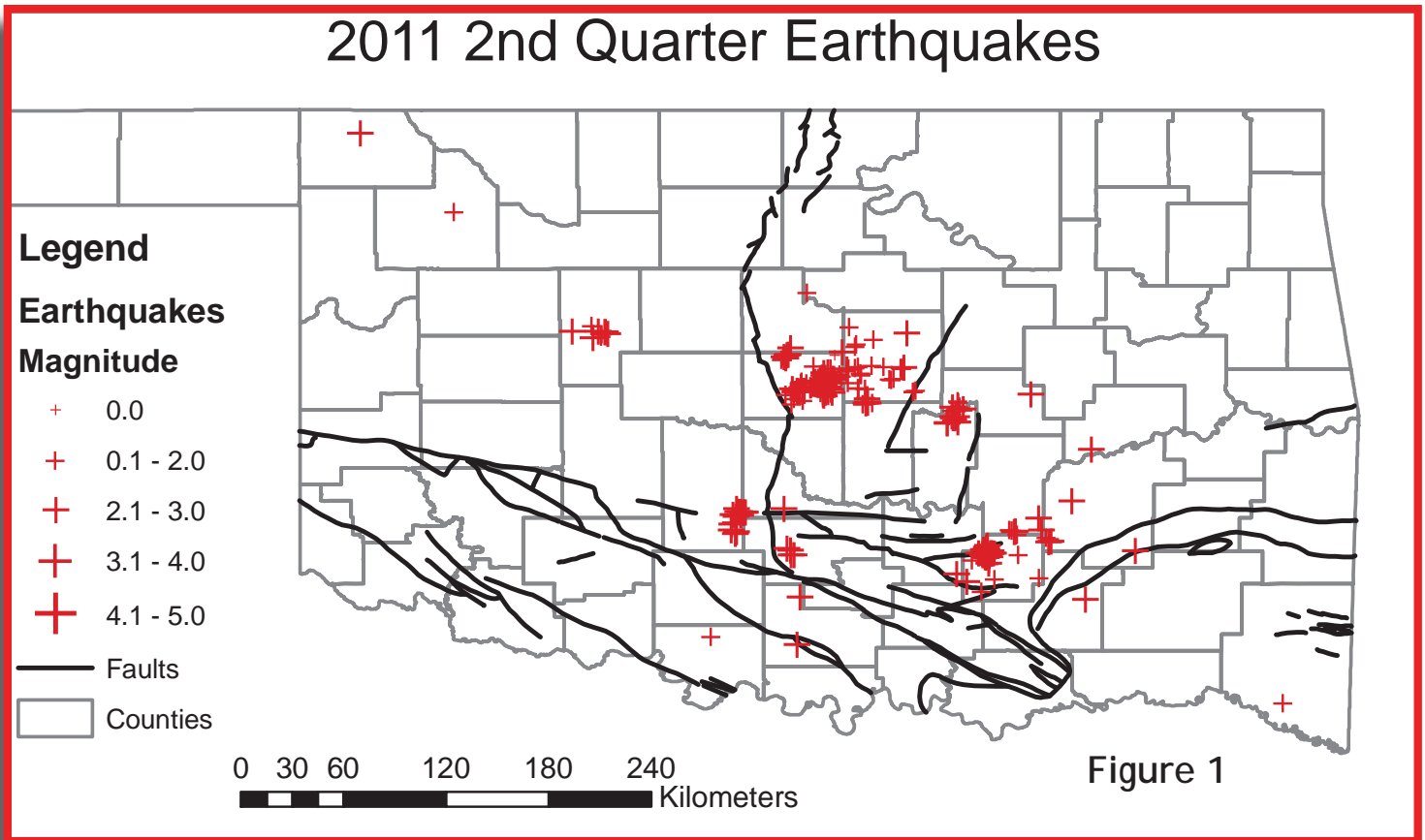
Mapping at Grape Creek. The students had to determine whether the white sandstone (middle of photograph) was part of the Lytle-Plainview Sandstone (upper left) and therefore Cretaceous or the Morrison Formation (lower right) and therefore Jurassic. Looking at the nature of the upper and lower contacts of the sandstone, therefore, was critical. (Photograph by Neil Suneson, OGS.)



Exhausted after a hard day in the Mixing Bowl. Always a lot of fun, the Mixing Bowl is both physically challenging and structural complex. At first it seems terribly confusing, but after three days the lights begin to go on and the faults and unconformities begin to make sense. (Photograph by Neil Suneson, OGS.)

OGS Quarterly Earthquake Report 2011–2nd Quarter

Austin Holland, OGS Research Seismologist; Amie Gibson, OGS Research Scientist II



The Oklahoma Geological Survey recorded 270 earthquakes from April 1 through June 30, 2011 (Fig.1). These earthquakes occurred in 22 different counties with the continuing earthquakes swarms in Oklahoma and Coal Counties having the largest number of earthquakes with 93 and 62 respectively. Lincoln County had 32 earthquakes, and Grady County had 14. The OGS received felt reports for nine earthquakes these can be seen in Table 1 with the largest a magnitude 2.4 in Blaine County which had 9 earthquakes large enough to be located and several more small earthquakes which could not be located.

The OGS along with other state agencies within Oklahoma and throughout the central US participated in the first **Central US Shake Out** exercise on April 28, 2011. This exercise provides the

opportunity to encourage earthquake hazard preparation, and includes an exercise where participants simulate what to do in an earthquake; drop, cover, and hold on. We participated in this drill both at OGS offices and at the Jones Elementary School where every kid in the class selected to participate for the media had felt at least one if not several earthquakes over the last year. The planning for the 2012 Central US Shake Out is under way. We encourage you and your organization to consider participating in next years Shake Out event on February 7, 2012.

The OGS continues to operate the accelerometer network in Oklahoma County; however, due to changing space needs the accelerometer at the Oklahoma Science Museum, OK004, was removed on April 1st.

We supported several interviews and news stories with local news outlets. The Leonard Observatory gave three tours of the facilities and had three community service workers helping out. We presented two posters at the Seismological Society of America spring meeting in Memphis, TN, titled *"Analysis of the Jones, Oklahoma, Earthquake Swarm"* and *"Incorporating Near Real-Time Transportable Array Data into the Regional Oklahoma Seismic Network"*. Austin Holland gave a talk at the Inter-Tribal Environmental Council Meeting titled *"Earthquakes and the possible link to Hydraulic Fracturing in Oklahoma"*. He also gave a talk at the Inter-Tribal Emergency Management Coalition summit titled *"Oklahoma Earthquakes Hazard and Resources for Emergency Managers"*. Austin also gave a talk to the Tulsa Astronomy Club titled *"Increase in Earthquake Recurrence Rates in Oklahoma"*.

We also have an undergraduate student, Christopher Toth, working with us over the summer.

He is primarily working on seismic station instrumentation and automatic calculation of ground motion parameters for an earthquake such as peak ground acceleration and spectral acceleration.

Download 2011 2nd Quarter Earthquake File (CSV):

http://www.okgeosurvey1.gov/media/quarterlies/2011_qt2.csv

We encourage you to visit the Leonard Observatory website where we have information on recent earthquakes in Oklahoma and around the Earth.

<http://www.okgeosurvey1.gov/>

Table 1 - Felt Earthquake Reports and Their Associated Modified Mercalli Intensities as Reported to the OGS

Origin Time (UTC)	Longitude	Latitude	Depth (km)	Magnitude		Modified Mercalli Intensity	County
					Type		
4/1/11 1:43	-96.5311	35.4336	5	2	Md	II	Seminole
5/10/11 4:05	-97.0261	35.4577	5	2.2	mbLg	II	Pottawatomie
5/10/11 6:00	-97.3612	35.5655	3.7	1.9	Md	III	Oklahoma
5/11/11 9:22	-97.4323	35.7131	1.1	2.2	ML	II	Oklahoma
5/15/11 5:55	-96.5694	35.4368	5	2.3	mbLg	III	Okfuskee
5/18/11 3:24	-97.2877	35.5776	3.1	1.7	Md	III	Oklahoma
6/7/11 22:59	-98.3968	35.8314	5	2.4	mbLg	III	Blaine
6/8/11 16:55	-96.5961	35.3511	5	2.2	Md	II	Seminole
6/30/11 16:26	-96.5426	35.3571	2	2.3	Md	II	Seminole

Oklahoma Geological Survey Receives Grant for Data Preservation

Jane Weber, OGS Staff

The Oklahoma Geological Survey (OGS) recently received a grant award from the **National Geological and Geophysical Data Preservation Program** (NGGDPP) administered by the U. S. Geological Survey (USGS). This marks the fourth year OGS has received funding under this program. The focus of the program is to assist in archiving geological and geophysical data and sample collections held by state geological surveys. In addition to providing financial support on a cost-share basis, the USGS uses information derived from the data collections to populate its internet-based National Digital Catalog of archived material. The Catalog serves as a database, a web portal, and a set of web services that drive other applications.

OGS's award for the August 2011–July 2012 period is being used to complete work on its collection of mud logs. As of this writing, OGS has inventoried 3,115 mud logs. Header information for these logs can be viewed at <http://www.ogs.ou.edu/level3-databases.php>. For last year's project, OGS organized, cataloged in a database, and prepared metadata for mud logs from northeastern, southeastern, and southwestern Oklahoma. Project activities this year will involve entering mud logs from the northwestern and panhandle regions of Oklahoma into the system.

After samples are cataloged in a database, metadata ("descriptive information about data content") for each item in the collection is generated according to protocols and standards established by the USGS. It is this metadata that is submitted for inclusion in the National Digital Catalog.

Mud logs represent the second data set OGS will have contributed to the National Digital Catalog by means of a grant from the NGGDPP program. Three years ago we developed and submitted metadata describing 8,910 individual rock core samples maintained by us. Because both rock core and mud log data involve much of the same type of borehole information, we were able to apply methodology developed for the previous rock core project to the current mud log project.

10TH ANNUAL OSAGE OIL & GAS SUMMIT AND LEASE SALE

November 9 & 10, 2011

Joyce Whitewing, Summit Chairman

The 10th annual **Osage Oil & Gas Summit & Lease Sale** will be held on **Wednesday and Thursday, November 9-10, 2011**, in the Hyatt Regency Tulsa. The event will begin on Wednesday morning with a continental breakfast at 8:00 a.m. There will be excellent

workshops for producers, and the Bureau of Indian Affairs will be conducting an oil and gas lease sale on Wednesday morning. There will also be plenty of exhibitors with new ideas and products that you won't want to miss.

The program will include a variety of speakers and titles. The BIA will be conducting a workshop entitled **"Moving in & Rigging Up in the Osage"**. Technical papers with great speakers will include: **"Exploitation of the Mississippi Chat"**, **"Dewatering and Horizontal Drilling in the Osage"**, **"3D Seismic Antelope Shoot"**, and many more. CEU and PDH credits will be available.

Some of our speakers will be Marginal Well Commissioner Jim Revard, Shane Matson, Jessie Crews, Randy Keller, Kurt Rottman, Mojan Kelphar, San Mazullo, Dennis Kerr, Brian Johnson and others. The keynote speaker for the luncheon on Wednesday will be the AAPG Executive Director, David Curtiss.

Registration is a bargain! **Pre-registration is only \$100 per person and includes all meals, breaks and materials. On-site registration is \$150 per person. [Registration form on back page of this newsletter.]** Brochures will be mailed out in October and will include a registration form as well. If you would like to stay in the hotel, room rates are great! A double is \$81, and a triple-quad is \$105. Be sure to mention that you are with the Osage Oil & Gas Summit if you use the hotel. The hotel number to call is 888-591-1234 or the local number is 918-582-9000.

If you need further information, contact:

- Registration Chairman, **Reta Lintner at (918) 358-5359 or rlintner@osagetribe.org**
- Chairman, **Joyce Whitewing at (918) 885-2433 or jwopa@valornet.com**

GEM Launches Boy Scout Merit Badge Project

Stan Krukowski, OGS Geologist

Stan Krukowski, industrial minerals geologist at the OGS, has been petitioning the Boy Scouts of America to reinstate the Mining Merit Badge since 2007. The effort is a project of the **GEM (Government, Education, and Mining) Committee** of the **SME (Society for Mining, Metallurgy, and Exploration, Inc.)**. The project began in 2007 when SME members, who had attained Eagle Scout status in their Scouting days, approached the GEM Committee to endorse and sponsor the efforts to reinstitute the badge by providing financial support and technical expertise. The GEM Committee agreed and later endorsed the Mining Merit Badge project.

The BSA last awarded a Mining Merit Badge in the 1940s. In 2007 SME member Eagle Scouts had proposed and submitted a draft Mining Merit Badge handbook to the BSA; their submission was rejected due to low interest by the BSA Youth Innovations Committee. A second petition for the Mining Merit Badge was submitted in 2010 with over a 50% favorability rating, but not enough to re-establish the Badge.

The BSA requires a proposal to explain the Mining Merit Badge requirements. Once that proposal is accepted, a core committee of volunteer experts will formulate, write, and review the Mining Merit Badge handbook requirements. The following subjects will be included: **sustainable development, mining health and safety, careers in mining, mining reclamation, everyday**

minerals and their uses, and how society depends on the mining industry.

SME has since participated in the 2010 BSA Jamboree at the international exhibits midway. **Over 3,000 scouts visited the SME exhibit and participated in mine-related exercises and games.** SME distributed a commemorative patch celebrating 100 years of Scouting. Volunteers from various local chapter GEM committees as well as from the SME corporate office shared in the Scouting experience. **The SME and the GEM Committee are looking forward to attending the 2013 Jamboree at the new BSA Summit Bechtel Reserve in West Virginia. Boy Scouts will test some of the requirements by taking part in Mining Merit Badge exercises, immediately providing GEM with valuable feedback.**

SME's drive to reinstitute the Boy Scout Mining Merit Badge went into higher gear earlier this year starting at its Annual Meeting. The latest effort included a letter-writing campaign by SME members in support of the badge. Executive Director Dave Kanagy collected over 60 letters encouraging the BSA to reinstate the badge. Dave delivered the letters to Mr. Bob Mazzuca, Chief Scouting Executive, on June 24, 2011 at the Beartooth Lodge near the Stillwater Mining Company's (SMC) Stillwater Mine in Montana.

The occasion was a luncheon program sponsored by SMC and its Chairman and Chief Executive Officer, Mr. Frank McAllister, where the guest of honor was Mr. Mazzuca. The event was to include a visit to the mine complex, above and underground. The program shared with Bob how multifaceted the mining profession has become. Over 25 mining professionals, most of whom had earned the rank of Eagle Scout, testified to the role that Scouting had played in their lives. Other guests from State agencies and mining service companies stated likewise.

Some of the attendees made presenta-

tions on health, safety, and environment pertaining to the mining industry, as well as technical talks on the geological and engineering aspects of mineral extraction. Stan Krukowski, who spearheads the project as GEM's Project Chair, made a case for the Mining Merit Badge with a power point presentation about SME's efforts concerning reinstituting the badge. All talks advocated the Mining Merit Badge, suggesting requirements and goals to earn the badge. Mr. Lyle Knight, Chief Executive Officer and President of First Interstate BancSystems, was also in attendance in support of the Mining Merit Badge. Both Mr. McAllister and Mr. Knight sit on the BSA National Council; Mr. Knight is head of the Youth Innovations Committee, whose responsibility is the promulgation of Scouting merit badges.

Bob was certainly appreciative of the attention and effort of those contributing to the day's events. Of course, he shared his vision of Scouting and its future. Included in future Scouting programs is the promotion of science and engineering. As the number of scientists and engineers graduating from US universities wanes, the BSA plans on doing its part to revitalize interest in these career paths. Agreeing in principal to the endorsement of a Mining Merit Badge, Bob talked about the use of the Internet in disseminating information on BSA programs and the ease of publishing BSA handbooks in the immediate future. We discussed the future of the BSA Summit Bechtel Reserve in West Virginia and SME's participation there during the 2013 Jamboree. SME proposed exhibiting heavy equipment used in mineral extraction and hauling as a major component of any mining display.

Both Stan and Dave followed up with letters of appreciation to Frank, Lyle, and Bob. Their hope now is that the BSA response is as positive as Bob's outlook during the meeting. As of this writing (September 12, 2011), the ball is now in the BSA court as we eagerly await a response from the BSA.



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