Does the 1938 Eleven Province System best support student learning? Should the Eleven Geomorphic Provinces framework commonly used to teach California Geology classes be revised?

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Objective: Refocus course structure to improve student learning.

California Geology Classes within Geology Departments within the California Community College System, 2015

- Taught at 20 of 113 community college districts.
- Constituted 1.0% of geology classes offered.
- Was in every case (except possibly one) a 3.0 credit-unit class

In all cases:
- Was deemed UC and/or CSU transferable.
- Fulfilled General Education requirements.
- Lacked a Geology or 'hard science' prerequisite.
- Was apparently not coordinated or paired with a laboratory class.


Survey of Instructors* – How do you teach it? Would you like to teach it?

Salient Findings

Textbook vs. Powerpoint:
- 2 used primarily a textbook (Deborah Harden' book), with Powerpoint as a supplemental material.
- 1 used primarily Powerpoint, and a textbook as a secondary source.
- 2 used Powerpoint and little/no other formal material or media.

All 5 would use a textbook if a more updated book (or .pdf) were available.

All 5 use the Eleven Geomorphic Provinces framework to organize content & learning.

“Survey emailed in March 2016 to instructors identified as teaching California Geology in Fall 2015. Anonymous responses were received from instructors at 5 community college districts. n = 5.

Survey Question: “How would you like to organize the California Geology portion of course content?”

- Via a statewide system that is less than 11 provinces.
- Via a chronologic or event-based scheme.

Survey Question: “How should the Eleven Provinces System be improved?” (responses paraphrased, shown in bubbles)

Survey Question: “Why Is the Eleven Geomorphic Provinces used?”

Responses ranked by relative importance:
- Matches a textbook (or similar body of reference material) used in the curriculum.
- Considers physical geography/California geography.
- Instructor personally likes the 11 provinces system.
- How the instructor learned California geology.
- Specified in the college’s official curriculum or catalog.
- Explicitly or implicitly required by or compatible with the college’s accreditation.

Possible Alternative Learning Frameworks

Magmatic Arc

Active

Former Basin & Range

Current or Disc- Dis- sectected by SAF by EGSZ sectected Major Active

Bassin & Range

Cascades

Salton Trough

Mojave

Transverse Ranges

Klamath

Peninsular Ranges

Sierra Nevada

Coast Ranges

Central Valley

Offshore? CA Borderlands

Map widely used in teaching California Geology (map engine/author obscure/unknown)

Is an Offshore or Borderlands province warranted? The USGS, IODP/SSDP/ODP and others have provided ample salient data.

California's Chief Geologist D'Arms published the Geomorphic Map of California in 1938.

The state’s Geomorphic Map remains unchanged since 1938.

The state and other have made simplified geologic maps.

Source: California Science Content Standards, 2014, calearners.org/standards

Not Addressed in this Presentation

- Classes hosted by Earth Science departments
- Classes hosted by Geography departments
- California Geology classes less than 3.0 credit units.

"I would lump the Basin & Range with the desert provinces since they have so much in common... I might also consider lumping the Sierra and Klamath; not sure about that."

"Harden concludes with a chapter that shows how the regions fit into state geologic history. I have found this transition from small to large effective."

"I tied the Basin & Range, Modoc, Mojave and Salton Trough together, for it to make more widespread (Basin & Range) continental extensional tectonics."

"I teach the Modoc as Basin & Range covered in Cascade volcanism."

"I teach the Klamath as a westward translated portion of the Sierra."

"Eastern California shear zone & Walker Lane Belt"