ESS 403
Capstone Project
An Investigation of the Cascadia Subduction Zone

A 10 minute presentation of geophysical and geological observations that increase our understanding of processes occurring within the Cascadia Subduction Zone. Bring memory stick to class with presentation or email it to me.

> **Note that "bulleted" slides are boring and typically ineffective in communicating ideas. Try to make slides in the form of an assertion and supporting evidence.**

Content Requirements:

1. The interpretation must make use of more than one source of geophysical or geologic observations (gravity, magnetics, heat flow, seismic, geodetic, mapped units and structures).

2. At least one figure presenting data must be created specifically for this project. You cannot simply cut and paste from previously published sources

3. The scope of your effort can be

    a. "regional" – looking at processes acting over the entire Cascadia region (examples: what are the large scale trends of gravity and magnetics and how do they relate to subduction and geologic structures? How do geodetic times series correlate with patterns of seismicity?)

    b. "local" – examining a specific area to elucidate its origin or evolution in the context of the larger scale processes (examples: Why has the Seattle Basin formed? What is the relationship between the Benioff zone and seismicity under Mt St Helens?).

    c. "global" – examine similarities or differences between Cascadia and other subduction zones. (examples: How different are patterns of ETS in other subduction zones compared to Cascadia? What factors in subduction zones favor the occurrences of Megathrust earthquakes?)

Presentation Requirements:

1. A Title slide: your name and affiliation with ESS 403 "Global tectonics"
2. An Overview slide: What are you going to cover in your presentation?
    a. Note that a slide that simply lists the terms (overview, introduction, main body, conclusions) is not an "overview"
3. Slide that describe a "problem"
4. Slide describing your "methodology "
5. Slide that "presents data" (observations from various sources)
6. Slide that "articulates a theoretical/conceptual context"
7. Slide that "links theory with data" to show either success (or failure) of the ideas to explain the data
8. Summary or conclusions
9. Sources cited or used in creation of the poster

Evaluation:

1. Adherence to format and content requirements
2. Degree that the methodology leads to an interpretation with a clear linkage of observations and theoretical concepts
3. Clarity of figures
4. Appropriateness of summary and conclusions
5. Quality of oral presentation – a clear articulation of themes and a clear connection between observations and interpretation.

Example Topics:

1. Crustal earthquakes near the Cascade volcanoes: what is the relationship between the Benioff zone and the Cascade volcanoes? Time dependence? Evidence for magma chambers or conduits?
2. Geology and Geophysics of the Crescent formation: Origin? Comparison of models that fit gravity and magnetic data with surface mapped units.
3. Benioff zone earthquakes and the location of the subducted oceanic crust. Are the earthquakes in the crust, the mantle below or above the crust?
4. Patterns of the time dependence of strain – impact of "slow slip" events on surface stations
5. Heat flow patterns relative to other geological and geophysical features.
6. Time dependence of seismicity under volcanoes or elsewhere
7. Detailed comparison of geophysical and geological observations in the Seattle fault/basin region
8. Slowslip earthquakes and tremor in Cascadia and elsewhere – what is it? How well understood?
9. Megathrust earthquakes – what do we know? What have we learned from elsewhere and what impact on local planning?

Some Recent Titles:

Seattle Basin: Structure and Earthquake Risk

Episodic Tremors and Slips: comparison between North Cascadia and SW Japan Subduction zones

The Nisqually Earthquake: Location, focal Mechanism, Plate Tectonic Setting, and future risk

Crustal Deformation from the Locked Cascadia Fault Zone

Olympic Mountain Region: Structure based on seismic and gravity data

Tidal Triggering of Earthquakes in Cascadia

Cascadia: Changing Angle of Subduction

Curvature of Subduction Zones related to Earthquake Frequency?

Effects of the Seattle Basin on the Destructive Capability of Earthquakes

Factors Contributing to the Depth of Trenches within the Pacific Ocean

The Relationship between Surface Acceleration and Bouguer Gravity Anomalies: and why it matters

Cascadia Accretion