



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

**Α.ΔΙ.Π.**

ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ ΚΑΙ  
ΠΙΣΤΟΠΟΙΗΣΗΣ ΤΗΣ ΠΟΙΟΤΗΤΑΣ  
ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

**H.Q.A.**

HELLENIC QUALITY ASSURANCE AND  
ACCREDITATION AGENCY

## EXTERNAL EVALUATION REPORT

DEPARTMENT OF GEOLOGY,  
ARISTOTLE UNIVERSITY OF THESSALONIKI

July 11, 2012



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### **External Evaluation Committee**

The Committee responsible for the External Evaluation of the Department of Geology, Aristotle University of Thessaloniki consisted of the following four (4) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005:

1. Professor Georgia Pe-Piper, Coordinator  
Saint Mary's University (Canada)
2. Dr Spyridon Bellas  
Expert of Greek State (Greece) & visiting Prof. in FU-Berlin (Germany)
3. Professor Filippos Tsikalas  
Eni E&P (Italy) & University of Oslo (Norway)
4. Professor Spiros Pagiatakis  
York University (Canada)

## **Introduction**

### I. The External Evaluation Procedure

- Dates of the site visit

The visit was carried out from 16:45 pm on 11/06/2012 until 18:00 pm on 13/06/2012.

- Whom did the Committee meet?

#### **Day 1, Monday, June 11, 2012:**

At the beginning of the evaluation process, the External Evaluation Committee (EEC) members met at the Main Administration premises with the Dean of Science (as representative of the Vice Rector of Academic Affairs), the Chair of the Department, members of the Internal Evaluation Committee (OMEA), and the Directors of the five Sections of the Department. General presentations accompanied by discussions about the history of the University, Faculty of Science, and the Department of Geology were held. In addition, a summary of the various outreach activities of the University was presented with specific focus on the Department of Geology (e.g., Seismological Station, Meteoroskopeion, Geology & Paleontology Museum). Furthermore, the Head of the Research Committee of the University presented statistical data on the research funding for the Department in relation to that of the Science Faculty and the University as a whole.

Subsequently, an overview of the curriculum and the research activities of the Department was presented. More specifically:

- (i) the high international ranking of the Department of Geology, best 101-150 (in Geoscience Departments), in the QS (Quality Standard) World University Rankings
- (ii) the structure of both the undergraduate and graduate curricula, and certain current issues (e.g., high number of incoming undergraduate students, high attrition rates)
- (iii) the academic staff and their achievements, consisting of national and international collaborations, external funding, and scientific output (publications, citations, awards, patents)
- (iv) the current issues with supporting personnel in the various teaching and research laboratories, and
- (v) teaching space allocation and need for upgrades.

#### **Day 2- Tuesday, June 12, 2012**

On the second day, the EEC met with the academic and staff members of the five Sections of the Department. The Directors of the Sections gave detailed overviews of the undergraduate and graduate curriculum structure by section, and an outline of research activities. The EEC also visited the Seismological Station and Meteoroskopeion. In the afternoon, the EEC had a focus group meeting with several departmental alumni with different employment status.

#### **Day 3- Wednesday June 13, 2012**

On the third day, the EEC visited departmental laboratories and research facilities as well the departmental library, where they had discussions with the chief librarian and staff. The EEC also visited the Department Secretariat and had focus group meetings with non-tenured academic staff, special teaching and technical-support personnel and undergraduate and graduate students. Also, the EEC quickly toured some non academic facilities on campus and was informed on others.

In the afternoon of Day 3, the EEC members returned to Athens.

#### **Day 4 - Thursday June 14, 2012**

The EEC members worked on the final draft of the EER at facilities provided by the HQAA.

#### **Day 5 - Friday June 15, 2012**

The EEC members continued working on the final draft of the EER.

#### **Day 6 - Saturday June 16, 2012**

The EEC members continued working on the final EER draft and submitted it to the HQAA representative. The EEC members departed from Athens.

**Summary:** The Department of Geology succeeded in preparing a program that allowed meetings and discussions with all its Sections and the Dean of Science. Faculty readily accommodated additional requests by the EEC (e.g., additional research evaluation material and a focus group meeting with non-tenured academic staff). Furthermore, the EEC had the opportunity to speak to laboratory instructors and to visit the teaching and research laboratories, computing facilities and the core teaching and research instrumentation used. The EEC also met and had discussions with students (undergraduate students, MSc and PhD candidates) and held a focus group meeting with departmental graduates. The EEC visited the Department library and non-academic facilities on campus.

## II. The Internal Evaluation Process

- *Appropriateness of sources and documentation used*

The EEC members had at their disposal prior to and during the evaluation process the following documentation: (i) Internal Evaluation Reports for the periods 2007-2008, 2009-2010, and 2010-2011, (ii) full overview of the educational and research activities of the Department for the period 1982-2012, accompanied by detailed statistics, (iii) undergraduate and postgraduate Study Guides for the academic years 2010-2011 and 2011-2012, (iv) teaching, exam and field trip schedules for 2011-2012, (v) detailed descriptions of all courses offered, and (vi) CVs of all faculty members. Additional documents and information concerning several research aspects and activities (see above) were received during the visit.

- *Quality and completeness of evidence reviewed and provided*

The furnished reports reflect the current status of the Department (up to 2012). They clearly describe the structure, organisation and facilities of the Department. The excellent effort made by the Department to provide a complete picture of teaching and research activities as well as of the administrative and laboratory facilities was highly appreciated by the EEC.

- *To what extent have the objectives of the internal evaluation process been met by the Department?*

Overall, the Internal Evaluation Reports met the objectives of the evaluation process.

## **A1. Undergraduate Curriculum**

## APPROACH

### Goals and objectives of the Undergraduate Curriculum (UGC)

The goal of the UGC is to provide students with basic and specific knowledge in both theoretical and applied topics in Geosciences in order for the graduates to practice as professional Geoscientists.

The objectives of the UGC are to offer courses relevant to Geosciences, namely in the specializations of Geology (including Paleontology and Tectonics), Mineralogy-Petrology-Ore Geology, Physical and Environmental Geography, Geophysics, and Meteorology-Climatology; to enable the social-economic impact and benefit of the above specializations, and more specifically within seismology, hydrogeology, and environment etc; collection, analysis and interpretation of data as related to various Earth systems.

This is a relatively mature program. The UGC was founded in 1973 and took its present form in 1983 with several important updates thereafter (e.g., introduction of the Physical and Environmental Geography Section in 2001). The Department has presently 46 faculty members and has been successful in educating undergraduate students. Upon graduation, graduates are relatively well received by academic/research institutions as well as by the industry.

- *What is the plan for achieving excellence?*

The structure of the curriculum compares well to the ones used internationally. Although there is no specific strategic plan nor clearly defined objectives for achieving excellence, based on discussions with faculty members there are innovative ideas for improvement. Student attendance in lectures, typical of Hellenic academic institutions, is not mandatory and the level of attendance is considered not satisfactory by both the academic staff and the EEC. The undergraduate laboratory training and field work are mandatory and very successful. In this rapidly evolving Earth science field, it is very important to update the material used in the classroom and the laboratory regularly.

- *How were the objectives decided? Which factors were taken into account?*

Undergraduate instruction is transparent and the methods used in the classroom concerning teaching and testing are determined by the instructors. A committee in charge of the undergraduate program within the Department evaluates the objectives and proposes course content updates. The majority of the senior academic staff, who teach the undergraduate courses, had education and academic experience in universities outside Greece. The very good level of undergraduates who matriculate under this departmental curriculum is evidenced by the very successful career paths taken by a number of these graduates in post-graduate studies in Europe and North America.

Technical/industrial training with various enterprises is not mandatory for the undergraduate students but highly recommended. The EEC applauds the policy of the Department to keep the Diploma Thesis mandatory within the curriculum. Such practices have been successful and should continue.

## IMPLEMENTATION

- *How effectively is the Department's goal implemented by the curriculum?*

The Department has designed the undergraduate curriculum in stages, adjusting it periodically as permanent staff was hired, and the discipline evolved and expanded towards innovative areas which the academic staff contributed to. Such a UGC development has resulted in lack of adequate intra-sectional co-operation and thus, partial overlapping of course content. Within the Department there is currently skepticism on whether to expand the current goals or to focus on emerging research initiatives.

- *How does the curriculum compare with appropriate, universally accepted standards for the specific area of study?*

The current curriculum structure compares well to those of the best internationally recognized universities.

- *Is the structure of the curriculum rational and clearly articulated?*

Yes, as shown by the orderly operation of the classroom, laboratory and fieldwork instruction and the availability of study guides, based on syllabi. However, some improvements should be made as indicated below.

- *Is the curriculum coherent and functional?*

Yes.

- *Is the material for each course appropriate and the time offered sufficient?*

Generally yes. The EEC praises the important decision of the Department to introduce in the UGC weekly a fieldwork day.

- *Does the Department have the necessary resources and appropriately qualified and trained staff to implement the curriculum?*

The departmental facilities (classrooms and laboratories) need certain improvements and for better program delivery, additional space is needed. However, the departmental library and the small study hall appear adequate. In general, the required instrumentation and equipment are available.

A group of highly qualified instructors, who supervise the laboratories and fieldwork, have been in the Department for many years and are very effective. The EEC is impressed with the dedication and strong effort of the laboratory/assistant staff (most of them hold PhD degrees), and although not their duty (vague legal framework) they assist in teaching and ensure good and safe work practices in the laboratory.

**Recommendation 1:** The Department needs to formulate a specific 5-year Departmental Strategic Plan with clearly defined goals, objectives, milestones and deliverables including measures of success for achieving excellence.

**Recommendation 2:** The weekly load of courses, laboratories and fieldwork is heavy. A thorough review and evaluation of the current UGC course content is needed to reduce



unnecessary overlap. The EEC believes that this will contribute to more effective course delivery and will improve further the intra-sectional co-operation.

**Recommendation 3:** Introduce a distinct “Sedimentary Geology” course (to clearly distinguish it from the current one that deals with Holocene Sedimentology) that comprises sedimentary processes, depositional facies, sequence stratigraphy, and basin analysis elements.

**Recommendation 4:** Consolidate the existing streams within the Department by converting certain elective courses to mandatory (e.g., GGP432E Seismic reflection/refraction methods, GMC431E General Climatology).

**Recommendation 5:** Re-enforce mathematics, probability and statistics in UGC to meet the growing needs for data analysis and interpretation as well as early introduction to appropriate commercial software (e.g., digital geological mapping).

## RESULTS

- *How well is the implementation achieving the Department’s predefined goals and objectives?*

The current curriculum includes very good quality core courses that meet the Department’s original founding goals and objectives. However, implementation of the above Recommendations 1-5 will further improve the curriculum.

- *If not, why is it so? How is this problem dealt with?*

n/a

- *Does the Department understand why and how it achieved or failed to achieve these results?*

The Department understands the strengths and weaknesses of the curriculum and has had several ideas for change. However, the existing legal framework is perceived by the Department as restricting their ability to make major changes in the curriculum. A few changes (e.g., introduction of new courses in evolving fields, introduction of required prerequisite courses) have been already introduced.

## IMPROVEMENT

- *Does the Department know how the Curriculum should be improved?*

The Department made several positive suggestions for the improvement of the curriculum in their Internal Evaluation Report (see pages 40-42, IER 2007-2008), with which the EEC fully agrees. Based on this report and the site visit of the EEC, the following recommendations are made:

**Recommendation 6:** Currently, there exists a lack of fellowships for teaching assistants (graduate students), who can support the instructional work of the professors during their laboratory courses and fieldwork. Funding and provision of these teaching fellowships by the State and/or the University is necessary and urgent, on a priority basis.

**Recommendation 7:** Currently, there exists a lack of technical staff to maintain and run the instrumentation of the Department that is a basic requirement of the curriculum. The EEC recommends the employment of specialised technical staff.

**Recommendation 8:** Implement homework assignments, group projects, and mid-term examinations. In addition to the final exams, these items should contribute to the final grade. This will largely improve the quality of the educational experience.

**Recommendation 9:** Further implementation of required prerequisite courses (“chain system” of instruction) is essential for a more effective development of the curriculum and quality of the educational experience.

## ***A2. Postgraduate Curriculum***

### **APPROACH AND IMPROVEMENT RECOMMENDATIONS**

#### **Goals and objectives of the Postgraduate Program (PGP)**

The PGP comprises two degree programs that may be followed sequentially (A and B) or in the case of A be a final destination.

- A) Post graduate Degree of specialization (Master of Science; MSc thesis is mandatory)
- B) PhD Degree

The current MSc curriculum was established in 1995 and offers two departmental MSc degrees in “Geology and Geo-environment” and “Meteorology, Climatology, and Atmospheric Environment”. The former comprises six specific specializations, namely: “Tectonics and Stratigraphy”, “Applied and Environmental Geology”, “Mineral Resources and Environment”, “Petrology and Geochemistry”, “Geophysics”, and “Geography and Environment”. In addition, there is a joint/interdepartmental MSc program established in 2007 entitled “Ecological Water Quality and Management at a River Basin Level”. All postgraduate degrees are driven by research and industrial practice.

The number of publications in high-impact international journals and attendance at international conferences attests to the high level of dedication and achievement of the academic staff and graduate students and it is commensurate with the available funding level (see section C). The MSc degree offers very good employment opportunities covering most of the needs of the Hellenic public and private sectors at present, which in many cases does not need the sophistication of the PhD degree. The PhD degree is usually required for preparation for supervisory industrial, academic or research positions. The success of both programs is evidenced by their effective continuation for several years and the continuing interest of students. The EEC sees that the current MSc program is heavily course-oriented, which when accompanied with the research required, explains the current long time before graduation (average ~3 years).

**Recommendation 10:** A thorough review and evaluation of the current PGP course content is needed to achieve more effective course delivery, increase the level in relation to the UGC and further improve the intra-sectional co-operation.

**Recommendation 11:** To maintain the high-level research in the MSc program within the specified two-year time frame, the Department must consider: (i) reduction of the number of

courses required via the formal process, or (ii) reform elective course content to closely match the research component of the individual theses.

**Recommendation 12:** Give more emphasis on applied aspects, new technologies and further collaboration with industry. For example, introduction to business and law framework as related to the profession, and more guest lectures and short courses from industry, State and international experts accompanied by complete project assignments. This will increase employment opportunities for graduates.

**Recommendation 13:** Additional instrumentation, equipment maintenance, software programs and technical staff are needed for training and laboratory exercises and fieldwork.

## **B. Teaching**

### **APPROACH**

The overarching principle of the teaching philosophy of the Department is to provide sufficient basic and specific knowledge in Geosciences through core and elective courses as well as applied projects towards undergraduate and graduate (MSc and PhD) degrees.

- *Teaching methods used, course updates, student participation, grades, and average duration for the undergraduate degree*

Teaching methods employ the traditional classroom lectures based on white board and projection facilities. The content of the courses has been updated in several stages according to the perceptions of the faculty. Faculty members of the Department of Geology have published their own textbooks, used textbooks from other Greek Universities, or translated popular modern textbooks in several core areas. Most course lectures, notes, homework assignments and solutions are made available through the web resources and multimedia (about 80% of the courses). The combination of these methods reflects the high quality and teaching expertise of the academic staff. The current overall work load does not always allow the faculty to be readily available for the students. The average duration to complete the undergraduate degree is 6.53 years (academic years 2005-2011).

- *Teaching staff/student ratio, interactions of faculty and students, and faculty teaching hours per week*

The ratio of the overall teaching staff to the number of undergraduate students (4 years of study) is  $46/752 = 1/16.3$ . Taking into account the total number of registered undergraduate students, the overall faculty to undergraduate student ratio is  $46/1158 = 1/25.2$ . The minimum teaching load requirement for each faculty member is 6 h/week. This assignment seems to be appropriate taking into consideration the examination load of the instructors and the extensive time the instructors have to invest in teaching laboratory courses and fieldwork due to the lack of teaching fellowships for graduate students and limited technical staff.

- *Teacher/student collaboration*

The focus group meeting with the students demonstrated that there is a high level of collaboration between students, lab instructors, and academic staff.

- *Adequacy of means and infrastructure resources*

The Department of Geology is very well equipped. A number of facilities and research instruments are state-of-the-art. The classrooms within each Section are properly equipped and with significant efforts are kept in good condition. The teaching laboratories are kept in good shape through strong commitment and collaborative efforts. The Department has access to a well-maintained departmental and central university library, both with wireless internet available. However at the Department level, there is an urgent need for additional space (classrooms, labs, storage areas, and graduate student offices) and upgrades of existing classrooms.

- *Use of information technologies*

Computer equipment and internet resources are widely used (at least 80% of courses have electronic material on the web), including online bibliographic databases, electronic books and wireless internet access. Dedicated computational facilities with several personal computers are available to the students within the Department, although the student to computer ratio is too high. The EEC notes that the existing computers need upgrading and specialised commercial software.

- *Examination system and assessment of course work by the students*

Assessing the performance of students in each class is carried out through written final exams, and in certain courses the final grade is a combination of the final exam and laboratory test. Some faculty members use a student questionnaire for the assessment of the quality of their courses. The Quality Assurance Unit (MODIP) of the University administered the first electronic evaluation during the spring semester 2012.

**Recommendation 14:** Faculty should institute regular contact office hours.

**Recommendation 15:** The EEC highly recommends that the Department and University continue their efforts to administer a uniform and attractive system of course evaluation, with the goal of high student participation, for all courses. Students should be able to provide comments anonymously. The results of these questionnaires should be used by the Department to improve teaching effectiveness.

#### **IMPLEMENTATION**

- *Quality of teaching procedures*

The teaching methods are highly commended and this reflects the experience, flexibility and dedication of the teaching staff.

- *Quality and adequacy of teaching materials and resources.*

The EEC notes that in this rapidly evolving field of Earth Science the teaching material and instrumentation are appropriate and updated frequently.

- *Quality of course material. Is it brought up to date?*

The lecture material in the majority of courses is in electronic form, and reviewed and updated frequently.

- *Linking of research with teaching*

The Department has implemented a mandatory Diploma Thesis in the undergraduate curriculum and urges students to participate in the Technical/industrial training course with various enterprises. This provides the students with a first-hand research experience which may also link with industry. For those students who enter the MSc program, the link between experimental research and teaching is clearer, and as a result of this it provides a better opportunity for employment and professional career development.

- *Mobility of academic staff and students*

Within the SOCRATES/ERASMUS program, the Department collaborates with several other European Universities. This program has given a lot of students and faculty the opportunity to spend 1-2 academic semesters abroad. The Department also participates in several research collaborations with other Universities and Institutes. The Department has achieved a high number of bi-lateral agreements that amount 50% of those in the whole University. These efforts are impressive and should be maintained in the future.

- *Evaluation by the students of (a) the teaching and (b) the course content and study material/resources*

During the discussions with the students, the comments on the teaching and course content and study material/resources were positive. However, improvements are needed in the feedback provided by the students and should be made through unified questionnaires (see Recommendation 15).

**Recommendation 16:** It is suggested that the undergraduate and MSc students create awards for the best teachers annually, where the nomination, assessment and selection process is exclusively student-controlled.

## **RESULTS**

- *Efficacy of teaching*

The EEC feels that the only criterion available for evaluating the efficacy of teaching is the average grades at the undergraduate and graduate levels. An average grade of 6.53 at the undergraduate level (years 2005-2011) suggests that the efficacy of teaching is good to very good. At the graduate level, there is a tendency of uniformly high grades (9-10; excellent) for the MSc degree, and for higher objectivity in marking this must be avoided (see Recommendation 18).

- *Differences between students in (a) the time to graduation, and (b) final degree grades*

Most undergraduate students (73.1% of all students in the years 2005-2011) achieve a final degree grade of between 6.0 and 6.9. The average grade of the undergraduate degree was 6.53/10 for 2010-2011 and 6.59/10 for 2009-2010. Time to graduation averages 6.53 years (academic years 2005-2011) which is longer than the expected 4 years.

- *Whether the Department understands the reasons of such positive or negative results?*

The reason of the current length of graduation time is due to: (a) the indefinite number of final examinations allowed following failure in course(s); (b) the need of certain students to support their educational expenses by working; and (c) the lack of fellowships in support of education.

#### **IMPROVEMENT**

- *Does the Department propose methods and ways for improvement?*

The Department is poised to introduce modern methods and other ways of improving teaching, and has made numerous detailed suggestions for improvement in their Internal Evaluation Report (see pages 40-42, IER 2007-2008).

- *What initiatives does it take in this direction?*

The Department has made several important suggestions for improvement in their Internal Evaluation Report (see pages 40-42, IER 2007-2008), with which the EEC fully agrees.

**Recommendation 17:** The EEC strongly recommends that the Department make considerable effort to find effective ways of increasing classroom attendance at the undergraduate level. For example, classroom assignments could only be handed to those attending and should be completed before a student is allowed to conduct the experimental part of the course.

**Recommendation 18:** The EEC recommends that uniformly high grades for the MSc degree be avoided, and instead a more objective and wider grading scale range be used. In addition and in an effort to improve the quality and objectivity of the assessment, it is recommended that an external evaluator be introduced with an equal percentage of contribution towards the final grade for the MSc Thesis.

**Recommendation 19:** The number of undergraduate students admitted should be reduced significantly.

**Recommendation 20:** The EEC strongly recommends that all those who hold a Postgraduate degree in Meteorology-Climatology from the Department of Geology have the same professional rights in the Public Sector.

### **C. Research**

## APPROACH

- *What is the Department's policy and main objective in research?*

The Department's research activities revolve around the following fields: geological mapping, tectonics, mineral resources, geomorphology, paleontology, stratigraphy, geothermal energy, seismology and geophysics, hydrogeology, engineering geology, climatology and meteorology, environment and related fields. Special emphasis is given to the applied sectors in order to manage natural resources in sustainable ways, and contribute to the improvement of the environment, social cohesion, economic activity and growth.

- *Has the Department set internal standards for assessing research?*

The Department has set internal evaluation procedures (see Internal Evaluation Reports for the periods 2007-2008, 2009-2010, and 2010-2011) for assessing all aspects of research activity. An internal committee (OMEA) was established for the evaluation of the scientific work and the presentation of the most important results. This committee was very responsive to all EEC requests for additional information or arrangements. The internal evaluation process used common international standards for the assessment of the scientific work, such as the number of publications and citations, the impact factor of journals in which the results have been published, the h-index (based on ISI Web of Science), the number of invited talks at conferences, and the recognition of faculty members with domestic/national or international awards.

## IMPLEMENTATION

- *How does the Department promote and support research?*

The Department has initiated multiple actions to promote research: a) several research collaborations have been set up with Geoscience Departments abroad, many of them with distinguished researchers; b) faculty members participate in several national and international funding programs; c) several faculty members have initiated collaborations with industry; d) several faculty members arrange for graduate student exchanges; e) several national and international symposia have been organized by the Department at the University.

- *Quality and adequacy of research infrastructure and support*

The research infrastructure of the Department is rather adequate. In the most cases, this is a result of the initiatives of the faculty members, who have been able to acquire specialized equipment, mostly through competitive national funding sources. It is worth noting that the laboratory space is poor, and equipment maintenance and technical support is still a concern. Furthermore, the limited availability of State funds for fellowships for MSc and PhD students is noted. There may be a risk that this could jeopardise the good quality of research and contribute to brain drain from Greece in the near future. The Department has set up a prioritized equipment list to be purchased. The EEC members fully support this, and urge the State and/or the University to contribute towards this need.

**Recommendation 21:** The Department prepared the following equipment list which EEC

members support: (1) Shear Box (for rock discontinuity); (2) Schmidt Hammer; (3) Point Load Test; (4) Profilometer (JRC); (5) Upgrades of the seismic prospecting instrumentation (recording unit, geophones, cables, sources); (6) Alkali vapour magnetometers (two to function as gradiometer whenever needed); (7) Commercial software for student training (seismic reflection, geological mapping software, upgraded GIS); (8) Lightning Detection System; (9) Small Weather Radar-Doppler; and (10) 3D sonic anemometer. The above equipment should be purchased as funds become available.

- *Scientific publications*

Commensurate with the available funding level (highest in mid-1990s and mid-2000s, and currently experiencing a slight decline due to the financial situation), the Department has been very active in research as evidenced by: a) the number of publications in peer-reviewed journals, b) the number of contributions to books and participation in conferences, c) the invitation of faculty members to act as guest editors for special issues, and d) the number of patents. An increasing number of publications in journals with an impact factor 2.0-2.5 indicates the overall increasing quality of the scientific work carried out in certain fields and Sections within the Department. The national and international impact of the research results and achievements of faculty members are noteworthy as indicated by the following two measures: a) the annual average number of publications (international + domestic journals) per faculty member of the Department of Geology is 2.4 (years 2002-2012); b) the average h-index (quantitative and qualitative research output index, based on data provided by the Department) for the Department is 10.6; the EEC notes the high research productivity of the Section of Geophysics with average h-index of 15 (range 7-24).

According to the Internal Evaluation Report and additional material provided, during the period 2006-2011 the Academic Staff of the Department has published 412 papers in peer reviewed international academic journals and had almost 1,235 citations. In the period 2002-2012, the published papers in peer reviewed international journals are 695 and the citations 3,560. Moreover, during these years (2002-2012), the faculty members of the Department participated in 607 presentations at international scientific meetings.

- *Research projects*

The Department has been successfully involved in several competitive research projects and the funding for the period 2002-2012 amounts to approximately 9.4 MEuros (corrected for inflation amounts ~12.9 MEuros); of this 83% originates from domestic and 17% from international sources. The per capita allocation of research funds in the Department of Geology is among the highest within the University. This includes 343 research projects (years 2002-2012).

- *Research collaborations*

It is noteworthy that the Department has had and continues to have research collaborations with domestic and international academic and research institutions, as well as industrial partners and local authorities. The Internal Evaluation Reports provide a list of collaborating institutions.

## **RESULTS**



- *How successfully were the Department's research objectives implemented?*

The departmental objective in research is attained to a reasonable degree (see comments in the IMPLEMENTATION section above). The participation of faculty members in several national and international funding programs has attracted research funds in the form of contracts and competitive grants, which led to the current infrastructure. Faculty members of the Department have also initiated collaborations with industry that led to several patents.

- *Scientific publications*

See comments in the IMPLEMENTATION section above. The EEC considers several members of this group of researchers as national and international leaders in their respective fields of expertise and highly productive.

- *Research projects*

See comments in the IMPLEMENTATION section above. In the EEC's opinion the quality and the number of research projects (mainly national) is outstanding.

- *Research collaborations*

See comments in the IMPLEMENTATION section above. In the EEC's opinion the number of national and international collaborations is at a good level.

- *Efficacy of research work. Applied results and patents*

The efficacy and applied results of the Department research activities are evident by the productivity in publications dealing with applied issues, numerous invited presentations, and patents.

- *Is the Department's research acknowledged and visible outside the Department?  
Rewards and awards*

The international recognition and visibility of several faculty members are evident by the invitations to act as Guest Editors in peer-reviewed journals/books, journal reviewers, and keynote speakers. In addition, faculty members are members of national and international committees.

## **IMPROVEMENT**

- *Improvements in research proposed by the Department, if necessary.*

The Department is commended for its good level in research effort in spite of the limited resources available within the Hellenic Republic. The Department has made specific suggestions in their Internal Evaluation Report (see pages 30-32, IER 2007-2008), with which the EEC fully agrees.

- *Initiatives in this direction undertaken by the Department*

The faculty have made significant efforts to maintain and improve their level of research productivity and impact. External factors, such as legal and financial hurdles, seem to be the

main limitation for the Department to reach its full potential.

**Recommendation 22:** The EEC recommends that the Department offer some graduate courses in English and encourage more students to submit the MSc Thesis and PhD Dissertation in English. The EEC anticipates that this will attract a higher calibre of students as well as students from other countries, and increase international research collaboration even further.

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**Recommendation 26:** The EEC suggests the faculty members be more active in seeking international funds to compensate the current decline in national funding.

## **D. All Other Services**

### **APPROACH**

- *How does the Department view the various services provided to the members of the academic community (teaching staff, students).*
- *Does the Department have a policy to simplify administrative procedures? Are most procedures processed electronically?*

The Department views the various kinds of administrative and technical services provided by the Department and the Aristotle University of Thessaloniki to the academic community as satisfactory to very satisfactory. When compared to other countries (panel member's impressions), the Department appears to have a larger proportion of happy staff members.

Student admissions, the recording of course grades, and all other administrative responsibilities are handled by the capable secretarial staff of the Department. The EEC believes that this office is understaffed. Several procedures are electronically processed but there is room for improvement in this area, supported by appropriate staff.

**Recommendation 27:** The EEC recommends the hiring of one additional secretarial staff member.

### **IMPLEMENTATION**

- *Organization and infrastructure of the Department's administration (e.g. secretariat of the Department).*

The Department of Geology is composed of five major sections on the basis of teaching and research responsibilities. The administrative staff is mainly encumbered with a large load of administrative duties imposed on the Department.

Technical support is needed by the University to address specific safety issues and improve safety in general and in particular in the laboratories of the Department of Geology and in the fieldwork.

- *Form and function of academic services and infrastructure for students (e.g. library, PCs and free internet access, student counseling, athletic- cultural activity etc.).*

The student secretariat is quite efficient. In addition to the central university library, the Department has its own library (called "Theophrastos") that is very well organized with a significant digital section, and completely adequate for the faculty staff and students. Good sport facilities are available within the university campus.

### **RESULTS**

- *Are administrative and other services adequate and functional?*

See comments above.

### **IMPROVEMENTS**

- *Initiatives undertaken by the Department to improve the services provided*

The Department has established a good practice to hold interviews with first-year admitted students in order to provide study counseling and support. In addition, faculty members are

heavily involved with the University Career Office that is responsible for technical/industrial training.

#### **Collaboration with social, cultural and commercial organizations**

Since its establishment the Department has developed substantial collaboration with local authorities, societies and organizations, and local and national commercial enterprises such as co-operatives, industrial and private sector companies (see extensive account on pages 33-34, IER 2007-2008). The majority of the members of the Department of Geology participated in a large number of joint projects which relate to the specific needs of such enterprises. In addition, members of the Department give various public lectures related to Earth Science issues and write articles in local and national newspapers and magazines on their research topics, which are of the interest to the public.

A number of faculty members actively participate in various Hellenic and international scientific union councils.

### ***E. Strategic Planning, Perspectives for Improvement and Dealing with Potential Inhibiting Factors***

- *Potential inhibiting factors at State, Institutional and Departmental level, and proposals on ways to overcome them*

Inhibiting factors noted by the EEC are:

(a) the lack of adequate research funding opportunities and negligible support from the Ministry of Education and the General Secretariat of Research and Technology of the Hellenic Republic. The lack of fellowships and teaching assistantships for the MSc and PhD programs is of particular concern and duly noted;

(b) the small number to near absence of technical staff;

(c) the long delays in the approval and hiring process for new faculty;

(d) the lack of a startup grant system for new faculty members, and bare minimum state funding to cover absolutely basic necessities for research consumables and equipment;

(e) the lack of well-defined criteria for the promotion of faculty members;

(f) the non-introduction of transparent metrics for the distribution of funds from the senate of the University; distribution of funds needs to reflect (i) the high quality of research and teaching programs, (ii) the documented excellence and recognition of research, and (iii) the continuation and enhancement of fine examples of excellent work which keep Departmental staff competitive with their peers at the international level;

(g) the apparent disincentive for change attributed to inertia in Hellenic Universities; and

(h) the current high attrition rates (approximately 30%) in the student population

**Recommendation 28:** It will be necessary to replace all soon to become vacant academic positions in the same or emerging areas.

**Recommendation 29:** The Department should formulate internal transparent and measurable guidelines for the timely promotion and tenure of staff, based on excellence in both research and teaching.

**Recommendation 30:** Criteria based on excellence should be introduced at the University- and Departmental-level for the distribution of funds for educational and research needs.

**Recommendation 31:** The Department should carefully analyze the reasons for the current student high attrition rate and take measures to remedy the problem.

**Recommendation 32:** The Department should re-think the structure, scope, and membership of the various departmental committees to make them more effective, efficient, and reserve time for other activities for the faculty.

**Recommendation 33:** The Department should introduce a lab and fieldwork Safety Protocol according to EU standards.

- *Short-, medium and long-terms goals/plan and actions for improvement by the Department/long-term actions proposed by the Department*

Although there is neither a specific strategic plan nor clearly defined objectives for achieving excellence, several ideas for short-, medium- and long-terms goals for improvements are outlined by the Department in the Internal Evaluation Report (IER 2007-2008). Some of these items were discussed briefly during the site visit. Given the low employment needs and continuing economic crisis, the EEC is of the strong opinion that the number of incoming students must decrease to about 70 per year at the undergraduate level.

**Recommendation 34:** The State and the University should agree to reduce the number of incoming students to about 70 per year at the undergraduate level.

- *Long-term actions proposed by the Department*

The recently enacted law by the Hellenic Republic for higher education, long-term strategic plans will have to be reconsidered within the new Academic Unit (School).

## F. Final Conclusions and Recommendations of the EEC

### **Conclusions:**

The Department of Geology of the Aristotle University of Thessaloniki has established a good quality research and teaching program and certain areas/fields are commensurate with international standards. The faculty, although well-grounded in the realities of Hellenic Universities, has identified the need for improvements. The Department is well-equipped to implement changes and is encouraged by the EEC to do so.

- The majority of faculty members have active and successful research programs.
- Most faculty members pursue modern teaching initiatives.
- To conduct good research and teaching, State/University funding is absolutely necessary for personnel, instrumentation and technical infrastructure.

In summary, the strengths of the Department are the broad areas of teaching and research covered and the presence of active and devoted faculty members. The main weaknesses are the lack of fellowships for students at the MSc and PhD programs, the limited number to almost non-existent of technical staff, the very limited financial support provided by the State/University and the poor student attendance particularly in the undergraduate courses.

### **Recommendations:**

The EEC members make the following recommendations to enhance the future development of the Department. Some of these recommendations are intended for the Department, while others are directed at the University and State authorities:

#### Education:

**Recommendation 1:** The Department needs to formulate a specific 5-year Departmental Strategic Plan with clearly defined goals, objectives, milestones and deliverables including measures of success for achieving excellence.

**Recommendation 2:** The weekly load of courses, laboratories and fieldwork is heavy. A thorough review and evaluation of the current UGC course content is needed to reduce unnecessary overlap. The EEC believes that this will contribute to more effective course delivery and will improve further the intra-sectional co-operation.

**Recommendation 3:** Introduce a distinct “Sedimentary Geology” course (to clearly distinguish it from the current one that deals with Holocene Sedimentology) that comprises sedimentary processes, depositional facies, sequence stratigraphy, and basin analysis elements.

**Recommendation 4:** Consolidate the existing streams within the Department by converting certain elective courses to mandatory (e.g., GGP432E Seismic reflection/refraction methods, GMC431E General Climatology).

**Recommendation 5:** Re-enforce mathematics, probability and statistics in UGC to meet the growing needs for data analysis and interpretation as well as early introduction to appropriate commercial software (e.g., digital geological mapping).

**Recommendation 6:** Currently, there exists a lack of fellowships for teaching assistants (graduate students), who can support the instructional work of the professors during their laboratory courses and fieldwork. Funding and provision of these teaching fellowships by the State and/or the University is necessary and urgent, on a priority basis.

**Recommendation 7:** Currently, there exists a lack of technical staff to maintain and run the instrumentation of the Department that is a basic requirement of the curriculum. The EEC recommends the employment of specialised technical staff.

**Recommendation 8:** Implement homework assignments, group projects, and mid-term examinations. In addition to the final exams, these items should contribute to the final grade. This will largely improve the quality of the educational experience.

**Recommendation 9:** Further implementation of required prerequisite courses (“chain system” of instruction) is essential for a more effective development of the curriculum and quality of the educational experience.

**Recommendation 10:** A thorough review and evaluation of the current PGP course content is needed to achieve more effective course delivery, increase the level in relation to the UGC and further improve the intra-sectional co-operation.

**Recommendation 11:** To maintain the high-level research in the MSc program within the specified two-year time frame, the Department must consider: (i) reduction of the number of courses required via the formal process, or (ii) reform elective course content to closely match the research component of the individual theses.

**Recommendation 12:** Give more emphasis on applied aspects, new technologies and further collaboration with industry. For example, introduction to business and law framework as related to the profession, and more guest lectures and short courses from industry, State and international experts accompanied by complete project assignments. This will increase employment opportunities for graduates.

**Recommendation 13:** Additional instrumentation, equipment maintenance, software programs and technical staff are needed for training and laboratory exercises and fieldwork.

**Recommendation 14:** Faculty should institute regular contact office hours.

**Recommendation 15:** The EEC highly recommends that the Department and University continue their efforts to administer a uniform and attractive system of course evaluation, with the goal of high student participation, for all courses. Students should be able to provide comments anonymously. The results of these questionnaires should be used by the Department to improve teaching effectiveness.

**Recommendation 16:** It is suggested that the undergraduate and MSc students create awards for the best teachers annually, where the nomination, assessment and selection process is exclusively student-controlled.

**Recommendation 17:** The EEC strongly recommends that the Department make considerable effort to find effective ways of increasing classroom attendance at the undergraduate level. For example, classroom assignments could only be handed to those attending and should be completed before a student is allowed to conduct the experimental part of the course.

**Recommendation 18:** The EEC recommends that uniformly high grades for the MSc degree be avoided, and instead a more objective and wider grading scale range be used. In addition and in an effort to improve the quality and objectivity of the assessment, it is recommended that an external evaluator be introduced with an equal percentage of contribution towards the final grade for the MSc Thesis.

**Recommendation 19:** The number of undergraduate students admitted should be reduced significantly.

**Recommendation 20:** The EEC strongly recommends that all those who hold a Postgraduate degree in Meteorology-Climatology from the Department of Geology have the same professional rights in the Public Sector.



Research:

**Recommendation 21:** The Department prepared the following equipment list which EEC members support: (1) Shear Box (for rock discontinuity); (2) Schmidt Hammer; (3) Point Load Test; (4) Profilometer (JRC); (5) Upgrades of the seismic prospecting instrumentation (recording unit, geophones, cables, sources); (6) Alkali vapour magnetometers (two to function as gradiometer whenever needed); (7) Commercial software for student training (seismic reflection, geological mapping software, upgraded GIS); (8) Lightning Detection System; (9) Small Weather Radar-Doppler; and (10) 3D sonic anemometer. The above equipment should be purchased as funds become available.

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## The Members of the Committee

Name and Surname	Signature
1. Professor Georgia Pe-Piper, Coordinator Saint Mary's University (Canada)	
2. Dr Spyridon Bellas Expert of Greek State (Greece)	
3. Professor Filippos Tsikalas Eni E&P (Italy) & University of Oslo (Norway)	
4. Professor Spiros Pagiatakis York University (Canada)	