

May 7, 2013

Bruno Nachtergaele, Chair
Davis Division of the Academic Senate

Subject: Proposed name change for Department of Geology

Dear Professor Nachtergaele,

After careful review, the College of Letters and Science Executive Committee is recommending approval of the proposal to change the name of the Department of Geology to the Department of Earth and Planetary Sciences. We believe that the new name more accurately reflects the range of work represented in the research and teaching interests of the faculty.

On behalf of the Executive Committee, I am hereby forwarding the proposal to you for review and final action by the Davis Division.

Sincerely,

A handwritten signature in black ink, appearing to read "Julia Simon". The signature is fluid and cursive, with the first name "Julia" and the last name "Simon" clearly distinguishable.

Julia Simon, Chair
Executive Committee
College of Letters and Science

cc: Beth Floyd, Director
Undergraduate Education and Advising

Nov. 18, 2012

To: Julia Simon, Chair, Executive Committee of Letters and Sciences
From: Department of Geology

**Proposal to change the name of the *Department of Geology*
to the *Department of Earth and Planetary Sciences***

Background

The Department of Geology was first established on the UC Davis campus in 1959 and has steadily grown in FTE and national stature over the past few decades. We currently have 21 FTE, 49 graduate students and 80 undergraduate majors. Our department was ranked #17 in Earth Science programs in the nation by USNWR in 2010 (in a tie with Brown University, the University of Chicago, Arizona State, UCLA and UCSD) and we have aspirations to rise into the top 10 by 2020. We have progressively come to a realization, however, that our current department name limits our growth potential as it does not encompass the scientific identity of our faculty, nor is it an accurate descriptor of the wide variety of research done by the faculty and graduate students. Our concerns were justified in 2011 when an external review of our graduate program recommended a change in the department name to better represent the range of disciplinary research beyond ‘geology.’ After much discussion and deliberation, the faculty has voted in favor of changing our departmental name to the Department of Earth and Planetary Sciences. This proposal presents the arguments justifying this name change.

Like most modern scientific disciplines, the geologic sciences have changed markedly over the past several decades. Driven by new findings, new questions, new approaches, and new technology, the science has undergone a profound transformation. A unique aspect of the earth and planetary sciences is the range of scales in space and time that we address. The Earth and the life it supports comprise an integrated system of matter, forces, and processes that affect the workings and composition of the atmosphere, oceans, crust, mantle, and core, all evolving through the vast expanse of deep time. Earth is profoundly coupled to the rest of the solar system and thus planetary sciences has become an integral aspect of our department. Current research includes the timing and chemical processes controlling the origin of Earth (primarily from the study of meteorites), the influence of extraterrestrial impacts on the history of life, the nature of interior dynamics of other planets, and the potential habitability of Mars. Understanding how the Earth and other planets operate on geological time scales, how the Earth formed and how it has changed since its origin more than four and a half billion years ago, and how humans and other life forms interact with their environment constitutes the central mission of our department.

Justification of Departmental Name Change

The following list of reasons justifying the departmental name change follows PPM Sections 200-20. The renaming of our department falls under the definition of ‘reconstitution’ according to the PPM.

- 1) The existing Department name no longer describes the faculty in our department, nor does it adequately capture the breadth of research and teaching activities conducted by faculty, research

scientists, postdoctoral fellows and graduate students. We are a department of geoscientists whose range of disciplines includes structure and tectonics, geophysics, geochemistry, cosmochemistry, oceanography, paleoclimatology, paleobiology and planetary science.

- 2) External reviews of our graduate program have recommended that we change our name to better reflect our research breadth in the study of the Earth and other planets. To quote from our recent 2011 graduate program external review: “The Geology Department would benefit from adopting a different name that reflects the broad range of specialist and interdisciplinary studies taking place under its umbrella.” The external review further notes that “The names Geology Department and Geology Graduate Group do not adequately describe the broad range of disciplinary and interdisciplinary research carried out across the Geology Graduate Program.”
- 3) Over the past 20 years or so, most prominent research universities have renamed their geoscience departments to more accurately reflect their personnel and research expertise. Geoscience departments are now identified as Earth and Planetary Sciences (UC Berkeley, UC Santa Cruz, Johns Hopkins University, Washington University, Harvard), Earth and Space Sciences (UCLA, University of Washington, Columbia), Earth and Environmental Sciences (University of Michigan), Earth and Atmospheric Sciences (Purdue University), Earth, Atmospheric and Planetary Sciences (MIT), and Division of Geological and Planetary Sciences (Caltech). None of the geoscience programs at other UC campuses retain the name ‘Geology.’ Changing our department's name will bring us in line with this national trend.
- 4) Planetary science is the study of planets (including Earth), moons, and space debris like asteroids and comets, as well as the processes that form them. It is a strongly interdisciplinary field, incorporating many disciplines such as planetary astronomy, planetary geochemistry and geophysics, atmospheric science, oceanography, hydrology, glaciology, and the study of extra-solar planets. It is distinctly unique from cosmology and astrophysics, which are concerned with larger scale astronomical phenomena. A number of our faculty conduct research directly related to the study of the origin of the Earth and other planets such as Mars, Venus, and the Moon, as well as the asteroid Vesta. Professor Dawn Sumner is a member of the science team for NASA’s flagship mission, the Mars Science Laboratory (MSL). She led the project landing site evaluation efforts and announced why Gale Crater was chosen in the official NASA press conference (beginning at 29:30 at <http://youtu.be/IknfWcps40g>). Since the successful landing of MSL on Aug. 5, she has been “driving” the largest rover ever built, the car-sized Curiosity on Mars from the JPL control room. Professor Don Turcotte is a leading figure in the field of planetary geology and geophysics. His work on the fractal interpretation of topography and geoid spectra of the Earth, Moon, Venus, and Mars, and his hypothesis on catastrophic resurfacing on Venus laid the groundwork for comparative planetology as a field of study. Professor Louise Kellogg’s work on mantle convection and thermal evolution of planets is highly influential in interpreting isotopic data obtained since the Apollo missions. Professor Qing-Zhu Yin focuses on the early solar system and planet formation. His research is primarily supported by NASA’s planetary science programs such as Cosmochemistry, Origins of Solar Systems, Exobiology, and Planetary Major Equipment and his laboratory is one of the best equipped isotope cosmochemistry laboratories in the nation. Dr. Yin’s recent meteorite search and public outreach effort to find samples of the extraordinary 2012 Sutter’s Mill meteorite (<http://www.youtube.com/watch?v=0CyORXrBpew>) received national attention. We anticipate

that the department name change to Earth and Planetary Sciences will provide a critical boost in graduate recruitment and momentum to our current research areas and future target hires, in accord with our aspiration to rise into the top 10 national ranking.

- 5) A change to the Department of Earth and Planetary Sciences will substantially benefit our undergraduate recruitment efforts as this name more effectively communicates to students the rich learning opportunities in the Department. A name change will also help recruit graduate students, postdoctoral fellows, and faculty with research interests at the broad interface between Earth sciences and planetary sciences. We anticipate the proposed name change will help in positioning the faculty to secure more extramural funding from diverse federal agencies and foundations. The higher funding potential has clear positive budgetary implications.
- 6) Changing our name to the Department of Earth and Planetary Sciences will help develop new connections and strengthen existing collaborative ties to other units at the University of California, Davis, by more effectively communicating the range and versatility of the faculty's research and teaching. The name change will enhance the synergy of graduate students, postdoctoral researchers, research scientists, and faculty colleagues to explore potential opportunities for interdisciplinary education and research, collaboration on proposals, and access to laboratories and other areas of expertise. Most importantly, it will add to the visibility of the University and the Division of Mathematics and Physical Sciences as one of the premier research institutions engaged deeply in research from a wide variety of perspectives, as is typical for a top research university. The Washington Advisory Group that the Chancellor brought in has the following assessment of MPS at UC Davis: "The review team believes that the performance of the Division of MPS will be a major determinant in how the higher education community views the College and hence UCD. The departments of the Division have the know-how and ambition to rise in national ranking." We are confident that this proposed departmental name change will move us one step forward in our goal to reach the top 10 Earth Science departments in the country, and in so doing further enhance the stature of MPS and the UC Davis campus.

Budgetary Impact

We anticipate that the department name change will attract additional undergraduates to our courses in *astrobiology*, *solar systems*, and *planetary geology and geophysics*, with perhaps some of them deciding to join the department as majors. Our graduate student numbers may increase as well, as the new name draws in prospective planetary scientists. So the departmental budget may be impacted in a positive way with increased enrollments. Moreover, we have every reason to believe that the proposed name change will boost the department's extramural funding potential and diversify the portfolio of potential funding agencies.

There should be very little discernable budgetary impact on the campus, MPS Division or department. The Registrar will need to make the name change on all materials related to teaching and courses, mostly electronically. Campus units like Accounting and Financial Services, Admissions, University Communications, and Resource Management and Planning will need to respond to the name change. Internally, we'll need to change our digital letterhead and make the appropriate changes to our website. We'll need to change department and campus hardcopy documents and we'll need to change physical signage around the EPS building.

Dept. Earth and Planetary Sciences

No changes in the department's objectives or instructional programs will occur at this time. We plan to continue to offer AB, BS, MS and PhD degrees in 'Geology,' which will be the formal designation on diplomas. We plan to keep the 'GEL' prefix to our classes as listed in the course catalog for simplicity and to maintain consistency. It is likely that in the near future we will be creating new courses in response to our elevated focus on planetary sciences.

Phase-Out Plan & Timetable for Implementation

Our plan to implement the name change will begin immediately upon formal approval by the appropriate units on campus. Campus notification is done from the office of the Vice Provost of Undergraduate Studies (VP UGS), which will jump-start the process upon approval. Internally, we will harness our front office staff and IT personnel to begin the changeover immediately upon approval. All undergraduate students in the major, all graduate students, all staff and all research personnel will be notified of the departmental name change via email and flat-screen projections scattered around the EPS building that houses the department. We anticipate the changes will take place over a few months and be fully completed by the start of the 2013-2014 academic year.

Method of Consultation

During a faculty meeting on October 10, 2011, the Academic Senate faculty of the Department of Geology voted very strongly in favor of changing our name to the Department of Earth and Planetary Sciences. Discussion of the pros and cons was vigorous and represented the culmination of a few months of prior informal discussion. A faculty committee was assembled to prepare the proposal and discuss the details of the name change. The MPS Dean (Winston Ko) was fully informed about our proposal and was part of a discussion of the topic during a faculty meeting coincident with his annual visit. This proposal was developed following his recommendations. The decision was conveyed to our Academic Federation personnel for feedback. We discussed our proposed new name with the chair of the Department of Physics, Andy Albrecht, and the chair of the Department of Land, Air and Water Resources, Randy Dahlgren, both of whom supported our decision of the proposed name change.

Howie Spero
Professor and Chair, Department of Geology



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May 2, 2011

Dean Jeffery Gibeling
c/o Graduate Programs Assistant,
Office of Graduate Studies,
University of California, Davis
Re: Geology Graduate Program Review

Dear Dean Gibeling,

I enclose my external reviewer's report from the Geology Graduate Program review conducted in late January. It was interesting to learn about the programs at UC Davis, and I very much hope that both you and the department find my comments useful.

Sincerely,

A handwritten signature in black ink that reads "C. Constable". The signature is written in a cursive style with a long horizontal line extending to the right.

Catherine Constable
Professor of Geophysics

UC Davis Geology Graduate Program Review
External Reviewer's Report
Cathy Constable
May 2, 2011

1. Review Methods

A review of the UC Davis Graduate Program in Geology was conducted on January 24 - 25, 2011 by an internal ad hoc committee from UC Davis (Professors Peter Wainwright, Ross Boulanger and James Shackelford) and a single external reviewer from Scripps Institution of Oceanography, UCSD (Professor Cathy Constable). This document constitutes the external reviewer's report.

The report is based on material supplied to the review team including the Geology Program's self review, responses from faculty and students to confidential questionnaires, and two days of meetings with the Graduate Program Chair Carlson, Department Chair Spero, and various subgroups of faculty, students, and staff from the geology department. The external reviewer met with Graduate Dean Gibeling at the beginning and end of this process and Professors Wainwright (the ad hoc chair) and Constable met with Physical Sciences Dean Ko on the first day of the review. We received a tour of the department facilities. My report draws heavily on internal discussions among the review team, and I believe it reflects our general consensus about the current state of the program.

2. Overall Assessment

Our overall assessment of the Graduate Geology Program (GGP) is that it is doing well, as indicated by its rising position in the standard measures of quality, such as the US News and World Report rankings. This reflects the rewards from a series of strategically sound hiring decisions, improved research facilities, and a generally happy and collegial group of quality students who are provided with adequate funding and are great representatives for the GGP.

Given the general perception of a strong program, much of our review focused on how to capitalize on the gains since the last review initiated in January 2000 (report in 2002). The next natural step is to work towards the program being acknowledged as one of the best in the country. This will be a significant challenge against the inevitable backdrop of declining overall funding from the state government, which will certainly lead to increased tuition, declining TA support, increased numbers in undergraduate classes, and probably to decreases in research funding unless the faculty can develop a broader competitive edge and increased efficiency. To address this challenge, they will need to overcome a perception that internal collegiality will be impaired by becoming more competitive in their external activities and requests for funding.

Considering these circumstances our basic recommendations (elaborated and repeated later in the report) are as follows:

- (1) The development of a stronger department chair model would allow the group to address poor coordination in a number of areas, providing enhanced support for implementing the program.
- (2) Additional faculty effort to acquire extramural funding for students would help the GGP to sustain and enhance its support of graduate student researchers.
- (3) It is recommended that the department put in place a development plan targeted at enhancing discretionary funding.
- (4) The program should develop a coherent plan for improving its national visibility and further enhancing its ranking.

(5) The Geology Department would benefit from adopting a different name that reflects the broad range of specialist and interdisciplinary studies taking place under its umbrella.

(6) The department should work hard to strengthen the student body with a comprehensive recruitment plan and more non-resident enrollments.

(7) The faculty should consider whether the current partitioning of funding among MS and PhD candidates represents the optimal use of limited resources.

(8) The review committee found no need to establish a core curriculum. However, the program should routinely review and revise its graduate course offerings, improving scheduling and communication with the students to allow for systematic curriculum planning.

3. Faculty and Research

3:1 Faculty

The overall number of faculty in the GGP has remained constant at 34 since the last review, but has expanded considerably in both depth and breadth as a result of recruitment to replace retired members and expansion in numbers in the Department of Geology from 17 to 24 members. Their overall quality is reflected in their generally extensive publication lists, their participation in national and international service for their own and related (sub)disciplines, a healthy number of external awards and fellowships from important geological societies, and several high fliers including members of the National Academy of Sciences, a MacArthur Fellow, and a recipient of the Franklin Medal. With 3 assistant and 8 associate level members, the faculty reflects a reasonable demographic balance in terms of seniority. The program scores exceptionally well in recruiting and retaining women faculty (currently 35%), perhaps an indication that placing competent women in leadership roles, such as department chair, can help in this area. Along with almost all Geosciences programs in the US the UCD GGP has yet to overcome the supply problem and acquire strong representation of other historically under-represented minorities.

Not all of the faculty have funding from extramural grants, and some rely on department TA or block grant support to sponsor their students. For those that do have extramural support we were informed that NSF is the major source of funds. We were told that the faculty as a whole considered the reliance on TA support essential to support the diversity of research and undergraduate teaching within the department. A small fraction of the faculty seemed to see the policy of providing support across the board as a somewhat luxurious subsidy for colleagues to do research that could not be funded from other sources. A larger fraction may be of the opinion that block grant and TA support could be better deployed in ways that might incentivize faculty to seek extramural support or serve the department in other ways. There is a perception from some that high research performers tend to contribute less to teaching and service than others in the group. The GGP chair noted that (unlike a department chair) she and her advisory group have limited authority to require faculty to contribute in specific ways that might enhance their ability to run the program.

3:2 Research

The geology faculty has identified three core areas of research: (1) Ancient Environments and History of Life, (2) Applied Geosciences, Natural Resources, & Natural Hazards, (3) Composition Structure & Evolution of Earth's Interior). Within each area they have identified a series of future hires intended to build on current areas of strength and build future collaborations as positions open up from current faculty retirements. Within and across these areas of emphasis, the department engages in research ranging from conventional geological projects to broad interdisciplinary work addressing societally important issues in their historical and geological context. For example, graduate students are actively engaged in projects related to ocean acidification, earthquake hazard and climate science, and the policy is to try and engage

students in research from day 1.

Some faculty have research interests that overlap with other ORUs or departments on campus and sponsor their students through other graduate groups. Given the range of activities being undertaken by Geology faculty and students, I believe it is time for the Geology Department and the group to move forward with a new name, reflecting their broad engagement in Earth and Environmental Sciences. The term "geological" is not understood by all students and the outside world to be as inclusive as the research activities represented by the GGP. It may also be appropriate for UCD to consider how best to integrate separate educational programs that duplicate Environmental Sciences or other functions across the various divisions (e.g. land and water resources, engineering) and avoid redundant effort across the campus.

4. Students and the Curriculum

The number of students in the program averages 44 per year from 2005-2009, with 14 enrolled in MS and 30 as PhD students. Graduation rates for MS and PhD are 5 and 3.6/yr respectively. Completion rates have increased and withdrawal rates have decreased over the past 5 years. The average time to degree has also decreased in that time period. Faculty generally seem happy with the quality of the students in the program, and although numbers of applications are down in the current cycle the perception is that the quality of applicants is improving. The great majority of enrolled students are California residents, in large part because of the punitive costs associated with non-resident tuition. Many faculty expressed the opinion that the ability to support non-residents in the program would open access to a more competitive pool of applicants.

About 17% of the students are supported from fellowships and other sources of GSR funding. Others are funded from block grant and partial (or in some cases entirely) TA support. Students are encouraged to TA in the first year. There appears to be no uniform policy on providing summer support for students. Some GSRs get it, while others TA or get funding from course improvement grants. There is potential for inequity in support levels depending on research area and advisor. However, the existing students were not generally dissatisfied with their various financial support packages.

Faculty noted that review and revision of the graduate curriculum is under way. At present students are required to take 6 classes for an MS degree and 9 for the PhD. We were explicitly asked (as they had been) to consider whether the lack of a core graduate curriculum was detrimental to training of graduate students. In discussions with both students and faculty we found a consensus that the current more flexible system provides the best training. A diversity of backgrounds and needs for the various students means that there is no one size fits all solution for core classes, so students essentially design their own curriculum in consultation with faculty advisors. Students were united in the opinion that courses that provide critical background for individuals in one area would be seen as boring repetition of previous classwork for others. Unlike some other campuses UCD has no pre-qualifying exam (often given at the end of year 1 or early year 2), but includes breadth requirements as part of the PhD qualifying exam. It is possible that this leads to uneven evaluation of students' overall qualifications.

Students appreciated that the department faculty were generally accessible, safe to approach, and responsive to requests to teach specialized classes. They enjoyed the group's emphasis on research. However, they noted difficulties in planning their course work to get the training they wanted, because of a tendency for last minute decisions about graduate course offerings. Some faculty (especially more senior members) seemed to view teaching as an afterthought rather than a primary job requirement, with at least one professor reported as consistently failing to turn back student work. There was a perception that faculty are not held accountable by the curriculum advisory group.

Some students seem to suffer from excessive demands to serve as TAs and would benefit from GSR funding allowing them to complete their degrees more rapidly. It was noted that TA training (Geol 390) is only offered every other year, and may not be sufficient training for college level teaching.

Most students intended to work in an academic setting after graduation, with a minority expressing interest in the private sector. It was generally agreed that the department provided few in-house opportunities for making industry connections. Those interested in private sector work thought it would be useful if industry recruiters were invited to UCD.

On the research side students called out a number of groups in the department as offering what were perceived as excellent and dynamic research environments catering to students, including the structure group, the stable isotope laboratory, geophysics, and petrology. All students are encouraged to write in house proposals for small grants related to their graduate work in January each year. Some faculty have successfully engaged students in larger grant writing activities based on their PhD qualifying proposals leading to NSF funding for their projects.

5. Staff

The committee met with the half time program advisor. He seemed extremely well-organized and to have an excellent command of his job.

6. Facilities

The Geology Department has recently (late 2009) moved into the newly constructed Earth and Physical Sciences building and now enjoys spacious new facilities with newly designed cutting edge visualization and geochemical laboratories. Students and postdocs have expanded office space, and most appear very happy with the available resources. A particularly pleasant aspect of the new building is the open space on each floor that facilitates informal gatherings among students and faculty.

7. Strengths and Weaknesses of Program

The program is ascending in national rankings and overall seems to be working well. The faculty are generally excellent and, with improved visibility, there is scope for continued strengthening of the quality of students and the graduate program. There is an opportunity here to develop and implement a plan for moving into one of the top ten programs nationwide. The graduate students are mainly satisfied with their experiences and are excellent representatives for the system. I note explicit strengths and weaknesses below.

7:1 Strengths

(S1) The department has a collegial faculty with wide-ranging interests, excellent physical facilities, and provides strong research opportunities, with the chance for students to develop their teaching and proposal-writing skills.

(S2) Students appreciate the opportunity to control their own curriculum, drawing on a broad range of classes to build on their background strengths and future needs. They enjoy generally collegial relations with the faculty and appear reasonably satisfied with the support packages provided by the department.

(S3) There are significant resources for inter-disciplinary work in other departments and schools across UC Davis.

(S4) Most graduates find employment in Earth Science related professions, and as many as half live and work in California.

7:2 Weaknesses

(W1) Several comments from both faculty and student groups point to the need for greater coordination and

accountability of faculty in the program. The GGP chair lacks authority to enforce improvements.

A common refrain from the students was the need for better planning of (or at the very least communication about) when graduate classes will be offered. Class schedules should be available 2 years ahead of time so that students can plan their degrees. Occasional changes are to be expected but class announcements at the beginning of the quarter in which they are taught should be the exception not the rule. The department chair may need to exercise greater control on simultaneous sabbatical leaves across specific areas of teaching expertise.

There is a lack of uniformity in support packages for students, especially level of support over the summer. Students who are exclusively supported as TAs (rather than GSRs) can take a long time to degree. Faculty should be encouraged to raise GSR or fellowship support for students. Loss of TAs and other graduate studies funding in the current budget crisis generates increased pressure to assign resources in a discriminating fashion.

There is a perception that some (especially senior) faculty are not held accountable when they fail to deliver high quality teaching or student support.

(W2) The fraction of students who are supported as GSRs under extramural funds seems low in comparison with other high quality departments. Some faculty clearly need encouragement to write grants to support students as GSRs. The program should work to empower younger faculty and other major contributors to the program rather than pandering to equal entitlements across the board. Perhaps incentives for good behavior are necessary. For example, institutional support for students should be tied to grant writing efforts, teaching workload, and faculty service.

(W3) There is a need for more discretionary funds in several areas. The cost of non-resident fees is a major impediment to recruiting international students. Some departments at other UC campuses have solved this by sharing the average cost of all student fees across grants, effectively taxing everybody to support a diverse student population. Given the current relatively low fraction of GSR support this may not be tractable here. An alternative is to raise non-resident fellowship funds. Cost of recruitment efforts at national geology and geophysics meetings are also problematic and were cited as impediments to improving recruitment plans (e.g. by an orchestrated open house for admitted students) and for improving seminar series.

(W4) The department needs a plan to promote visibility and for continued improvements in its stature. Faculty need to overcome the perception that such improvements will come at the expense of a collegial work environment. The competition should be for external, rather than internal, status and can serve to bring additional resources that improve quality across the whole program.

(W5) The names Geology Department and Geology Graduate Group do not adequately describe the broad range of research disciplinary and interdisciplinary research carried out across the GGP. *Earth Sciences* or *Earth and Environmental Sciences* might be a more accurate description. If these represent substantial overlap with other campus programs then perhaps UCD should consider restructuring duplicative efforts.

(W6) Visibility lagging quality may impair recruitment. Faculty need to exert greater efforts in recruiting prospective students, and be more aware of offerings by competitor institutions. Targeted recruitments from specific schools could be helped by faculty explicitly recruiting students when they go out to give seminars elsewhere, and alerting invited speakers to UCD to opportunities for their students. Current students have emphasized that personal outreach efforts by individual faculty made a big difference in their choice of schools, and noted that there could be improvements in this area.

(W7) The current partitioning of funding between MS and PhD students reflects a large investment of TA funding on the MS side. The group is investing significant funds for training students who will acquire lesser research skills and spend less time on research than the PhD students. Some programs elsewhere

require MS students to be self-supporting.

(W8) Although I see no need for establishing core curriculum, the program might consider a more systematic pre-qualifier evaluation of background qualifications for the student's chosen research track.

8. Recommendations

(R1) The development of a stronger department chair model would allow the group to address poor coordination in a number of areas, providing enhanced support for the GGP advisory committee and chair in implementing the program.

(R2) Additional faculty effort should be devoted to acquiring extramural funding for students, providing better funding for some research projects and helping the GGP to sustain and enhance its support of graduate student researchers.

(R3) It is recommended that the department put in place a development plan. This could involve an advisory board for generating discretionary or fellowship support, and facilitating interfaces with industry.

(R4) The program should develop a coherent plan for improving its national visibility and further enhancing its ranking.

(R5) The Geology Department should adopt a different name that reflects the broad range of specialist and interdisciplinary studies taking place under its umbrella.

(R6) An active recruitment program with greater department coordination and structure combined with more personal effort from faculty is needed for greater success in recruiting an academically stronger student body. The department should work to achieve more non-resident student enrollments.

(R7) The faculty should consider whether the current partitioning of funding among MS and PhD candidates represents optimal use of limited resources.

(R8) The review committee found no need to establish a core curriculum. However, the program should routinely review and revise its graduate course offerings, improving scheduling and communication with the students to allow for systematic curriculum planning and evaluation of outcomes.

Finally I note that the last review was initiated in Jan 2000. A shorter interval between reviews seems desirable. I also suggest that the graduate dean consider additional external representation on the review committee. The internal *ad hoc* committee were extremely helpful in this review but, as they noted from the outset, a single earth scientist has difficulty evaluating the range of research achievements across a department this broad.

Respectfully Submitted,



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