Current Topics in Paleobiology  
GES 214

Biodiversity Dynamics in the Fossil Record

Fall Quarter 2007  
320-109 (Geology Corner)  
Wednesdays 3:15 – 5:05

<table>
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<th>Date</th>
<th>Topic</th>
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<tr>
<td>Wed 9/26</td>
<td>How do we estimate biodiversity in the modern and in the fossil record?</td>
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<td>Wed 10/3</td>
<td>How reliable is the fossil record of biodiversity?</td>
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<td>Wed 10/10</td>
<td>How does the structure of the sedimentary rock record affect estimates of biodiversity?</td>
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<td>Wed 10/17</td>
<td>How do origination and extinction combine to influence long-term biodiversity trends?</td>
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<td>Wed 10/24</td>
<td>Are mass extinctions a class of event distinct from background extinctions?</td>
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<td>Wed 11/7</td>
<td>What traits are most linked to extinction risk in the fossil record?</td>
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<td>Wed 11/14</td>
<td>What traits are most linked to extinction risk in living species?</td>
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<td>Wed 11/28</td>
<td>Are we living through a sixth major mass extinction?</td>
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<td>Wed 12/5</td>
<td>Presentations of student term papers</td>
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I. Rationale:  
This course is designed to provide graduate students in GES, Biological Sciences, and other related fields with an introduction to current research on biodiversity dynamics in the fossil record. More specifically, we will examine the reliability of biodiversity estimates and trends in the fossil record, the relative importance of extinction and origination in controlling long-term biodiversity dynamics, the extent to which mass extinctions represent a macroevolutionary mode qualitatively different from background intervals, and the similarities and differences between the modern biodiversity crisis and its ancient counterparts. A major goal of the course is to develop an understanding of the ways in which the fossil record allows us to view modern biodiversity within a long-term historical framework. The course is designed to develop in students the skills required to read and critically evaluate the current literature, write scientifically, and review manuscripts written by other scientists.
II. Format and Procedures:
The course is structured as a weekly discussion seminar. Each week, all members of the class will be expected to make short presentations on specific aspects of one or more readings from the primary literature and to participate in more general class discussion. Discussion may include small-group discussion as well as full class discussion depending upon enrollment.

III. Our Assumptions
We expect participants to have some familiarity with sedimentary geology or evolutionary biology, as well as experience reading from the primary literature in one or both of these fields. No particular familiarity with current paleobiological literature is assumed, but this course is NOT designed as an introduction to basic paleontological principles. Rather, it is a discussion of current research topics.

IV. Course Requirements:
1. Class attendance and participation policy: Participants in the seminar are expected to have read the assigned papers carefully and to have prepared answers to discussion questions provided. Participants will often be asked to lead parts of the group discussion focused on particular aspects of the assigned readings.

2. Course readings: A list of readings will be provided during the first week of the seminar, but may be updated during the quarter depending upon the areas of interest in the group and the publication of papers of interest during the quarter.

V. Grading Procedures: Grading will be based upon active participation in weekly discussions, a term paper, and peer reviews provided to other participants on their term paper drafts.

VI. Course Schedule:

Week 1 (September 26):
Introductory discussion of modern and ancient biodiversity, methods for estimating biodiversity, and scaling between biological and paleontological timescales.

Week 2 (October 3):
How reliable is the fossil record of biodiversity?

Required Readings:

Supplementary Readings:

Week 3 (October 10):

How does the nature of the sedimentary rock record affect estimates of biodiversity?

Required Readings:

Supplementary Readings:

Week 4 (October 17): Term paper topics due at the start of class

How do origination and extinction combine to influence long-term biodiversity trends?

Required Readings:

Supplementary Readings:

**Week 5 (October 24):**

*Are mass extinctions a class of event distinct from background extinctions?*

Required Readings:

Supplementary Readings:

**Week 6: (October 31): No Class - Geological Society of America Annual Meeting**

**Week 7 (November 7): Term paper draft due to peer reviewers**

*What traits are most linked to extinction risk in the fossil record?*

Required Readings:

Supplementary Readings:

**Week 8 (November 14): Comments due back from peer reviews by noon on Nov. 16**

*What traits are most linked to extinction risk in living species?*

Readings:
Olden, J.D., et al. in press. Global Ecology and Biogeography

Supplementary Readings:

November 21 – Thanksgiving break

Week 9 (November 28):
*Are we living through a sixth major mass extinction?*
Required Readings:

Supplementary Readings:

Week 10 (December 5): *Written term paper due December 7 by 5:00 pm*
*Presentations of student term papers*
Reading list:


