TECTONICS (GLY 6425) Section 6578

Time: MWF Period 2 (8.30 am- 9.20 am)
Place: WM 218
Instructor: J. Channell (Office: WM 219)
Texts (optional): "Global Tectonics" by P. Kearey and F.J. Vine
(Blackwell Scientific Publications)
"Fundamentals of Geophysics" by. W. Lowrie (Cambridge University Press)
Grading: Individual assignments (see below): 25%. Mid-term exam: 35%, Final: 40%

1. General Background
   - 1.1) Division of the Earth's interior
   - 1.2) Isostacy
   - 1.3) Satellite altimetry
   - 1.4) Geothermal gradient and heat flow
   - 1.5) Marine magnetic anomalies, paleomagnetism (paleogeography/timescales)
   - 1.6) Global seismicity and focal mechanisms

2. Plate Tectonics
   - 2.1) Evolution and breakup of Pangea
   - 2.2) Classification of plate boundaries
   - 2.3) Triple junctions and Velocity-Space diagrams
   - 2.4) Euler poles of rotation

3. Divergent Plate Boundaries, Passive Margins, and Basin Analysis
   - 3.1) Continental rifting and evolution to oceanic rifting
   - 3.2) Passive margins: structure and development
   - 3.3) Cratonic basins
   - 3.4) Backstripping and basin analysis

4. Convergent Plate Boundaries
   - 4.1) B-subduction (ocean-ocean & ocean-continent convergence). Examples from the western Pacific (Marianas), Andes, and western cordillera of North America.
   - 4.2) A-subduction (continent-continent convergence). Examples from the Himalayas and Appalachians.
   - 4.3) Episutural basins and continental collision - examples from the Alpine belt of Europe.

5. Conservative Plate Boundaries
   - 5.1) Transform faults and wrench fault tectonics

6. Mantle convection and the driving forces of plate motion.
   - 6.1) Hot spots
   - 6.2) Configuration of mantle convection
   - 6.3) Driving forces of plate motion

TECTONICS (GLY 6424)

Assignment

Prepare a ~15 minute oral presentation on a topic of your choice. Also please prepare an extended abstract (max length 5 pages of text, 1.5 line spacing, plus up to 5 figures) and hand it to me on **Wednesday Sept. 30, and be prepared to give your presentation after that date**. Please cite references in your abstract and provide a list of cited references (5-10 references should be sufficient).

The presentations and abstracts will be graded on the basis of (a) imagination in choice of topic, and relevance of topic to current research in Tectonics, (b) insight and depth of research into the subject matter, (c) clarity of oral presentation and of extended abstract.

Choose something (a) that interests you, (b) that you think is topical and controversial, and (c) that is closely tied to the topic of this course (tectonics!).

A good way to find a topic is to scan recent issues of "GSA Today", "Nature", "Science", "Geology", "Tectonics", "Scientific American", "American Scientist", "EOS" etc., or look through AGU abstracts, available on-line through American Geophysical Union. Find something that interests you. The reference list of the article will then lead you to other articles, and thereby help you to research the topic.

As you do your research, please do not hesitate to ask me for feedback. If you are unsure whether a particular topic is suitable, ask me!