Geology 220: Volcanology

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Office Hours: Pretty much anytime; email or call for specific appointment if you prefer.

The best way to contact me is by email. We will communicate as a class by electronic mail, including changes in assignments and class schedule, so it is *essential* that you check your email consistently, at least a day or two before each class. Not checking your email on a regular basis will be a problem. Of course the best option is to check it yourself. Don't let your email account get over its limit either.

I do not have set office hours, because they are basically all the time. You can either call or send email to set up an appointment for a guaranteed meeting, or come by anytime (with no absolute guarantee that I will be there at that moment -- but it's really *extremely* likely). Afternoons are always better than mornings for stopping by my office.

Location and Meeting Times of Volcanology
Lathrop 404 (unless announced otherwise)
Tuesdays and Thursdays at 8:30-9:45 AM

Course Description

Our fascination with volcanoes stems primarily from their awesome powers of destruction, yet their constructive role in shaping our landscape, atmosphere, and oceans has been crucial in Earth's history. This course explores the fundamental concepts of volcanology, from the geological, chemical, and physical processes that generate volcanoes to the implications of volcanic activity for humankind. Through a series of case studies, this course will examine: the tectonic environments that generate volcanoes and what they tell us about Earth's internal processes; eruptive styles and volcanic forms; volcanic rocks, minerals, and volatiles; properties, generation, and evolution of magmas and magma chambers; features of lava and pyroclastic flows; constructional forms; submarine volcanism; volcanic hazards, including their prediction and mitigation; and what extraterrestrial volcanism can reveal about the history of the solar system. There may be an optional field trip to examine the incredible volcanoes of the Long Valley, California area over spring break. That's completely tentative though, so stay tuned.

One of the main goals of this course is to give you a real geological experience, in which you use all sorts of information (observational, chemical, physical, historical, temporal, cultural…) to learn more about the Earth. Another very important set of goals is to stretch your imaginations, to have you experience how important creativity is in science and particularly in geology, to explore how geology is truly an interdisciplinary science, and to discover the excitement of discovering how our planet really works.

Required Texts

1. Jacques-Marie Bardintzeff and Alexander R. McBirney, *Volcanology, Second Edition*, Jones and Bartlett Publishers, Sudbury, Massachusetts (2000).
2. Dick Thompson, *Volcano Cowboys: The Rocky Evolution of a Dangerous Science*, St. Martin's Press (2000).
3. Simon Winchester, *Krakatoa: The Day the World Exploded, August 27, 1883*, Harper Collins Publishers (2003).

The textbook (Bardintzeff and McBirney) and the Thompson book are available at the Colgate bookstore, and the Thompson and Winchester books can be found at Amazon.com. Don't forget to check their used book options or Half.com, you can often find really cheap copies of these books here. You can also arrange to share books with other classmates, that's fine too. There will also be occasional additional reading assignments that I will hand out to you. Finally, there will be some useful books at the Science Library, including: Tom Simkin and Lee Siebert: *Volcanoes of the World: A regional directory, gazetteer, and chronology of volcanism during the last 10,000 years.*

Course Requirements

There will be several different kinds of assignments in this course. Some will emphasize research skills, writing, and organization, others will emphasize your ability to solve problems; all of them will focus on your abilities to synthesize information and to be creative.

You will be responsible for the following assignments:	
Midterm Exam	12%
Final Exam	13%
Problem Sets, class activities	35%
Participation	10%
Volcanic Concept Demonstration Project	10%
Volcano monitoring project and webpage	20%
The latter includes evaluations of several other students' webpages and regular, timely contributions to the group webpage.	
Total	**100%**

A. Exams

There will be one midterm exam (12% of your grade) and one final exam (13% of your grade; see schedule). The exams are designed to make sure you understand the details of the issues we are discussing. I will also ask you to take concepts beyond what we've covered in class and the reading, and to use your problem solving skills on new questions; problem solving is an absolutely integral aspect of volcanology. Assuming you have studied

and have been participating actively in the class, you will have the necessary information to solve any questions I ask on the exams. They are designed to make you think beyond the limits of the material and to apply what you've learned to new situations.

B. Problem Sets and Class Activities

There will be approximately 4-6 problem sets during the term. You will have ~one week to carry them out, and you must hand them in as a Microsoft Word file by email rather than on paper, unless informed otherwise. Submit the problem sets to me via the BLACKBOARD DIGITAL DROPBOX, **not my email;** I'll show you how to use the dropbox in case you haven't done so before when we're in class.

You can (and are encouraged) to do the problem sets in pairs and to hand in one version for the two of you. Just make sure that you know and understand all the material in the entire problem set, you will be held responsible for it on the exams.

The problem sets are designed to get you to experience some of the detailed work involved behind some volcanological questions, to get you to review some basic concepts about geology, and for me to verify that you understand the material from class. Because some of you may be more familiar with certain geologic concepts than others, there may be different tiers of questions geared for different levels of experience. Furthermore, part of some of the problem sets may require that the more experienced geology students help the relative newcomers to the field with the assignments. See the schedule for approximate due dates. Be prepared for these dates to be adjusted slightly on occasion.

We will also be doing lots of different kinds of activities in class. Sometimes there will be short assignments associated with these, either beforehand to prepare for them or afterward as follow-up investigations. Sometimes you will be expected to attend a video outside of class, and then either do a brief assignment or be prepared to discuss it in class. The sum of these assignments and the problem sets will make up 35% of your final grade. Stay on top of this category and you have a major fraction of your final grade locked up nicely.

C. Participation and Attendance

Your participation grade is based on several different components, including attendance, preparedness, completion of class assignments, willingness and frequency of participation in class discussions and activities, and so forth.

You are required to attend all but two of the Geology Department seminars during the semester. They are generally held on Tuesdays at 11:30 AM and you get lunch, if you tell our department secretary (Jodi McNamara) that you are coming a day or so ahead of time. We anticipate a good lineup of talks, and will have the schedule ready for you shortly.

Atmosphere and morale in a class of this size and style are strongly affected by your attendance and attention during class time. If you are drowsy or inattentive in class, or if you are habitually or even occasionally late to or absent from class, your grade will be adversely affected:

- Students with more than two unexcused absences from class will be penalized by a lowering of their course grade by one step (e.g., A will become A-; B+ will become B, etc.).
- Students with more than three unexcused absences will be penalized by a lowering of their course grade by a full letter grade (e.g., A will become B, B+ will become C+, etc.).

- Students with an excessive number of unexcused absences risk receiving an F in the course.
- Students who habitually come to class late or are drowsy or inattentive in class will be penalized by a lowering of their course grade by up to a full letter grade.

You may obtain an excuse for missing class by contacting me in person, by phone, or by email if you will need to be absent. Excused absences are of two varieties:

1) Classes missed due to illness or personal calamity. You may obtain an excuse by contacting me. Supporting documentation ought to be forthcoming from either the Health Center or the Dean of Student's Office unless we deem it unnecessary once you have spoken with me about the issue.

2) Classes missed due to athletic or conflicting academic reasons. You will need to notify me *at least 24 hours in advance*.

It is not difficult to get an excused absence for the class; all I ask is that you be courteous and let me know ahead of time for things such as sporting events, academic conflicts, family visits, and so forth. You must contact me at least 24 hours in advance for a valid excused absence (email, voicemail, or in person); if there is an emergency, simply contact me as soon as you can, within reason. Deal with the problem first, then get in touch with me.

I expect you to be prepared for class each and every time we meet. This means doing the readings assigned for that week with great care and attention. You should have finished the day's assigned readings by class time as indicated on the syllabus. I will expect everyone to be familiar with concepts dealt with in the reading, and may call on you to explain what you read occasionally. Please bring any questions that come up during your readings to class for us to discuss, anytime.

I also expect you to be alert and enthusiastic during class, and to contribute to discussions frequently. Oftentimes we'll work in small groups, where you should be an active participant. Some of you have more experience with geology than others; I will be calling on you to assist and teach concepts to the fellow students occasionally. This opportunity to teach is a great one, and I hope you will embrace the experience and responsibility with enthusiasm and care. Finally, if you have specific issues or topics you'd like us to consider in the class, let's discuss it and I'll do everything I can to accommodate your ideas.

Field Trip to Hawaii over Spring Break

One of the greatest things about geology is actually getting out and seeing it for yourself. I cannot overemphasize how exciting and important these opportunities can be; there is truly no better way to learn about geology than to experience it in person.

Despite the lovely, geology-rich, scenic location of Colgate in central New York, we suffer from a distinct deficit of volcanoes within reasonable distances, at least volcanoes that are easily recognized…So to compensate for this deficit, there will be an optional field trip to the awesome volcanoes that make up the Hawaiian Islands. You all should have been contacted about this by email, so none of this should be news to you at this point.

D. Volcanic Concept Demonstration Project

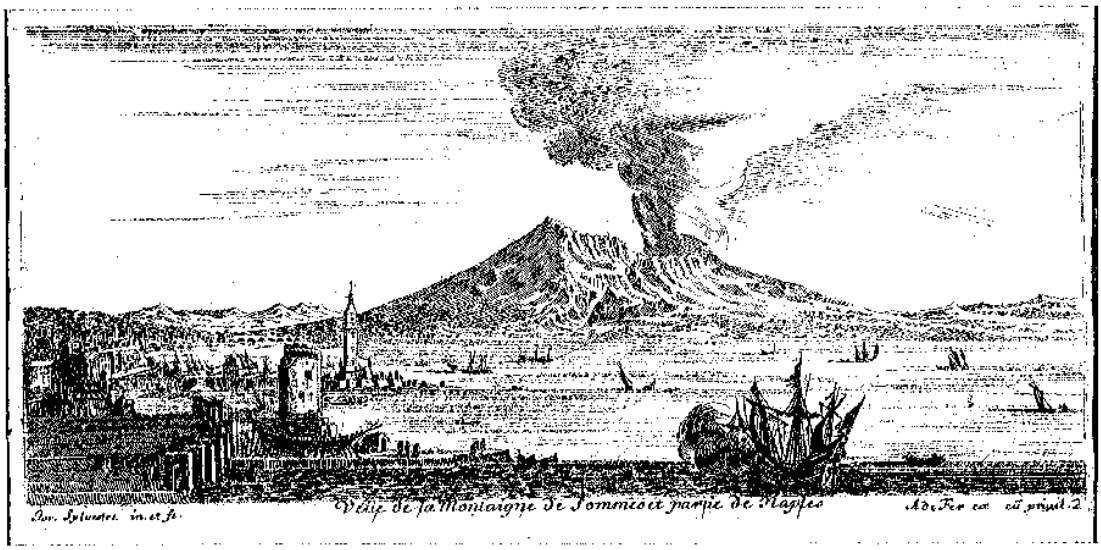
That is a really long-winded title to say that you will be responsible for designing a hands-on demonstration to illustrate a fundamental volcanological concept (10% of your

final grade). We will discuss ideas in class, but some examples include: why more viscous magmas result in more explosive eruptions; models of eruption types (e.g., Hawaiian versus Strombolian); which everyday materials can be used to reproduce magmatic behavior of various types; why pyroclastic surge deposits look different from lahar deposits and how you differentiate between them; what happens when lava erupts underwater at various depths; how avalanches and earthquakes can trigger volcanic eruptions; how a base surge forms; how gases control eruption mechanisms; how crystals affect magma behavior; how lava lakes are formed; how lava tubes and tunnels are formed; how volcanic plumes behave in various atmospheric conditions; or how minerals crystallize from melts, just to name a few. The idea is that you want to reproduce or find a good analogy for showing how one aspect of volcanic eruptions work, as a demonstration for your audience. The demo can be very simple, but you have to ground your experiments in reality by using real observations described in published articles and volcano studies (see instructions below).

You will present your work as a group in a 10-minute talk, so that everyone can get a chance to show their demonstration. **See schedule for the date.** You will evaluate your fellow students' work as a component of the final grade as well. Your presentation must include the following:

1. An actual real-time demonstration of your activity/idea for the audience (if you did a series of experiments to test something or quantify it, then show a typical example of the experiment and then summarize your results in a Powerpoint slide;
2. A few Powerpoint slides describing the fundamental volcanological, chemical, and/or physical principles behind the concept(s) you are trying to illustrate;
3. A reference to *at least* one scientific journal article and an explanation of how your demonstration relates to those findings; this can be done by, for instance, comparing viscosities, composition, velocities, or volumes of your experiment to real experimental studies in the scientific literature about magma/lava behavior or comparing your measurements to actual observations at volcanoes in the field.

Just re-iterating facts of a particular volcano's eruptive activity is not appropriate; you need to find a way to teach you audience something about the basic physics or chemistry of volcanology in your presentation and design. **You have to work in groups of 4, and must clear your choice of volcanic phenomena with me no later than the date indicated in the schedule.** I will help you get necessary materials as much as I can, but some ingenuity and initiative on your own will help immensely.



E. Volcano Monitoring and Website Project

At the beginning of the term, each of you will be assigned a volcano that is categorized as active, which will be the focus of a class web project. In a nutshell, what you will be doing is monitoring your volcano throughout the term, submitting summaries of its behavior to our trusty teaching assistant, who will compile the information in a class website that you should check regularly, to keep track of all the volcanoes' behavior. You will also produce a short website summarizing the basic facts about your volcano as supporting material for the class website. Below is a list of your specific responsibilities:

a) You are responsible for keeping the class up to date on the activity of your volcano and regional issues associated with your volcano, **throughout the term**. This means that every 2 weeks you need to submit a 1-2 sentence summary of your volcano's behavior to our TA for updating our summary website, including reports of no activity, seismic events, volcanic plumes, eruptions, political debates, mudflows, anything relevant. This means checking up on your volcano on a *very* regular basis (see details below for how to keep track of your volcano's behavior).

b) You are responsible, ultimately, for designing and producing webpage about your volcano and its activity during the term. Your goal here is to design a highly concise, focused site that summarizes the following information about your volcano:

1. Location, tectonic setting
2. Type of volcano in the context of its tectonic setting;
3. A brief summary of activity over the past 100 years (consider a table here), with a detailed description of the most recent eruptive activity (even if it was more than 100 years ago);
4. Risks to local population and economy in the event of an eruption;
5. Summary of current monitoring activities;
6. Brief summary of results from (or incorporation of information from) **two of the most recent articles** in the scientific literature about your volcano, to illustrate the types of studies taking place at your volcano;
7. Links to monitoring sites set up by volcanological groups for further information;

8. Any photos of recent activity or the volcano, maps, or other relevant illustrates are most welcome, if properly cited as to their sources.
9. A bibliography is absolutely essential, as is precise, meticulous citation of sources for each and every item, idea, fact, and photograph used in the webpage that you did not have originally. S**ee below for details.**

There should be no more than 1-2 written paragraphs per topic at the most and 3 total pages maximum. Use as many figures and photos as you want; a picture's worth a thousand words. So this is short and sweet, but should be thoroughly researched and well designed. You want a minimum amount of writing in this project; make the explicit effort to communicate as much information as necessary using illustrations, good organization, and the fewest words possible. Keep it simple, straightforward, and systematic, and aim it for the technical level of our class; you do not have to explain basic geological and volcanological concepts. In other words, make is so that someone with no geological knowledge would get the gist of it basically, but gear it more for someone with a reasonable background in the field (i.e., no need to define terms, for instance, or write a glossary). Your sites will be linked to our summary page so that you are basically providing follow-up information for anyone interested in your volcano at first glance.

Be sure to take advantage of the webpage medium: use pictures, drawings, movies (if you can find them), text, descriptions, links to other websites, anything you can think of/gather that will help pull this together into a useful, coherent, creative project. If you cannot find images on the web that are useful, then you can find them in books and scan them in. There is a scanner in the geology department (Lathrop 401).

We will arrange sessions for training in webpage design early in the term, and there will be scheduled help for you if you need it throughout the term; our TA knows the system as well. I strongly recommend that you work on this early in the semester. The only information that you are waiting on for near the end of the term is the behavior of your volcano in the last few weeks, so you can do almost all of this ahead of the crunch time at the end of the term (**see due dates on the schedule for various parts of the webpage**).

There are no limits to what you can do with web design tools, use them to their maximum potential. The great bonus is you will know how to work like a professional with the web and webpages by the end of the term, a skill that will inevitably be useful in the future.

c) You will be writing a 1 paragraph evaluation of ~3 other students' volcano webpages, so that you can learn more about active volcanoes around the world, see how other people design their webpages, and help evaluate the final products. This will take place at the end of the term, so plan accordingly.

Bibliography information that is really really really important:

Any pictures, figures, drawings, tables, graphs, and so forth must have a caption that contains:

a) an EXPLANATION in sufficient detail to be clear to the reader unfamiliar with your volcano;

and b) A REFERENCE as to their source, right when they appear in the website (either as a footnote which is then written out in detail in a list or simply as page number (if relevant), author, and year in parentheses at the fact/image/picture/quote). ALL THIS

INFO MUST BE WITH EACH AND EVERY IMAGE AND FACT YOU GET FROM AN OUTSIDE SOURCE.

There MUST be a complete and extensive bibliography associated with this webpage, either on a distinct page or as a list at the bottom of your main page. **If there is ANY information on your website that is not properly referenced, you will be severely penalized. If there is no bibliography, you will receive an F right off the bat.** As you gather information keep exceptionally careful track of your sources and include each and every one of them in the bibliography, with a citation right AT the information, regardless of what it is (do not just cite direct quotes, you must cite every concept, datapoint, image, drawing, you name it, that you did not come up with on your own).

Another NOTE: Your sources and references must include at least **two** papers from the scientific literature (see the reference librarian or me for help with this). Common journals that will be useful include the Journal of Volcanology and Geothermal Research, the Bulletin of Volcanology; the Geological Society of America Bulletin, and Geology, all of which we have in Cooley AND are mostly available electronically. The best way to proceed is to do a search on your volcano's name in GeoRef, an index of geological journals. If you can't figure out how to work with GeoRef, see me or a reference librarian at Cooley. You are bound to find at least one or two papers on a description of your volcano's geology at the minimum. If you cannot find anything, come see me immediately and we'll go from there.

Some very useful resources (use your imagination, you'd be surprised how newsworthy volcanoes turn out to be…):

1) A particularly helpful resource is the book: *Volcanoes of the world : a regional directory, gazetteer, and chronology of volcanism during the last 10,000 years* by Simkin and Siebert. I'll have that on reserve for our class at the science library under GEOLOGY 220.

2) It is worth checking the Colgate library catalog (MONDO) early on to see if there are any books dealing with your volcano or your region's geology in general. If there are none, see Debbie Huerta or Peter Tagtmeyer (the Cooley librarians) for help. They will show you how to find sources that are not necessarily at Colgate but which you could order by interlibrary loan. So it's worth starting early on this issue.

3) National Geographic is remarkably thorough in its coverage of volcanic activity since the late 1800s. I have the entire set on CDROM up through about 1995-ish if you want to use some of the images; alternatively you can scan them in easily from the originals. I will take possession of your car and your first-born child if you lose any of the CDs, though, be warned.

4) Newspapers, old and new, will have useful information. Try to find regional papers (e.g., El Commercial from Quito, Ecuador, has regular updates on the activity of Pichincha volcano).

5) The web is *incredibly* useful for monitoring volcanoes. The web has revolutionized volcanology in that we can know what's happening where almost in real time; you can get pictures, seismic data, or even videos of recent activity in a matter of days or less sometimes. Only websites and newspapers keep information this current, so it is realistically *the* best way to keep track of your volcano's behavior this term. The other resources listed above are more useful for the history of your volcano and its recent scientific studies. I strongly recommend that you spend considerable time exploring these resources. The list below is by

no means comprehensive, it is merely a start. If you find good sites not on this list, please email the addresses to me, that would be most helpful.

How to keep track of your volcano's behavior during the term:

There are numerous ways to keep track of your volcano's behavior and activity:

General Web Resources:

1) **Everyone in the class will be signed up for the VOLCANO Listserver.** The purpose of the VOLCANO Listserv, maintained by Dr. Lisa Koenig at Arizona State University, is to provide a means for rapid communication among members of the volcanology community and other interested people. It is used for announcements or inquiries about any aspect of volcanology. As a moderated list, all subscription requests and postings must first be approved by the moderator.

I will submit your email address to the listserver for you; the first email you get will give you plenty of information about how the listserver works. From then on, you will automatically get any current announcements about volcanic eruptions and related events (some will be irrelevant to you, but some may announce activity of your volcano, you never know). The point is that you will get a sense of how active volcanoes are on the timescale of a semester.

2) Smithsonian Institution Global Volcanism Program Website (more information than you can ever use, and a wonderful source for eruptive history and recent updates; you can get archives of the volcano listserver announcements here as well, extremely useful for the website and monitoring work you are doing)

http://www.volcano.si.edu/gvp

3) Check recent activity of volcanoes regularly at the VolcanoWorld (University of North Dakota) site:

http://volcano.und.nodak.edu

Their current eruptions list (not updated daily by any means) is:

http://volcano.und.edu/vwdocs/current_volcs/current.html

4) Check recent activity of volcanoes regularly at Discovery's Earth Alert:

http://www.discovery.com/news/earthalert/earthalert.html

5) Michigan Tech University Volcanoes Page

http://www.geo.mtu.edu/volcanoes/

Their remote sensing page:

http://www.geo.mtu.edu/volcanoes/research.html

6) Electronic Volcano (Dartmouth College)

http://www.dartmouth.edu/~volcano/

7) US Geological Survey Volcano Hazards Program
http://volcanoes.usgs.gov/
This includes multiple volcano observatories, including:

Hawaiian Volcano Observatory (HVO)
http://hvo.wr.usgs.gov/

Cascades Volcano Observatory (CVO)
http://vulcan.wr.usgs.gov

Yellowstone Volcano Observatory (YVO)
http://volcanoes.usgs.gov/yvo/

8) Total Ozone Mapping Spectrometer (TOMS)
(tracks SO_2 emitted by volcanoes *via* satellite)
http://toms.gsfc.nasas.gov

9) Worldwide Volcanic Reference Map
http://www.geo.mtu.edu/volcanoes/world.html

10) International Association of Volcanology (IAVCEI)
http://www.iavcei.org/

11) Volcanic Ash Clouds and Aircraft Safety
http://www.geo.mtu.edu/department/classes/ge404/gcmayber
(this isn't an official site, but a summary prepared for a class, but it's a good place to start for references)

12) NASA Earth Observing System:
http://eospso.gsfc.nasa.gov/

NASA Earth Observatory:
http://earthobservatory.nasa.gov

13) NASA Earth Images from Space:
http://images.jsc.nasa.gov (JSC Digital Image Collection)

14) National Geophysical Data Center (NOAA):
http://www.ngdc.noaa.gov/

15) National Hazards Mitigation Group (University of Geneva):
http://www.unige.ch/hazards/

16) Submarine Volcanism (Vents Program):
http://www.pmel.noaa.gov/vents/

17) NASA Jet Propulsion Laboratory

http://www.jpl.nasa.gov/index.html

More Specific Regions (but many of them have links to more general resources too):

1) US Geological Survey Hawaiian Volcano Observatory
http://hvo.wr.usgs.gov/

2) Italy's Volcanoes (Boris Behncke)
http://boris.vulcanoetna.com/

3) Mount Erebus Volcano Observatory
http://www.ees.nmt.edu/Geop/mevo/mevo.html

4) Latin American Volcanoes
http://www.volcanoes.ca/LAVolc.html

5) Galapagos Islands
http://www.darwinfoundation.org/

6) Ecuadorian volcano monitoring from the Escuela Politecnica Nacional
http:/www.igepn.edu.ec/

7) Nordic Volcanological Institute NORDVULK (Iceland)
http://www.norvol.hi.is/

8) Science Institute, University of Iceland:
http://www.hi.is/~mmh/gos/

9) Vesuvius Observatory, Italy
http://ov.ingv.it/eng_home/eng_home.htm

10) Gruppo Nazionale per la Vulcanologia (Italy):
http://gnv.ingv.it/

11) Instituto Internazionale di Volcanologia Catania (Italy):
http://www.iiv.ct.cnr.it/

12) Volcano observatories in Japan:
http://volcanoes.ca/observat/japobsv.html

Hakone Volcano Research Center (Japan):
http://hakone.eri.u-tokyo.ac.jp/

13) Volcanological Society of Japan:
http://hakone.eri.u-tokyo.ac.ip/kazan/VSJ1E.html

14) Alaska Volcano Observatory:
http://www.avo.alaska.edu/

15) More on Hawaii (not checked lately):
http://hvo.wr.usgs.gov/
http://www.soest.hawaii.edu/
http://www.satftp.soest.hawaii.edu/space/hawaii/all.bi.vfts.html
http://www.soest.hawaii.edu/GG/hcv.html
http://hiiaka.uhh.hawaii.edu/csav/start.html
http://quake.wr.usgs.gov/QUAKES/CURRENT/hvo.html
http://volcanostore.com
http://www.volcanovideo.com

16) Universities (try to find the university closest to your volcano):
e.g., National Hazards Information Center, Univ. of Colorado
http://www.colorado.edu/hazards

Volcano Systems Center, University of Washington
http://www.vsc.washington.edu

17) Montserrat Volcano Observatory
http://www.mvo.ms

18) Geoscience Information Society
http://geoinfo.org/

Try internet search engines to find more sites (e.g., Google, etc.). The science librarians are also really good at this and happy to help (see Debbie Huerta or Peter Tagtmeyer, both are great). In addition, many of the sites listed above have links to other sites not listed here…there are many more than this available out there.

An extremely important word about Academic Honesty….

It's very simple, really, I expect 100% academic honesty from each and every one of you. Don't cheat, don't make up information or sources, don't plagiarize, don't lift ANYTHING from books of websites, always cite sources for everything (that includes ideas, concepts, images, drawings…not just direct quotes) and don't help anyone do any of the above. I have *absolutely* no patience for anyone who cheats in classes in any way. Everything you hand in must be your own, original work; if someone helps you with your work, with proofreading, with ideas, then you *must* acknowledge them. I encourage you to work with other people, to bounce ideas off each other, to brainstorm, to read each other's work; all you have to do is acknowledge that person in the work you turn in. Even though the Colgate Honor Code does not technically go into effect until the next academic year, I expect you to adhere to it in its entirety; after all, it is only a description of honest and appropriate behavior. If you are unfamiliar with the concepts of the Honor Code, or plagiarism, or academic dishonesty, I encourage you to read the details in the Student Handbook. I take this very seriously and expect you to do the same. If you have any questions do not hesitate to discuss them with me immediately.

And finally, a reminder....

HOW TO DO HIGH QUALITY WORK

The grades you receive for your work depends only in part on 'getting the right answer'. In fact, for the topics in this class, nobody knows *all* of the answers; we are looking at natural systems that change on a daily basis, and we are looking at very complex systems that we do not understand completely yet. It is also very important that you communicate what you know clearly and effectively, and so your grade will depend on the form of your work as well as its content. Heed the following, terribly simple advice:

Do high quality work!

This may seem obvious! But what does it mean? The best advice I can give you is to avoid producing work in this or any course that looks like you are just going through the motions of something without knowing why except that you were told to do it, or hastily getting something done in time, or complying grudgingly with something that you are being made to do. Craft your work well. Plan and think before you write. Make your work both complete and precise: avoid vague generalizations and, whenever appropriate, include relevant details and show your logic and rationale. Make sure your tone and language are worthy of the occasion: scholarly and professional. Find a way to get into the spirit of things that is compatible with your basic nature. There are many ways to shine. Nevertheless, excellent work LOOKS excellent -- mediocre work LOOKS mediocre. Some guidelines:

FORM: 1) Correctness. A basic issue is always the correctness of your work -- punctuation, grammar, spelling. Make sure your handwriting is neat and legible. If I can't read it or understand it, how can I give you credit for it?

2) Accuracy and precision of language. A big problem many students have is the use of inaccurate and imprecise language. Avoid vague, cryptic and colloquial language. It reflects both inadequate thought formulation and inadequate facility with vocabulary. Time and care can fix this problem.

CONTENT: 3) Focus and relevance. Did you stay on one well-defined subject or fly off on tangents? Did you have a point or did you wander and ramble, as though lost?

4) Verisimilitude. Was you interpretation of the problem or issue reasonable or did it indicate a probable misunderstanding?

5) Preparation. Did your work reflect adequate familiarity with the material we have studied, or did it look like you hadn't studied very much or paid attention in class?

If your work is weak in any of those ways, then it is hard to think of it as more than fair to mediocre in quality, and to give you more than about a C, that is, even if you have done all the assignments.

SOME QUALITIES OF EXCELLENCE: To get an honest and heartfelt B or higher for your work, it needs in addition to display at least some of the following qualities:

1) A sense of mission. Did you get the point of the exercise? Or did you seem confused?

2) Deftness. Was the tail wagging the dog, or vise versa? Did you seem as if you didn't have a clue about what you were doing or why, or did you have things under control?

3) Insight. Did you see deeply into the issue? Did you have an original thought about it?

4) Awareness of context and significance. Did you indicate when and how the problem called for a larger understanding of the material as well as the various contexts in which it could be usefully viewed?

5) Subtlety. Did you seem to appreciate the depth and complexity of the issue? Or were your thoughts facile, superficial, poorly formulated, hasty, incomplete, etc.?

Arenal Volcano, one of the most active volcanoes in the world (it's in Costa Rica). Andesite lava avalanches down its flanks every few minutes in a most impressive display of incandescence (which just means red hot lava). You can witness these events while dancing to the dulcet tunes of ABBA from the not-quite-so-world-famous Volcano Look Disco, located ever so safely right at the foot of the volcano…