



EASTERN OREGON  
UNIVERSITY

**Program Portfolio**  
**Geology**  
**March 2008**

**Description of Program**

The Eastern Oregon University Geology Program offers a wide array of courses for students seeking to fulfill general education requirements and/or requirements for degrees in Agriculture, Education, Environmental Studies, and Liberal Studies. We offer a minor in geology which requires a minimum of 30 graded credits in geology including GEOL 201, 202, and 203 and a minimum of 15 upper division (300-400) credits in geology including at least one 400-level course.

**Recent Programmatic Changes**

Reducing the number of on-campus geology staff from two to one after Spring 2003 forced the Geology program to gradually phase our GEOL 100-level sequence, which had high enrollments of education majors and students seeking to fulfill Natural Science General Education requirements. Henrietta Laustsen, a visiting professor of geology, taught an on-campus GIS class in Fall 2008 and is offering other GIS classes through DDE. Kendall Baxter, who has taught DDE classes since he retired 20 years ago, is gradually reducing the number of geology courses that he is offering.



GEOL 201, 202, and 203 class trips to the Wallowas (Fall), Elkhorns (Winter) and John Day area (Spring).

## **How the Geology Program serves the Mission of the University and needs of the region**

Our geology courses provide a basis for understanding Earth's geological phenomena for all who enjoy the out-of-doors. The lower division courses fulfill the general education natural science requirements for non-science majors and they provide complimentary background for other program areas—The Natural Sciences, Physical Anthropology, Geography and Land Use Planning, Forestry and Agriculture, Education, Environmental Science. Our upper division courses give students wishing to pursue geology as a career a strong background in the fundamentals of geology which makes it possible for them to successfully pursue undergraduate and advanced geology degrees at other institutions. Many of our upper division students use their geology minors to fulfill part of the requirements of their Liberal Studies degree programs.

Our on-campus 100-level courses focus on “hot topics in geology” (plate tectonics, dinosaurs, global warming, etc.), environmental geology, and the geologic history of the Oregon coast, while our distance education offerings

include classes on gold mining in Eastern Oregon, earthquakes and volcanoes, and field studies of some of the outstanding geological sites in Oregon. Students in our 200-level Physical and Historical Geology courses learn the knowledge and techniques they need to decipher the geologic history of the Wallowas, the Grande Ronde Valley, and the John Day area, and also participate in an important new fossil dig in the Baker City area. We offer a wide range of upper division courses. New courses for 2007-2008 include *Introduction to GIS* and *GIS and Geoforensics*

Mining has played a prominent role in the history and economy of Eastern Oregon and topics such as earthquakes and groundwater are also important to the region. Our faculty regularly provides information to residents, government agencies and newspapers about these issues and we identify rocks, minerals, and fossils for people in the area and give presentations to local school groups and civic organizations. The Wallowa County Sheriff's Office recently asked for a copy of our chart of the floor of Wallowa Lake for use in possible searches for drowning victims.



EOU Volcanology and Glaciology class trips to Mt. St. Helens (left) and the Wallowa Mountains (right).



Corby Weyhmiller (left) carefully excavates the humerus of the grison, *Trigonictis*, and Carli Morris sieves fossils at the early Pliocene Always Welcome Inn fossil site in Baker City, Oregon.

### Program Objectives/Outcomes

- To take students out into the field and teach them how to make geologic field measurements and record their observations.
- To teach students how to analyze the data they collect in the field and interpret the geology and geologic history of the area they are studying.
- To give students experience presenting the results of their research orally and in poster form at professional meetings and in writing in scientific journals.

### Key Programmatic Assessments

The Geology program's objectives and outcomes are assessed in the following ways:

- Students hand in field notes after each trip in the 200-, 300-, and 400-level classes and the accuracy and

completeness of their field notes, sample descriptions, geologic maps, and geologic cross-sections is assessed.

- Each 200-level and upper division class includes at least one project in which students piece together the geologic history of the area they have visited. Students in GEOL 201 draw illustrations showing the geologic and plate tectonic history of the Wallowa; GEOL 202 students investigate well logs from the Grande Ronde Valley and predict the depth where water will be found at and how much will be available; and students in GEOL 203 piece together a picture of the paleoenvironment and life at the Always Welcome Inn fossil site during the Pliocene.

- Students present the results of their research in every class, beginning with posters and progressing to oral presentations and written papers and senior theses as they progress through the geology sequence.

The level of accomplishment is determined by the quality of the students' presentations; the level at which they are presenting (in-class, campus-wide (Spring Symposium; *Eastern Oregon Science Journal* and *Eastern Oregon Geology*); professional (geology meetings and journals).

The best way to assess the EOU geology program is to look at what our students have accomplished because of their enthusiasm for geology. Their research efforts have greatly increased our knowledge of the geologic history of the Grande Ronde and Powder Valleys. They have presented their findings at geology meetings and have started a new program where they give presentations *Travel: The Eastern Geology Club* travels to great geology spots every year to give papers at professional meetings and tour the geologic sites in the area. Past trips have visited the Big Island of Hawaii (1997, 2001); the Grand Canyon National Park, Sunset Crater, Walnut Canyon, and Wupatki National Monument (1998); Glacier National Park (1999); Craters of the Moon and Yellowstone (2000); Crater Lake and the southern Oregon coast (2002, 2004); Puerto Vallarta, Mexico (2003); Colorado National Monument, Canyonlands, Arches, Dinosaur National Park, and the Black Canyon of the Gunnison in Colorado (2005); Prince William Sound, Earthquake Park, Matanuska Glacier, and Denali National Park in Alaska (2006); and Snow Canyon, Bryce Canyon, and Zion Canyon in Utah (2007). This year (2008), we plan to return to Hawaii again to attend an AAAS meeting and tour the sites.

to local high school, middle school, and elementary students and bring these students out in the field to participate in the Always Welcome Inn fossil dig in Baker City. Thanks to their efforts, research at the Always Welcome Inn site has blossomed into a national caliber effort. Our students have discovered a new species of sunfish and a new genus of minnow, along with a vole that may be an important part of the evolutionary history of its group. EOU students are currently working with some of the top vertebrate paleontologists in the United States to identify the species present and unravel the paleoecology of the site.



The 2007 Phi Beta Rock group relaxes after hiking up Angels Landing in Zion Canyon National Park.



Jay Van Tassell poses with three of his students in front of Mt. Denali on the 2006 Phi Beta Rock trip to Alaska. All of these students are completing Liberal Studies majors with an emphasis in geology and are planning to go on to graduate school or work for geology consulting firms when they graduate.

*Learning Basic Geology Skills:* Geology is a field science. All of our 200-level and upper division classes involve field trips and projects based on the observations made on those trips. Students learn the basics of surveying in the very first lab in our GEOL 201 Physical Geology class and proceed from there to learn how to use the Brunton compass and map and construct a geological cross-section of the Eagle Creek area on the south side of the Wallowa Mountains. In our GEOL 202 class, students learn to plot well logs and use them to predict where and how much water wells in the Grande Ronde Valley will yield. Our GEOL 203 students learn to measure stratigraphic sections and use their measurements to discern the paleoenvironments that the different formations in the John Day area were deposited in. Our upper division students learn advanced skills and use them to unravel the geologic history of our area. The success of these efforts is reflected in the comments of Whitman College students who thought that an Eastern Oregon student (Story Miller) who came along on one of the Whitman field trips must be a graduate student because of how comfortable she was doing fieldwork. Another EOU student who transferred to the University of Oregon at the end of her sophomore year

went on to win the University of Oregon's "Outstanding Undergraduate Geology Student of the Year" award. Knowing the fundamentals of geology and understanding how to use basic field techniques have been a great aid to our students who have gone on to graduate school and careers in geology.



Eric Bergey surveys Maggie's Vent, a volcanic center composed of a rare volcanic rock called basanite. The vent was discovered by Maggie Swanger, an Eastern Oregon University geology student, while she was working during the summer as a field assistant for the Oregon Department of Geology and Mineral Industries.



Eric Bergey and Carli Morris survey the distribution of a new species of plant on an eroded Pleistocene alluvial fan north of Arco, Idaho.

*Class Projects and Senior Theses:*

Geology is a field science and EOU geology students have plenty of opportunities to get out in the field and do research. The quality of their field projects and senior theses is outstanding given that there is no geology major at EOU.

Senior theses currently in progress (2008) include:

Carli Morris: Distribution of a new species of plant on a Pleistocene (Bull Lake) alluvial fan, Lost River, Idaho.

Eric Bergey: Geology and geomorphology of Maggie's (basanite) Vent, Oregon.

Misty Davis: New techniques for unraveling the identity of the Always Welcome Inn vole (*Ophiomys*).

Kate Asplund: Teaching Kids Geology: In-Class Exercises

EOU geology senior theses and class projects that have recently been published include:

Asplund, K., Bergey, E., Davis, M., Garton, B., Grimshaw, B., Kuenzli, A., Miller, S., Morris, C., Swanson, K., Weyhmler, C., and Van Tassell, J., 2007, A guide to the fossils at the Always Welcome Inn, Baker City, Oregon: Eastern Oregon Geology, v. 4, 24 p.

Leithner, A., and Van Tassell, J., 2006, Pliocene vole fossils, Always Welcome Inn, Baker City, Oregon: Eastern Oregon Geology, v. 3.

Kisselburg, J., 2006, Semi-quantitative analysis of the distribution of fossils in the upper third of the Always Welcome Inn sequence, Baker City, Oregon: Eastern Oregon Geology, v. 3.

Zublin, B., 2006, The geology of the lower half of the Powder River canyon between Thief Valley Reservoir and the lower Powder Valley, Baker City, Oregon: Eastern Oregon Geology, v. 3.

Ledgerwood, R., and Van Tassell, J., 2005, Stratigraphy and age of the late Miocene sediments and volcanic deposits along the Baker-Copperfield highway between Banta Road and the Love Ranch, Keating, Oregon: Eastern Oregon Geology, v. 3.

*Presenting Results at Professional Meetings and in Publications:* Our geology curriculum is designed to help students progress from presenting projects in poster format to oral presentations to formal written publications. Our students are comfortable presenting their findings to others, as evidenced in their numerous presentations at professional meetings and publications in national and regional journals, the *Eastern Oregon Science Journal*, and the Geology program's own on-line journal, *Eastern Oregon Geology*.

Presentations by Eastern Oregon University geology students at Geological Society of America meetings include:

Van Tassell, J., Bergey, E., Davis, M., Grimshaw, B., Miller, S., Morris, C., Ferns, M.L., Smith, G.R., McDonald, H.G., and Mead, J.I., 2007, New discoveries at the Pliocene (early Blancan) Always Welcome Inn fossil site, Baker City, Oregon [abs.]: Geological Society of America Abstracts with Programs, v. 39, no. 5, p. 28.

Van Tassell, J., Fischer, A., Grimshaw, B., Miller, S., and Morris, C., 2006, Stratigraphy of the East La Grande

area: A lab exercise (abstract): Geological Society of America Abstracts with Programs, v. 38, no. 5, p. 6.

Davis, C., Bluhm, L., Ledgerwood, R., Killgore, K., Kisselburg, J., Starner, K., Steele, J., Zolotoff, N., Van Tassell, J., Ferns, M.L., and Smith, G.L., 2005, Fossils and stratigraphy of the Always Welcome Inn fossil locality, Baker City, Oregon: Geological Society of America Abstracts with Programs, v. 37, no. 6, p. 8.

Budlong, B., Collier, J.R., Gilbert, D.E., and Van Tassell, J., 2003, Possible glacial moraines and graben on the floor of Wallowa Lake, NE Oregon: Geological Society of America Abstracts with Programs, v. 35, no. 4, p. 3.

Van Tassell, J., Beam, M., Bishop, J., Brown, S., Hanford, K., McDonald, T., Thompson, L., and Wilson, J., 1996, Sedimentology of the Middle Jurassic Weatherby Formation, northeastern Oregon: Preliminary studies: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 120.

Bishop, E.M., Thompson, L.L., and Woodward, J., 1992, Sedimentation and tectonics in the Grande Ronde graben, northeast Oregon: A preliminary assessment: Geological Society of America Abstracts with Programs, v. 24, no. 5, p. 7.



Bryce Budlong and J.R. Collier pose in front of their poster on the bathymetry of Wallowa Lake at the 2003 Geological Society of America meeting in Puerto Vallarta, Mexico. This is the most detailed bathymetric chart of the floor of Wallowa Lake currently available. Copies have been requested by the Wallowa County Sheriff's office for use in search and rescue efforts and by Navico, a branch of Lowrance Electronics that specializes in oceanographic and limnological charts.

*Outreach:* The outreach efforts of the EOU geology program take many forms. We have enjoyed numerous joint field trips with Blue Mountain Community College and Whitman College. In 2004, our geology club joined up with the geology club from Southern Oregon University for a field trip along the southern Oregon coast. The SOU club came to Eastern Oregon two years later for a tour of the Grande Ronde Valley and the Willowa Mountains, including a hike up Lostine Canyon.

We are very proud of our “Bringing the Classroom to the Geology” program, which was initiated by Story Miller, Eastern Oregon University’s 2007 President’s Scholar. After giving talks at Pine-Eagle High School on the geology and fossils of nearby areas, EOU students brought Pine Eagle teacher Troy Tubbs and five seventh and eighth graders to the Always Welcome Inn site, where they did a quantitative survey of the fossils at different levels in the outcrop. The fossil finds included salamander, fish, and bird bones. Seventh grader Adora Brockman found what turned out to be the complete lower left jaw of the beaver *Castor californicus*. A report in the *Hells Canyon Journal* nicely summarized how the Pine Eagle students

felt about the experience: “It was my best day ever,” announced eighth grader Cassie Bloom. “I feel sorry for the kids who didn’t come, ‘cause it was awesome,” said Matt Thayer (*Hells Canyon Journal*, v. 25, no. 15, p. 1, April 11, 2007). Pine Eagle students will be returning to the site again in the spring of 2008 and we are looking forward to having groups from other schools come, too.

We have published a short article on the Always Welcome Inn *Castor* fossil with the Pine-Eagle student who found it and her teacher:

Brockman, A., Tubbs, T., Miller, S., and Van Tassell, J., 2007, Early Pliocene (Blancan) fossil beaver (Castor) jaw found at the Always Welcome Inn, Baker City, Oregon: Eastern Oregon Geology, v. 5, 6 p.

Another exciting new development is a cooperative research effort with the limnology laboratories at the University of Minnesota and the University of Alaska at Fairbanks to study the sediments of Willowa Lake. This started with coring of the lake sediments in July 2007. Scientists from Oregon State University are also interested in pursuing cooperative research with EOU at Willowa Lake.



Story Miller shows students from Pine-Eagle School, their teacher, and a reporter from *the Hells Canyon Journal* how to look for fossils at the Always Welcome Inn.



Piston coring on Wallowa Lake with a crew from the University of Alaska and the University of Minnesota. Photo by EOU president emeritus, David Gilbert.

*Alumni Accomplishments:* We are proud of the successes of our alumni who have attended graduate school. Four of our graduates have gone on to complete M.S. degrees in geology at Boise State University, the University of Idaho, and the State University of New York at Buffalo. One is currently pursuing her Ph.D. in geology at Buffalo. Another student completed her M.S. in Resource Management, helped excavate the Wenas Creek mammoth near Selah, Washington, and is now pursuing her Ph.D. in Anthropology at the University of Edinburgh. Another former student is working on a degree in surveying at Portland State University.

Two of our graduates are now working for mining firms in Nevada and another works in the geology department at the Kensington gold mine near Juneau, Alaska. Another graduate works for an environmental consulting firm in Boise. One student works with a firm in

South Dakota that specializes in archaeology, paleontology, and GIS and another is the GIS coordinator for Harney County.

Education is the most popular career for our graduates, who are now teaching in La Grande, Union, Milton-Freewater, Boardman, and Prairie City here in Oregon, as well as in Idaho, California, Arizona, Wyoming, California, and Hawaii. One student is teaching history at Utah Valley State College. Two of our graduates have won awards for their outstanding science teaching.

We also have graduates who work in the computer field, do carpentry, are in management of the Boy Scouts, and work for the Baker City Herald. Two students have become librarians and another is a residence life coordinator at Whitman College who will soon be moving on to graduate school.

## **Programmatic Assessment: Synthesis and Recommendations**

The Geology Program plans to continue offering the best field-based undergraduate program possible. We plan to continue doing what we do best--teaching students the basics of geology with an emphasis on field trips and projects. Designing upper division classes with labs that are integrated into each course rather than taught separately and offering these courses on a three year rotation has allowed Jay Van Tassell to teach the range of courses needed by students who want to pursue geology as a career. The effectiveness of this approach is measured by the success of our students who have gone

to graduate school and careers in geology.

One exciting new development is the possibility of adding Henrietta Laustsen's GIS classes to our curriculum on a regular basis and expanding our GIS offerings to include more advanced courses if funding can be found. GIS is an important tool that students in Geology, Biology, Anthropology, Agriculture, and other disciplines must have in order to compete successfully in today's economy. We are also working on developing a Physical Sciences Liberal Studies concentration in cooperation with the Physics and Chemistry that should be attractive to future teachers.



Our Winter 2006 GEOL 202 class poses on the side of Mt. Harris during a February field trip.

**Enrollment and Program Performance**

Enrollments in EOU geology classes have dropped significantly over the past 5 years as we gradually phased out our GEOL 101, 102, and 103 courses after one of the two on-campus geology faculty positions was eliminated in the spring of 2003. Changes in general education requirements and the gradual phasing out of some of the distance education courses taught by Kendall Baxter as he approaches his 20<sup>th</sup> year of retirement have also contributed to a decline in the number of geology student credit hours.

An average of approximately 4 students complete the geology minor on-campus each year, usually as part of a Liberal Studies major. We expect 6 students to graduate with geology minors and a degree in Liberal Studies in 2008. A few DDE students have completed the geology minor as part of their Liberal Studies programs.

**Commentary on Enrollment and Graduate Trends**

Our upper division geology class enrollments have remained relatively steady during the past five years, but the enrollment in our lower division courses has dropped significantly due to the loss of one of our two on-campus faculty positions. In order to boost our lower division enrollments we have found a way to offer our 100-level series again, by trimming our 200-level labs from 3 to 2 hours. This will free Jay Van Tassell up to offer at least one of the 100-level series courses each year in load. The other two 100-level classes can be offered as an overload or the 100-level classes can be rotated on a three-year basis.

Adding GIS classes to the curriculum would significantly increase our enrollment and fulfill an important gap in the EOU curriculum. This is dependent on obtaining funding for licensing and paying the salary of the instructor.

Student Credit Hours Generated By the Geology Program

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Campus	1306	778	731	682	546
All Other Campus	919	880	1060	777	618

Number of Students Receiving Geology Minors

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Campus	6	4	6	6	2

## Program and Course Scheduling Requirements

### General Education and Service Course Schedule

FALL YEAR 1			FALL YEAR 2		
Course	Load Hours	Mean Enrollment	Course	Load Hours	Mean Enrollment
GEOL 101	3	24	GEOL 101	3	24
GEOL 201	6	24	GEOL 201	6	24
WINTER YEAR 1			WINTER YEAR 2		
Course	Load Hours	Mean Enrollment	Course	Load Hours	Mean Enrollment
GEOL 102	3	24	GEOL 102	3	24
GEOL 202	6	18	GEOL 202	6	16
SPRING YEAR 1			SPRING YEAR 2		
Course	Load Hours	Mean Enrollment	Course	Load Hours	Mean Enrollment
GEOL 103	3	24	GEOL 103	3	24
GEOL 203	6	12	GEOL 202	6	12
TOTAL	27	126	TOTAL	27	126

### Minor Course Requirements Schedule

FALL YEAR 1			FALL YEAR 2		
Course	Load Hours	Mean Enrollment	Course	Load Hours	Mean Enrollment
GEOL 201	6	24	GEOL 201	6	24
GEOL 441	5	7	GEOL 311	5	7
WINTER YEAR 1			WINTER YEAR 2		
Course	Load Hours	Mean Enrollment	Course	Load Hours	Mean Enrollment
GEOL 202	6	18	GEOL 202	6	16
GEOL 431	5	7	GEOL 334	5	7
SPRING YEAR 1			SPRING YEAR 2		
Course	Load Hours	Mean Enrollment	Course	Load Hours	Mean Enrollment
GEOL 203	6	12	GEOL 202	6	12
GEOL 451	5	7	GEOL 350	5	7
TOTAL	33	75	TOTAL	33	75

Total SCH required per academic year (General Education; service, and minor courses)

Total Load Hours: 45

## Staffing

Jay Van Tassell (Professor of Geology and Physics, Ph.D.) is the only full-time on-campus geology professor at EOU. Jay began teaching at Eastern Oregon University in 1988. He teaches a wide range of courses, including *Introduction to Geology*, *Environmental Geology*, *Geological Oceanography*, *Physical and Historical Geology*, *Mineralogy*, *Optical Mineralogy*, *Petrology*, *Volcanology*, *Sedimentology*, *Paleontology*, *Hydrology*, *Glaciology*, and *Field Investigations*, as well as supervising senior theses and other projects. Over the years his research interests have shifted from studying turbidite sedimentation offshore of the Bahama Banks and the influence of orbital variations on sedimentation in the Devonian Catskill Delta to working with his students to map the bathymetry of Wallowa Lake and unravel the geologic history of the Grande Ronde and Powder Valleys. He and his students, with assistance from the faculty and students from other universities and local high schools, learning a lot and having fun discovering Pliocene fossils in Baker

City, Oregon, including a new species of sunfish and a new genus of minnow. Jay edits our on-line journal, *Eastern Oregon Geology*, and advises our geology club, Phi Beta Rock.

In addition to Dr. Van Tassell, three part-time faculty assist with additional courses and other activities. Kendall Baxter (Professor emeritus, Ed.D.) retired from Eastern in 1988, but continues to teach a wide range of courses through DDE including *Earthquakes and Volcanoes*, *Gold Mining in Eastern Oregon*, *Geology of the Wallowas*, *Geology of the John Day Country*, *Geology of the Columbia Gorge*, and *Geology of the Oregon Coast*. Henrietta Laustsen (Visiting Assistant Professor, Ph.D.) started teaching *Introduction to GIS* on-campus in September 2007 and also offers a *GIS and Geoforensics* course via DDE. She is currently teaching Science 103. Mark Ferns (Adjunct Professor, Ph.D.) is a state geologist with the Oregon Department of Geology and Mineral Industries. Mark leads field trips and is helping our students learn to apply GIS techniques to geologic mapping.



Jay Van Tassell and his students at Ecola State Park on a 2008 Sedimentology class trip to the Oregon Coast.

## Faculty Accomplishments

Jay Van Tassell is a member of the Oregon State Geologic Mapping Advisory Board. He belongs to the Geological Society of America, the National Association of Geology Teachers, the Society of Vertebrate Paleontology, the International Association of Sedimentologists, the American Association for the Advancement of Science, and the Society of Economic Paleontologists and Mineralogists. The Medical Center in the town of Union was named after Kendall Baxter in recognition of his outstanding contributions to the community over the years. Mark Ferns' publications on the geology of Oregon are too numerous to count. Mark is *the* expert on the geology of Eastern Oregon.

## Selected Publications:

Ferns, M., McConnell, V., Madin, I., and Van Tassell, J., 2001, Geologic Map of the Imbler quadrangle: Salem, Oregon Department of Geology and Mineral Industries, 1:24,000.

Laustsen, H.M.S., and Smyth, J.R., 1998, High pressure X-ray refinement of Wadsleyite II. EOS—Transactions of the American Geophysical Union.

McCammon, C.A., Frost, D.J., Smyth, J.R., Laustsen, H.M.S., Kawamoto, T., Ross, N.L., and van Aken, P.A., 2004, Oxidation status of iron in hydrous mantle phases: Implications for subduction and mantle oxygen fugacity: Physics of the Earth and Planetary Interiors, p. 143-144, 157-159.

Van Tassell, J., Bergey, E., Davis, C., Davis, M., Grimshaw, B., Kisselburg, J., Ledgerwood, R., Miller, S., Morris, C., Steele, J., Wehymiller, C., Ferns, M.L., Smith, G.R., McDonald, H.G., Mead, J.I., and Martin, R.A., 2007, Early Pliocene (Blancan) Always Welcome Inn local fauna,

Baker City, Oregon: Oregon Geology, v. 68, no. 1, p. 3-23.

Van Tassell, J., Ferns, M., McConnell, M. and Smith, G.V., 2001, The Imbler fish fossils, Grande Ronde Valley, NE Oregon, and the Pliocene Lake Idaho-Columbia River connection: Oregon Geology, v. 63, no. 3, p. 77-84, 89-96.

Van Tassell, J., 1994, Cyclic deposition of the Catskill Delta of the Appalachians, U.S.A.: International Association of Sedimentologists Special Publication 19, p. 395-411.

Van Tassell, J., 1994, Evidence for orbitally-driven sedimentary cycles in the Devonian Catskill Delta complex: *in* Dennison, J.M. and Ettehnsohn, F., Tectonics and Eustatic Controls on Sedimentary Cycles, SEPM Concepts in Sedimentology and Paleontology #4, p. 121-131.

Van Tassell, J., 1989, Upper Devonian cyclic sedimentation, *in* Dennison, J. M., 1989, Paleozoic sea-level changes in the Appalachian Basin: Field Trip T359: 28th International Geological Congress, p. 20-29.

Van Tassell, J., 1988, Upper Devonian Catskill Delta margin cyclic sedimentation, West Virginia and Virginia: Reply: Geological Society of America Bulletin, v. 100, p. 994-995.

Van Tassell, J., 1987, Upper Devonian Catskill Delta margin cyclic sedimentation: Brallier, Scherr, and Foreknobs Formations of Virginia and West Virginia: Geological Society of America Bulletin, v. 99, p. 414-426.

Van Tassell, J., 1986, Discussion: The hydraulic interpretation of turbidites from their grain sizes and sedimentary structures: Sedimentology, v. 33, p. 437-440.

Van Tassell, J., 1981, Silver Abyssal Plain carbonate turbidite: Flow characteristics: Journal of Geology, v. 89, p. 317-333.

## Minimum Staffing Requirements

1) Current assessment of Faculty  
Offering the geology minor currently requires one FTE of faculty load (36 hours). Jay Van Tassell has also been teaching GEOL 401 Research and GEOL 420 Field Investigations classes plus offering one GEOL 100 level class per year on an overload basis ever since our second faculty position was cut in 2003.

Based on the current faculty in geology, the following total FTE are available:

Total = **1.0 FTE**

2) Efficiency Ratios

### Load/Faculty On Campus

Based on the 2006/2007 SCH:

The ratio of SCH to faculty in on-campus GEOL prefix courses is **546**.

Student Load Hours/1.0 FTE = **41** per on-campus faculty member.

Total SCH: **1164**.

On Campus SCH: **546**.



An EOU geology student examines the wreck of the Peter Iredale exposed on the beach at Fort Stevens State Park on the Oregon coast after a series of severe winter storms.