

**ES 123a**  
**The Dynamic Earth**

**ESSAY REQUIREMENT**

**Thesis:**

*The Earth is a dynamic planet – show and discuss.*

**Topics**

As part of the course requirements for students enrolled in ES 123a, each student will submit an original essay of her/his own effort on any topic within the context of the course that highlights the Earth as a **dynamic planet**.

Examples of the Earth's dynamism include (but are not limited to):

- Earth's magnetic field (<sup>1</sup>changes in the outer-core process that generates it, <sup>2</sup>aurorae, <sup>3</sup>magnetic-field reversals: are we entering one at this time?)
- lithospheric plate motions and associated phenomena (<sup>3</sup>continental drift, <sup>4</sup>crustal recycling, <sup>5</sup>earthquakes, <sup>6</sup>tsunamis)
- Earth's heat engine (<sup>7</sup>mantle convection, <sup>8</sup>liquid outer core, <sup>9</sup>volcanoes)
- Earth's gravitational field (<sup>10</sup>solid or <sup>11</sup>liquid tides, <sup>12</sup>free oscillations, <sup>13</sup>change in Earth's rotation axis, <sup>14</sup>the Earth-moon system)
- Geophysics and society (<sup>15</sup>world's oil supply, <sup>16</sup>measuring global change)

Each of these 16 topics, among many others, could serve as the basis for your essay. If you choose another topic and are unsure as to its suitability, please check with me before beginning your literature review. Since all of these topics will be discussed in class, essays that simply contain just the material presented in class will receive a low grade. You are expected to research the topic using, in addition to class material, books, research articles in journals, websites, etc. Optionally, the essay may be written in an argumentative style.

**Essay Guidelines**

Text length: 10 pages minimum, 12 pages maximum

Format:

- typed, double-spaced text, stapled
- title page: all titles will have "The Dynamic Earth" along with the specific topic chosen (e.g., "The Dynamic Earth: Mantle Convection")
- title page must indicate course number, your name, lecturer's name, student number, date submitted
- margins: 1 inch on all sides
- font size: 12 point

Figures: - unlimited number

- each figure is to fit on one page and must be sized to the entire 8.5" x 11" page
- to be collected in a group at the end of the paper

- must be numbered
- must have caption and reference (e.g., Fig. 2: Fluid flow in the outer core (Jacobs, 1992)).

### References/Bibliography

References used in your essay must be cited throughout the text as in the following example:

*Cyclic changes in the orientation of the rotation axis of the Earth are called Milankovitch cycles (Stacey, 1992).*

If there is one or two authors, give both surnames in the citation and the year (e.g., Romanowicz and Knittle, 2003). If there are three or more authors, give the first author surname only along with “*et al.*” and the year (e.g., Bridgman *et al.*, 1905). All references cited in the text and figures must be listed, in alphabetical order, in the reference list at the end of the text on a separate page. Examples for a book, a research paper in a journal, and a website are given below.

The Cambridge Encyclopedia of Earth Sciences, ed. D.G. Smith, 2<sup>nd</sup> edition, Cambridge University press, Cambridge, 1989, 496 pages.

Yukutake, T., The inner core and the surface heat flow as clues to estimating the initial temperature of the Earth’s core. Physics of the Earth and Planetary Interiors, pages 103-137, Volume 121, Issues 1-2, 2000.

<http://www.nasa.gov/> website

NOTE: Most websites contain information that is not peer reviewed (as in a book or research article in a journal) and therefore is not checked for accuracy and scientific rigor. Please limit the websites from which you obtain information (facts or figures) to those belonging to reputable agencies and institutions (e.g., government agencies, research institutions, etc.)

### Due Date

Essays are due by **3:00 p.m. Friday November 24, 2006**. Essays should be submitted to Prof. David Eaton (room B&G 10), or may be inserted into the lowest slot in the hallway box outside of room B&G 4. A penalty of 10% per day will be assessed for late submissions.

### Marks

The grade assigned for the essay will contribute to 10% of the final grade for the course. It will be combined in the final exam grade for a total of (i.e., exam + essay = ) 45%.