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HELLENIC REPUBLIC

**H.Q.A.**

HELLENIC QUALITY ASSURANCE AND  
ACCREDITATION AGENCY

## EXTERNAL EVALUATION REPORT

DEPARTMENT OF MARINE SCIENCES  
UNIVERSITY OF THE AEGEAN



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### **External Evaluation Committee**

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

1. Professor George Arhonditsis (Coordinator)  
University of Toronto, Canada
  
2. Dr Ioanna Bouloubassi, Chargée des recherches 1<sup>st</sup> classe CNRS,  
LOCEAN, CNRS/Université Pierre et Marie Curie, France
  
3. Professor Urania Christaki  
Universite Du Littoral Cote D'Opale-ULCO France
  
4. Research Associate Professor Villy Kourafalou  
University of Miami, USA

**N.B.** The structure of the “Template” proposed for the External Evaluation Report mirrors the requirements of Law 3374/2005 and corresponds overall to the structure of the Internal Evaluation Report submitted by the Department.

The length of text in each box is free. Questions included in each box are not exclusive nor should they always be answered separately; they are meant to provide a general outline of matters that should be addressed by the Committee when formulating its comments.

## **Introduction**

### I. The External Evaluation Procedure

The visit of the Department of Marine Sciences (DMS) was carried out from 5 pm on 09/12/2013 until 8 pm on 11/12/2012.

#### Day 1 - Monday December 9, 2013:

In the morning, the External Evaluation Committee (EEC) members were briefed in the HQAA offices in Athens. In the early afternoon, the EEC members flew to Mytilene. At the beginning of the evaluation process, the EEC members met at the Department premises with the Vice Rector of Academic Affairs and Student Welfare of the University of the Aegean, the Chair of the Department, and all the faculty members. An introduction was held on the history and structure of the University of the Aegean (UA). The discussion also revolved around the performance of UA along with various statistics that offered insights into the development of the Institution over the past 2-3 decades. Following this meeting, the EEC attended a series of presentations regarding the history of the department, its evolution, the goals, structure and objectives, and current teaching and research activities:

(i) the overview of the educational and research activities by the Chair of the department (Assoc. Prof. D. Koutsoumbas)

(ii) the history of the department (Prof. M. Karydis)

(iii) the general research achievements of the department, such as publications, citations, h-index, and research grants (Assoc. Prof. V. Zervakis)

(iv) the curriculum of the undergraduate program as well as all educational activities (courses, undergraduate thesis) by Prof. A. Velegrakis

During and after the talks, there was an extended time to discuss and comment on the presentations.

#### Day 2- Tuesday December 10, 2013

On the second day, the EEC met with the junior academic staff members of the Department in groups based on their academic rank (Assist. Prof. and Lecturers), all the administrative staff and technicians, and with samples of the undergraduate students (~50), postgraduate students, PhD candidates, postdoctoral research associates, and alumni. The schedule was kept flexible to address a broad range of issues and provide relevant input to the EEC. There was also one presentation about the curriculum of the two graduate programs (Coastal Management, Biodiversity Conservation) by the Assoc. Prof. G. Tsirtsis, followed by two presentations of the research achievements of the sectors "Marine Environmental Quality", "Ecosystem Management and Sustainable Fisheries", and "Oceanography and Coastal Applications" (Assist. Prof. M. Kostopoulou-Karadanelli and Assoc. Prof. E. Georgakarakos).

#### Day 3- Wednesday December 11, 2013

On the third day, the EEC met with the group of Assoc. Prof & Full Professors, visited all teaching and research laboratories/facilities of the department, library, and the administrative services of the department. The EEC also received additional documents regarding the research highlights of the faculty members, training opportunities of the graduate students, and the performance of the department relative to the rest units of the University of the Aegean. The EEC also had the opportunity to interview representatives of collaborative social, cultural, production organizations.

#### Day 4 - Thursday December 12, 2013

The EEC members worked on the draft of the EER at the hotel facilities arranged by the HQAA (Hotel Iliotropion).

Day 5 - Friday December 13, 2013

The EEC members continued working on the draft and then departed from Mytilene.

Day 6 – Saturday Decemebr 14, 2013-12-14

The EEC members continued working on the draft at the Divani Palace Hotel, Athens

*Summary:* The Department of Marine Sciences prepared a program that allowed meetings, discussions and visits of the entire Department. In these meetings, all members of the academic staff were present. Furthermore, the EEC had the opportunity to speak to the laboratory instructors, visit all teaching and research laboratories, computing facilities, and the core teaching and research instrumentation used. The EEC also met and had discussions with a number of students (undergraduate, MS), PhD candidates, postdoctoral research associates, alumni and representatives of collaborative social, cultural, production organizations. Our stay in Mytilene was very well organised thanks to the warm hospitality of all the faculty members and the administration of UA. They were extremely accommodating to all of our requests.

## II. The Internal Evaluation Procedure

The EEC members had at their disposal during the evaluation process the reports of teaching and research activities of the Department in the period 2011-2013, Internal Evaluation Report for the period 2010-2011, and a wide range of documents related to the teaching and research enterprise of DMS. These documents included detailed information on the organizational structure of the Department, the facilities, research aspects (e.g., papers, citations, h-index), and educational material (textbooks, theses, brochures for outreach activities). The documentation supplied accurately depicted the current status of the Department up to 2013, pedagogy, goals, structure, organisation, teaching and research philosophy, instructional facilities and research laboratories. The EEC was originally dissatisfied by the somewhat belated availability of the majority of the material (three days prior to our visit) and also by significant gaps in the Internal Evaluation Report. However, additional documents and information were made promptly available upon request of the EEC members, and this accommodated all of our needs and tremendously facilitated our work.

## ***A1. Curriculum (Undergraduate)***

*To be filled separately for each undergraduate, graduate and doctoral programme.*

### APPROACH

*What are the goals and objectives of the Curriculum? What is the plan for achieving them?*

The Department of Marine Sciences (DMS) is a relatively new department, founded in 1997, as part of the School of Environment in the University of Aegean. The first Bachelor degrees were delivered in 2003. DMS is the nation's only academic institution that offers Bachelor, Master and Ph.D. degrees in Marine Sciences. The aim of the study program offered by the DMS is to provide the graduate students with a comprehensive and multidisciplinary knowledge on marine sciences (e.g., physical, chemical, biological, geological processes, protection and management of marine natural resources, interactions between human activities and the marine environment, oceans and global climate change). The study program also aims to nurture strong theoretical and applied skills, allowing students to handle topics on marine environmental issues and natural resources management. The Hellenic Republic recognizes the professional rights stemming from the curriculum, as the final degree is an accredited diploma, Marine Environmental scientist (IIE), and Ichthyologist (IIE). This significantly improves the marketability of the alumni for positions in the industry, consulting firms, and the government. To achieve these objectives, the DMS offers an impressive range of courses that provide a strong foundation in Biology, Physics, Chemistry, Mathematics, and Computer sciences as well as a broad range of multidisciplinary subjects in the field of marine sciences.

*How were the objectives decided? Which factors were taken into account? Were they set*

*against appropriate standards? Did the unit consult other stakeholders?*

The driving force for the establishment and evolution of the curriculum was to fill a major gap in post-secondary education in marine sciences, to achieve accreditation of its diploma, and to meet market/societal needs for highly qualified personnel. During the curriculum development, DMS members have consulted with national and international universities and research institutions. The study program is absolutely comparable to the high international standards, and, in fact, there are instances in which the EEC noted the inclusion of advanced courses (such as Wavelet/Fourier analysis) that are typically found in graduate programs. Capitalizing on the rigour of the program and the expertise of academic and technical staff, students can effectively meet the needs of academia, industry and the public sector.

*Has the unit set a procedure for the revision of the curriculum?*

The curriculum is subjected to minor revisions/updating every year, to adapt with scientific progress, international policy developments, job market, societal needs. It has been subjected to two major revisions since the DMS foundation. We also wish to highlight the open rapport between students and faculty members during this evaluation/revision process.

#### IMPLEMENTATION

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

The curriculum, oriented towards a high-level education in marine sciences, successfully implements the DMS' goals, and cultivates a unique set of skills. It is directly comparable to the curricula of internationally recognised universities in Europe (European Credit Transfer System, ECTS) and North America. It involves a first cycle – 2 semesters- with 12 background compulsory courses (including 3 courses related to the marine realm), and a second cycle -6 semesters- with 22 compulsory and 21 electives in specific topics of marine sciences. A diploma thesis is mandatory (see also B section). A 2-3 month internship is currently treated as an elective course, and involves a final essay and oral presentation. There is large participation (>50%) of students in the internship and positive evaluation by the trainees. Besides lectures, virtually all courses include a major portion of practicals, lab exercises, and field trips; the latter ones also involve courses on board with the DMS' Research Vessel ("R/V Amfitriti"). The EEC enthusiastically agrees with the recent implementation of pre-requisites (12 courses) for attending the 5<sup>th</sup> semester, which evidently has improved the graduation rates and the overall learning process. However, some flexibility in this system could be considered.

*Is the structure of the curriculum rational and clearly articulated? Is the curriculum coherent and functional?*

The curriculum is rational and clearly articulated with coherence and functionality. Its content and structure is described in detail in the DMS website (and in the material distributed during our visit). The academic staff is strongly committed to the continuing improvement and effective implementation of the curriculum, taking into account the students' evaluations, the scientific progress in the field of marine sciences, and the ever-growing societal needs and environmental policy. The interviews with the academic staff and the students offered overwhelming evidence on the willingness of the DMS community to maintain a high-level, multidisciplinary curriculum.

*Is the material for each course appropriate and the time offered sufficient? Does the Department have the necessary resources and appropriately qualified and trained staff to implement the curriculum?*

The content of the curriculum is more than adequate and is further solidified by the strong expertise and the overall high qualifications of the DMS academic staff. A recent departure of the faculty member responsible for socioeconomic studies is recognized as an issue and the interruption of the related courses is hopefully temporary. The DMS facilities provide high quality classrooms with access to computer-based presentations, and satisfactory laboratories thanks to the continuous efforts of the academic and hard working technical staff. A pair of qualified and motivated instructors supervises the Biology and Chemistry labs. The impressive efforts to ensure good working practices in the department are commendable, despite the very limited personnel (2 ETEII) and the excessively high teaching load.

#### RESULTS

*How well is the implementation achieving the Department's predefined goals and*

*objectives?*

The curriculum includes high quality core and specialised courses that meet the Department's predefined objectives to offer comprehensive knowledge on Marine Sciences. The EEC highlights the fact that a number of specialised (and possibly challenging) courses (such as advanced GIS, multivariate statistics, wavelet analysis) are part of the undergraduate curriculum, providing highly coveted skills and increasing the students' competitiveness to graduate programs and job applications. The high level and skills of the graduates is evidenced by the performance of a number of students in post-graduate studies and their capacity to establish professional careers, as witnessed during the interviews of the EEC with the Alumni Association.

A major difficulty is the high number of admitted students despite the fact that the DMS has repeatedly requested from the authorities to keep the number commensurate to its carrying capacity and the absolute need for laboratory courses in order to achieve the goals and objectives (requested number =50 students per year, but about double this number is consistently assigned by the State). In addition, a negative consequence of this practice is the fact that the quality of incoming students is not guaranteed in terms of their background in natural and technological sciences (in secondary school) and thus their capacity to successfully undertake the wide range of undergraduate course offerings. The DMS academic staff aims at maintaining the high quality of the curriculum. The EEC noticed that the same views are shared by both graduate and post-graduate students. It was truly inspiring to experience the passionate advocacy of the high number of lab practicals and advanced courses by the entire DMS community. The apparent mismatch of the relatively low-quality incoming students and high quality curriculum likely results in the excessively long (7.5 years) graduation time in the department. The DMS is already considering innovative teaching methods that could revolutionize its outlook, such as on-line learning and courses taught in English open to qualified international students, especially from developing countries.

**IMPROVEMENT**

***Recommendation 1:*** The DMS academic staff should continue evaluating and regularly updating the curriculum, considering the scientific progress in marine sciences, trends in the job market, critical issues of societal concern (e.g., climate impacts/adaptation, delineation of marine protected areas, coastal management; see also section C). The DMS should embrace the practice of offering international courses/workshops (delivered in English), which will undoubtedly improve its visibility and international stature. Recent legislative reforms permit the Greek academic institutions to offer this kind of courses.

***Recommendation 2:*** The EEC supports the DMS' efforts to fill the recent gap in its undergraduate offerings, regarding the courses on economics and law of the marine coastal environment.

***Recommendation 3:*** The EEC supports the DMS' repeated and urgent requests to the appropriate authorities concerning the reduction of the number of incoming students, the adaptation of their background to natural or technological sciences, and the increase of technical support of its teaching programs. The EEC finds that the responsibility for addressing these issues from now on lies outside the Department.

**A2. Postgraduate Curriculum**

*To be filled separately for each undergraduate, graduate and doctoral programme.*

**APPROACH-IMPLEMENTATION-RESULTS**

The Postgraduate Curriculum consists of two directions that offer the opportunity for graduate students to select their specialization field: (i) Post graduate Diploma of specialization (Master of Science; M.Sc. thesis is mandatory); and (ii) Ph.D. diploma.

The Post graduate Program leading to M.Sc. offers two self-contained curricula: Biodiversity Conservation and Coastal Management. The M.Sc. on Biodiversity Conservation is a joint Program of the University of the Aegean (School of the Environment), and the University Montpellier 2. Upon successful completion, the M.Sc. Diploma is awarded by both collaborating French and Greek academic units. The overarching goal of this program



revolves around the training of highly qualified personnel that specializes on issues related to the biodiversity in the Mediterranean region. In 2012, BIODIV was awarded by the Ministry for Academic and Research Excellence, and also got the MOY designation (Mediterranean Office for Youth) for the period 2011-2014. The M.Sc. on Coastal Zone Management (established in 2002) is run in collaboration with the Hellenic Centre for Marine Research, and the Departments of Environmental Sciences and Geography at the University of the Aegean. This program offers specialization on issues related to the development of integrated coastal management strategies, including planning, design, legislation, environmental quality assessment and management plan implementation. The curricula of the two programs are consistent with their objectives and were decided after extensive consultation with all the collaborating parties involved. The curriculum is coherent, functional and certainly in parity with universally accepted standards for the specific areas of study. The graduate program in Coastal Zone Management appears to be both academically appealing and reasonably successful, and its sustainability and viability depends on continued success in attracting students. The EEC was delighted to witness the high level of satisfaction of the students interviewed. On the contrary, the Biodiversity Conservation program demonstrates a small participation of Greek students and a distinctly decreasing trend in the number of student applications. The lack of external funding, the linguistic barriers, and the rigour of the courses (i.e., many students appear to struggle completing the coursework) were pinpointed as the most important factors that appear to undermine its viability.

The PhD degree is awarded to candidates with proven ability to carry out independent research through the submission of a thesis demonstrating the successful original study of a scientific problem. The EEC congratulated the DMS' faculty for actively encouraging students (even at the undergraduate level) to be co-authors in peer reviewed international journals and to present findings at national and international conferences. This reflects good mentoring and fair-minded acknowledgment of the student work. Several of the students receive financial support through competitive external scholarships or research grants that were obtained from their supervisors. The Department has the necessary instrumentation to support projects in very diverse areas of research. However, there are no specialised technicians designated to run the maintenance of all the infrastructure of the teaching and research laboratories of the department. This can potentially be a significant impediment of the uninterrupted progress of the research projects and the capacity of the PhD students to complete their dissertation in a timely manner.

#### IMPROVEMENTS

Recommendation 4: The EEC supports the proposal of the department to move the Biodiversity Conservation program into an inter-university Anglophone MSc degree. In doing so, not only the odds for achieving financial sustainability (greater pool of applicants) will increase, but also the visibility of the department at an international level will improve. EEC also supports the efforts of the DMS to maintain and further develop the CMZ MSc degree.

Recommendation 5: The EEC recommends the establishment of a mechanism to obtain financial support for the postgraduate students (PhD level) through merit-based fellowships. Such support could come from the return to the Department of part of the overhead earned by the department's academic staff through competitive research or industrial grants. In addition, external grant requests (as in national and international proposals) should explicitly contain salary to support PhD candidates (see also section C).

## **B. Teaching**

### APPROACH:

*Does the Department have a defined pedagogic policy with regard to teaching approach and methodology?*

The DMS has a clear pedagogic policy through the strategic decision to provide quality education of internationally high standards. The overall undergraduate and graduate

program aims to provide to the students all the necessary knowledge needed for their future professional plans whether they will chose to orient towards policy and management of the marine resources or a researcher's career through a PhD.

#### *Teaching methods used*

The teaching approaches used in the department are modern and up to date. Generally, teaching is based on a series of lectures supported by practical and/or laboratory exercises. The focal principle of the teaching philosophy of the department is to provide a multi- and interdisciplinary training in physical, chemical, biological, and geological processes in the marine environment. Teaching methods employ both the traditional classroom lectures based on white board and modern projection facilities. The DMS is also equipped with personal computers for the courses, where the students need to practice with specific software (in particular for GIS and data analysis). It is important to mention that special effort is made to carry on with the necessary funds to keep up-to-date with the new versions of the software (GIS in particular). The content of courses is updated once a year with the consensus of the faculty members. Translated popular modern textbooks in several core areas are handed out to the students. Lecture notes, powerpoint presentations, homework assignments and solutions are made available in hard copies or through the use of Web resources of the DMS. The combination of these methods reflects the high quality of teaching delivery and expertise of the course instructors.

#### *Teaching staff/student ratio*

The enrolled students in the DMS are 721, however, because of the overall context of the Greek educational system, only about 500 can be considered as "active". The presence of "inactive" students is a generalised phenomenon in Greek universities and does not necessarily reflect a pathogenic symptom of the department. The ratio of the "active" undergraduate students (4 years of study) to the teaching staff is 30.6 (=521/17). This ratio can be considered as high- to very high - relative to the international standards of about 20. The load of the academic staff is even higher, if one considers the examination load of the faculty members and the extensive time they and the lab instructors (only 3!) have to invest in teaching laboratory courses. Finally, the lack of teaching fellowships for postgraduate or doctoral students in the Greek educational system is regrettable.

#### *Teacher/student collaboration*

The interviews conducted with the students demonstrated that there is generally a good level of collaboration between students, lab instructors, and academic staff. However, this practice should become a policy for all faculty members.

#### *Adequacy of means and resources*

The building of the DMS provides an ideal working environment. It is modern, well designed and kept in very satisfactory condition. The DMS is very well equipped for teaching and as far as we could see from our visit, the facilities and research instruments for teaching are sufficient and in good condition. The teaching laboratories are well organized and meet safety international standards. Although, the technical staff (ETEII) is really deficient, their heroic devotion ensures high quality delivery of the laboratory courses.

#### *Use of information technologies*

The DMS has a very high speed internet system and designated computational facilities with personal computers available to the students within the DMS. However, upgrading of IT will be needed in the near future. This is acknowledged by the DMS and actions are already under way.

#### *Examination system*

The student assessment is based on written final exams. In certain classes/laboratories, the final grade is a combination of lab assignments, written reports and oral presentations.

### IMPLEMENTATION

#### *Quality of teaching procedures*

It is praiseworthy that all faculty members are regularly using student evaluation for the assessment of the quality of their courses. The teaching methods are appreciated and this reflects the competence and dedication of the teaching staff (faculty members and lab

instructors).

*Quality and adequacy of teaching materials and resources.*

The teaching material and resources are appropriate and updated frequently.

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

The lectures in all courses are reviewed and updated each year.

*Linking of research with teaching*

The integration of teaching with research is ensured through a mandatory "Diploma Thesis" implemented in the undergraduate level. The exact duration of this thesis is not clearly defined and can last from a semester to more than 1-1.5 years. The thesis is defended in front of the examination committee. The undergraduate students highly appreciate the implementation of the elective internship course. This internship course aims to familiarize the students with the professional work environment whether this internship is undertaken in a private company or in a public institution. The objective of the MSc diploma thesis is the specialization of the student relative to his/her future professional plans in order to provide a better opportunity for employment or continuation with a PhD thesis. The duration of the MSc thesis is not limited and although most of the students complete it within a year, in some cases, this thesis can go on for two or more years. It is, however, important to note that this is a generalized phenomenon in the Greek university system.

*Mobility of academic staff and students.*

The DMS has signed bilateral conventions for student placement with 38 Universities in 15 different countries. DMS is part of the Erasmus program (LLP ERASMUS and ERASMUS MUNDUS), through this program 31 students have been placed for their practical internship abroad during the 2007-2013 period. This represents the 16 % of the graduated students over this period, which is close to the recently set 'Bologna target' of 20%. The graduate students are financially supported through the research projects to participate in national and international conferences or short stays in research laboratories abroad, the last 5 years, more than 20 PhD students benefited from this mobility. The DMS is encouraged to maintain this activity and the same holds true about the mobility of the academic staff which is still not satisfactory.

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

The evaluation by the undergraduate and postgraduate students during the interviews was positive on both aspects. All faculty members are regularly using questionnaires to get feedback from the students.

## RESULTS

*Efficacy of teaching. Discrepancies in the success/failure percentage between courses and how they are justified.*

The ratio of the students who are present to the exams to the ones who passed them ranges from 25 to 75% (year 2012-13). This pattern stems from, according to the academic staff and the students themselves, the high level of studies in the DMS, the weaknesses of the secondary education, and the process of national entry exams for gaining admission in higher education (much higher – almost double – number of students admitted than the DMS request, resulting in a large number of low-level students who have a very hard time to catch up).

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

The length of the study for the undergraduate degree is long (~7.3 years). However, this is a generalised phenomenon in Greek universities, reflecting the weaknesses mentioned in the previous paragraph and is also due to the absence of any kind of financial support of the students from the Greek government which forces many of them to share their time between their studies and work.

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

An essential issue related to these difficulties is the discrepancy between the low entry level (around 9000 points for the last 5 years) and the high level of education provided in the

DMS. The EEC noted that there is also a small percentage of students at a satisfactory entry level (~15000 points). These particular students could have entered other competitive programs, but they elect to mark the DMS as their upper choice. This strongly indicates that there is a clear demand from students to study Marine Sciences. The State's policy to flood the DMS with low level students is an erroneous practice. The EEC was impressed that students greatly acknowledged that the high level of the study program should be cherished. In addition, students were overwhelmingly in favor of maintaining the independence of the DMS, as they could not find any other program in Greece that offers the courses and degrees they desire.

#### IMPROVEMENT

*Does the Department propose methods and ways for improvement? What initiatives does it take in this direction?*

The DMS has established since 2008 a prerequisite number of courses (12) before the students are given the option to access higher level courses. The first positive results are observed in 2013 with a ~20 % increase of the graduating students. An exemplary mindset that is nurtured by the department is the advice and support of younger students by PhDs and senior scientists. The existing Alumni Association is very active and plays a very positive role in consulting and offering orientation for younger students

Recommendation 7: Maintain and establish new tutorials to help first year students to fill their gaps in basic fields (mainly biology and mathematics) before they can access second year courses.

Recommendation 8: Maintain the high education level but try to better organise the time of the students in particular during the first 2 years (e.g., balance work load between first and second semester) and try to alleviate the laboratory practice load whenever this is possible. This will relieve both students and supporting academic and technical staff.

Recommendation 9: Define the number of months between the start and the end of the diploma thesis in both undergraduate and graduate diplomas.

Recommendation 10: Maintain and strengthen the links with the Alumni Association

Recommendation 11: Strengthen the mobility of students and academic staff through LLP ERASMUS and ERASMUS MUNDUS.

Recommendation 12: Currently, a lack of fellowships exists for non-permanent teaching assistants who can support the instruction work of the academic staff during their laboratory courses. Funding and provision of these teaching fellowships by the State and/or the University is necessary and urgently recommended, on a priority basis.

Recommendation 13: The EEC recommends the employment of new technical staff (e.g., technicians). Additional instrumentation is also needed for training and laboratory exercises.

## **C. Research**

*For each particular matter, please distinguish between under- and post-graduate level, if necessary.*

#### APPROACH

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

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

The Department of Marine Sciences (DMS) performs research in a wide range of subjects, contributing both to the needs of the State, governmental and private organizations and coastal communities, as well as international and national research projects. In specific research areas, the DMS exhibits national and/or international novelty and state-of-the art research. The main objectives are to: pursue excellence in research, under the guidance of the highly qualified and motivated faculty members; avoid geographical isolation and

establish a national presence in the Aegean and Eastern Mediterranean, in close collaboration with national and international partners; fulfill the needs of the island society and the remote Greek communities it serves. Three research tracts have been implemented and are well integrated with the curriculum: marine environmental quality; marine biological resources and ecosystem management; oceanography and coastal applications.

The research policy has been to promote a departmental environment that supports research activities for all members, encouraging the involvement of both undergraduate and graduate students and maintaining a fair sharing of resources. Interviews with students at all levels reflected the positive results of this policy, allowing them hands on experience on research associated with computer analyses, lab and field work. Research partnerships with Universities and both private and governmental institutes and entities have allowed students very valuable experience.

The EEC concluded that the DMS research activities have been in line with the overall strategy of the Univ. of Aegean, which was set from the beginning of its inception to be: interdisciplinary focus, high studies and research level, investment in information technology; support local community needs.

#### IMPLEMENTATION

*How does the Department promote and support research? Quality and adequacy of research infrastructure and support. Scientific publications. Research projects. Research collaborations.*

EEC members were informed that since its foundation in 1999, DMS has received ~2.500.000,00 € as State funds for the development of its infrastructure (mainly through the EPEAEK program), and has managed to attract an additional sum of about 6.400.000,00 € from research (amounting to €2.380.000,00 € from European research projects, 3.900.000,00 € from State-funded research and about 230.000,00 € from the private sector). As the DMS evolved, research funding was transformed from initially less than 10% of the overall budget to an average of more than 90% of the budget (since 2007). The EEC found that this has been an important change, especially given the new conditions and future outlook of substantial decreases in Greek government funding.

*Recommendation 14:* The DMS should continue seeking research funding from external (beyond state appropriation) sources, extending current efforts to remain highly competitive by pursuing cutting edge research.

The DMS has invested in infrastructure to support research and has succeeded in keeping up pace with the rapid increase in funded projects. However, the related personnel (ETEII) did not increase accordingly, despite the continuous department requests. It was noted that hiring of ad hoc technical personnel through research funds is challenging, both logistically (hard to enhance continuous funding, time consuming training needed) and legally (specially licensed personnel, contracts have constrains in health and other benefits, require additional tax payments as ΠΑ etc.). This problem has already stressed the existing ETEII personnel (who have the load to support research and teaching activities, e.g., lab and field work), the faculty (who have to fill in for the duties of missing technical personnel) and the students (who do not necessarily have the needed knowledge, posing security risks). Interviews with many people from all above categories and with the DMS leadership identified this problem as a fundamental one for the fulfillment of the rapidly expanding research activities, but also for maintaining the strong and specialized expertise of the DMS.

*Recommendation 15:* New ETEII positions are long overdue and are strongly justified, given the current status and projected increase in research activities. Taking into account the current challenges in Greek government hiring, the DMS should pursue other venues, such as the hiring and training of contract based qualified personnel, with a strategy to sustain them long term (as, for instance, support through complementary projects shared among many faculty members).

An important research asset is the Research Vessel (R/V) owned by the DMS (only University department in Greece that owns a R/V), used for both research and educational purposes. It is supported by permanent personnel (captain), who participates fully in these activities. The EEC agrees with the DMS' view that this is an important asset. The EEC also

received strong comments in support of the R/V from all faculty and students interviewed, although it is still not clear to the EEC if it is used in its full capacity. Another important asset is the High Frequency (HF) Radar installed on Limnos Island with research funds. In addition to scientific value (near surface currents provided in real time), it has national security value, as the only means of monitoring circulation around the Dardanelles Strait, covering international and Turkish waters. After the high cost of initial installation, this is an instrument of low cost maintenance, with excellent prospects to support the DMS strategy of cutting edge research.

A comprehensive list of research projects was provided, which showcased the impressive spectrum of collaborations on the national and international level. Examples of highlights:

- first organization globally to extend the use of High-Frequency coastal radars from simply monitoring coastal circulation to long term recording exchanges of adjacent seas through straits, aiming at climatological time-series;
- design and development of two state-of-the art surface drifters specially designed to a) monitor oil-spills, b) assess surface current data from HF radar systems;
- develop a globally novel method to measure the shear in the upper 2 m of the ocean;
- pioneer automatization of oil spill detection on radar satellite imagery;
- derive the first estimate of the magnitude of air–sea CO<sub>2</sub> exchange and of the potential role of the Aegean Sea in the transfer of atmospheric CO<sub>2</sub>.
- pioneer the development of methods to identify fish pathogens (probes that have found commercial application) and the production of novel vaccines for the prevention of fish diseases – plus urgently needed viral fish disease studies for Mediterranean fisheries;
- a long track activity regarding macrofaunal biodiversity patterns of the Hellenic Seas and at a Mediterranean scale, further engaged in the novel field of marine biodiversity and ecosystem function research, including surveying and new sampling techniques in support of management decisions and conservation planning at the Aegean and Mediterranean scale;
- a rapid, cost-effective method for the 3-dimensional mapping and visualization of marine caves, which can assist the sampling design of urgently needed ecological studies;
- marine microbiology developments, as the detection of environmental pathogenic yeasts;
- development of GIS tools for risk assessment, mapping and spatial planning of Mediterranean coastal areas based on EU Directives and national law, in support of coastal decision making oriented to the specific needs of coastal managers;
- development of state-of-the art numerical modelling tools for a variety of topics related to extreme events and climate change, such as: the response of beaches under sea level changes; rapid risk assessment of coastal erosion; hydrogeochemical modeling of rivers at reach scale, accounting for first flush events and the contraction and expansion of river bed;
- pioneer various techniques, as: hydroacoustic–computing processing techniques (toward custom high-tech products or services) and automated optical methods (for long-term, high frequency beach monitoring).

***Recommendation 16:*** The DMS should keep the high research standards, strengthening the coordination and collaboration among faculty members toward research sub-units that can leverage from shared resources. These units need to develop a strategy for team continuity, through well developed research targets that would strengthen existing “niches”, while in synergy with emerging priorities (such as oil and natural gas exploitation in the Eastern Mediterranean, adaptation of coastal communities to climate change, socioeconomic issues associated with transport of waters and materials in both marine and inland waters etc.).

***Recommendation 17:*** There is an urgent need to revisit the legislation and associated costs for recognizing patents in Greece. The DMS' researchers were pretty vocal about the challenges and enormous costs in their efforts to patent two state-of-the art surface drifters. The EEC echoes their disappointment and wholeheartedly endorses their plea for a major legislative reform and/or actions by the University system to support related procedures and costs.

***Recommendation 18:*** Start-up funding for the entry level new faculty members should be provided by the University soon after their appointment. This measure will largely enhance participation in competitive grants and excellence in research by young researchers.

**Recommendation 19:** The EEC strongly recommends that the University establishes explicit (written) internal rules that will help young researchers to quickly develop their own research. For example, besides start-up funding, another measure could be the allocation of funds from the overhead retained by the Research Committee of the University from competitive grants received by the research-oriented faculty members. Training in competitive grant writing and mentoring from senior faculty is another venue.

#### RESULTS

*How successfully were the Department's research objectives implemented? Scientific publications. Research projects. Research collaborations. Efficacy of research work. Applied results. Patents etc. Is the Department's research acknowledged and visible outside the Department? Rewards and awards.*

The EEC reviewed a variety of research results from projects mentioned above and was impressed by the quality of the research performed. The EEC found that the Department has become a focal point at national and international level in subjects like eutrophication indices, coastal morphodynamics, drifter design and hydroacoustics for fisheries (to name a few). There were strong indications of recognition of the unique expertise that DMS provides. Partnerships are actively sought with this particular department for collaborative research with national (e.g., Hellenic Center for Marine Research) and international partners. The DMS is recognized as a fundamental source for consultancies (such as service research to agencies), including at the international level (such as sharing island research focus with Caribbean countries).

The annual production of peer-reviewed department publications (journals and book chapters) shows a linear increase from 0 in 1999 to 23 publications in 2013. This number is based on Scopus, reflecting the lower limit of the published material. The number provided by the internal DMS review is 36 for 2013 (SCI journals only); however some may not carry the DMS affiliation. An increasing trend is also noted on the ratio of Scopus publications per faculty member and on the number of citations per year. Citations in 2013 exceeded 200 citations (and 1200 cumulatively), while the total citation sum of citations exceeds 5000.

The EEC recognizes that the publication attributes are closely linked to the department history (several years of administrative work to build the curriculum and facilities from scratch, delaying the development of research activities that can lead to publishable results). The EEC also noted the increasing trends in publications and citations, reaching between approximately 1 and 1.4 per faculty annually in this evaluation period. These numbers are very encouraging, but need to be stabilized and further strengthened, in parity with the substantial number of current research activities.

**Recommendation 20:** It is strongly suggested that the DMS faculty undertakes a concerted effort to substantially increase the number of publications at high quality journals, engaging students and post-graduate participants in the conducted research. This is an absolute need in order to ensure and strengthen the DMS' visibility on the international level. Tools to enhance motivation to publish and writing skills should be actively implemented, such as paper reading clubs on priority topics and writing seminars (both of which should also engage students); and higher emphasis for the publication record during departmental faculty evaluations (as for hiring and promotion).

#### **D. All Other Services**

**For each particular matter, please distinguish between under- and post-graduate level, if necessary.**

##### 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? Does the Department have a policy to increase student presence on Campus?*

Appropriate facilities exist to support the DMS educational and research needs. The DMS views the various administrative and technical services provided to the academic community

as very satisfactory, despite the small number of personnel and the high level of bureaucracy in the Greek University system. Our interviews confirmed that the support staff members are highly appreciated by the students and the faculty members. Student admissions and the recording of course grades for the undergraduate programs are electronically managed by a software program since 2011 but not yet for the graduate programs. Currently, Microsoft Office Excel is used for the administration of the grades of the graduate courses. By comparison, in many foreign universities these duties are handled by the central administration and software that offers the opportunity to derive useful summary statistics. The teaching evaluations are conducted in the classroom using hardcopies, although the Department has a platform to collect the students' input electronically. The former strategy is preferred because it is more effectively targeted towards students who regularly attend the lectures, thereby offering the opportunity to get more meaningful feedback. The EEC concurs with this practice. The facilities of the new building (cafeteria, library) along with the fairly demanding nature of the courses offered have ensured a remarkably high student presence on Campus (>70%). The administrative staff made suggestions for simplifying bureaucratic procedures, including their capacity to timely respond to student requests for confirmation letters or other technical issues related to the functioning of the computer labs. The administrative staff was not offered any vocational training/development nor did the DMS participate in any EU programs for advanced administration training. The EEC noted that highly qualified and deeply dedicated scientific/technical personnel oversee all lab and field activities. The EEC is concerned that the heavy work load of this scientific personnel does not allow them to advance their career through continuous training. The EEC recommends that the DMS considers offering training opportunities to its personnel, including scientific seminars and degree seeking opportunities, as appropriate.

#### IMPLEMENTATION/RESULTS

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

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

The administrative staff (4 members) supports the secretarial work and other needs of the undergraduate and graduate programs of the Department. Generally, despite the multiple commitments of the faculty members and the technical and administrative personnel, there exists a very positive, collaborative, "family-like" atmosphere that allows the (reasonable) accommodation of the student needs and the accomplishment of most day to-day tasks. The EEC found that there is no consistent policy (nor support services) for students with learning disabilities. Similarly, no counselling or other support services exist for students who have academic performance problems or face severe financial needs. The EEC strongly encourages the department to adopt a clear policy and exploit any available resources (or other creative ways) that could effectively accommodate the aforementioned student groups

#### IMPROVEMENTS

*Has the Department identified ways and methods to improve the services provided?*

*Initiatives undertaken in this direction.*

The DMS is severely understaffed in terms of the technical and administrative personnel. The EEC finds particularly troubling the fact that one single person is responsible for approximately 500 students (700 if we include the occasional requests from the inactive ones). There is only one technician responsible for the uninterrupted operation of the computer labs. If we also consider the lack of sufficient teaching personnel (only two instructors) for the delivery of all the undergraduate laboratory courses, it is becoming abundantly clear that the DMS will face serious challenges to further expand its graduate and undergraduate teaching enterprise. Recognizing the restrictions imposed by the prevailing economic conditions in Greece, the EEC advises the central governance of the University of the Aegean to consider accommodating the DMS' needs with respect to its technical and teaching needs. In parallel, the DMS should pursue other venues, such as the contractual hiring and training of highly qualified personnel.

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

Since 1999, when the first students were admitted, the DMS has developed very significant



collaboration with social, cultural and production organizations. Examples include the partnership with the National Marine Park of Zakynthos, the Hellenic Centre for Marine Research, and a number of consulting firms. The EEC was particularly impressed by the prospects of the former partnership in advancing the protection of marine protected areas and biodiversity conservation, and promoting fisheries management. Exemplary and particularly effective are also some activities of the DMS, which are associated with local government working groups. The Department has also been engaged in a number of outreach activities including visits of elementary schools, presentations, interviews and workshops for the societal benefits from the DMS' research and teaching enterprise. A number of faculty members actively participate in various Hellenic and international scientific union councils, and as expert evaluators of national and international scientific programs. The DMS, however, recognizes that more work needs to be done in this direction and its faculty members should be more actively involved in promoting its visibility at a national level and increasing the recruitment of higher calibre students. The EEC strongly encourages such initiatives.

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

*For each particular matter, please distinguish between under- and post-graduate level, if necessary.*

The main inhibitors negatively impacting the DMS at the State and Institutional level include the unprecedented economic crisis, limitations in cash flow (even for approved funds), the administrative fragmentation among 6 islands, lack of appropriately allocated personnel, number of incoming students greatly exceeding the department's request and the increasing bureaucracy. The last two factors have been increasingly important under the rapid departmental growth and greatly enhance the stressing of the limited personnel to critical levels. At the departmental level, inhibitors include the large percentage of unqualified incoming students, absence of clearly defined duration of undergraduate diploma thesis, overall long delays in graduation (resulting in a large number of inactive students), certain level of separation among the broad range of research projects (resulting in underused resources).

The DMS has excellent potential to overcome the above inhibitors. The EEC was impressed with the enthusiasm of the faculty, staff and students and their high motivation to actively work toward the success of the department. Interviews with a large number of representatives from all groups revealed a spirit of collaboration and documented personal sacrifices to ensure that the high standards set by the department are maintained and lead to successful outcomes. Another important positive aspect is the support of senior faculty toward junior faculty through mentoring, co-teaching and research collaboration.

The overarching goal of the DMS is to sustain the high level of education and research, improving on the quality of incoming students and adding value on their training, making them attractive for graduate and postgraduate studies and the job market.

The DMS recognizes that it is extremely important to attract undergraduate students with higher scores at entry level examinations. The EEC agrees with this assessment and urges the DMS to develop and implement specific plans to achieve this goal. Assets that should be publicized include the studies topic, the rigorous study program, the internship opportunities, cutting edge research and good employment prospects. Innovative teaching methods proposed by the DMS (such as courses and/or degrees that can attract high level international students, see section B) are on the right track.

***Recommendation 21:*** a dedicated, well-thought, coordinated and possibly accelerated outreach plan should be urgently put in place to showcase the DMS assets to the student body and the general public (especially parents and teachers).

Specific actions planned by the DMS to implement its research strategy include:

(a) the participation (and, when possible coordination) of large scale international projects

regarding issues that focus on cutting edge topics, such as:

- (i) the effects of climate change impacts on important economic activities and the society, in a European and global framework
- (ii) possible mitigation measures to ameliorate the impacts to coastal societies and ecosystems;
- (b) foster a strategic cooperation with large Research Centers (especially the Hellenic Center for Marine Research) and marine networks at European and national scale to obtain access to infrastructures and expertise;
- (c) further development of department's own capabilities to conduct independent research on issues where the DMS already leads on a national scale;
- (d) financial exploitation of specific research products.

**Recommendation 22:** The rapid departmental growth, which has been accompanied by successful educational and research outcomes, provides substantial opportunities that should be exploited to consolidate the DMS as a sustainable department that serves its original mission and emerging marine environmental challenges and related crucial socioeconomic needs.

The EEC remains optimistic about the DMS evolution, both due to the internal positive forces outlined above, but also (and very importantly) due to external factors that dictate a national need to monitor and predict changes in the national marine environment due to emerging exploitation, coastal risks due to increasing sea level and European directives.

## ***F. Final Conclusions and recommendations of the EEC***

*For each particular matter, please distinguish between under- and post-graduate level, if necessary.*

In little over a decade, the Department of Marine Sciences of the University of the Aegean has established a very respectable research and an outstanding teaching program that is commensurate with international standards. The success of the Department lies in its pioneering inception and inspired design, its dynamic and highly qualified faculty members, and the engaged and highly motivated student community. The overall assessment of the Committee is very positive. Despite all hindrances arising from the economical crisis, the development of the Department is impressive and the EEC is delighted to report a number of strong points identified during this comprehensive evaluation procedure:

- Highly qualified and very dedicated faculty members.
- Commendable aptitude of the faculty members to compete for external research grants.
- A record of teaching and research collaborations with a number of prestigious institutions worldwide.
- Outstanding support from the (limited) scientific and administrative staff.
- Very carefully designed undergraduate and graduate curriculum that offers a truly unique access to marine education. These high quality study programs consist of an unparalleled combination of classical oceanography courses with a wide variety of specialised modules, as well as field-trip opportunities and laboratory experience.
- A successful learning environment that is founded upon an open student-professor rapport. The EEC finds truly inspiring the nearly unanimous reluctance of the DMS community to embrace our recommendations to reduce the number of lab practicals or even to revisit some of the most advanced (and highly technical) courses (although they do recognize that optimization of activities should be an ongoing goal). The unconditional commitment of the department to high level education sets a bright example at a national level.
- Excellent facilities and modern instrumentation, despite the disturbingly low number of technical personnel.
- Organization of successful international summer schools.
- Very exciting prospects for employment opportunities in the field. Our interactions with the Alumni Association, and a number of stakeholders or representatives of the industry were more than encouraging about the potential of DMS to produce employable, highly qualified personnel. The employment rates of the DMS' alumni

stand well above the national level of employment at ages 25-35. The recent advancements in the spatial planning and coastal management paradigm evidently offer an excellent window of opportunity for job creation initiatives that can address the ominous ramifications of the current brain drain in Greece.

The Department is now at a turning point and needs to establish a new grand vision and strategic outlook. There is a need for DMS to capitalize upon its current expertise, knowhow and infrastructure in several research subjects, such as eutrophication indices, coastal morphodynamics, climate impacts, drifter design and hydroacoustics for fisheries, and further expand its current research and teaching capabilities. The DMS has to be careful about optimizing both its teaching and research activities to avoid stressing the faculty, the technical/ administrative personnel and students, while maintaining the DMS current high educational level and within the context of the (often challenging) State policies. The EEC believes that the department has an excellent potential to become a focal point in selected "niches" of marine research at national and international scale, as it offers distinctly different expertise compared to other environmentally oriented institutions in Greece, putting it in the primary position to train the next generation of marine scientists needed for employment in national labs, government agencies and the private sector. We stress the importance for the department to orchestrate its outreach efforts (media, high school visits, workshops, open houses) and increase its visibility at a national level. This practice is very likely to improve the quality of the incoming students. The Department's long term strength lies in the impartial evaluation of its current strengths and weaknesses as well as in the adoption of more extroversive academic and research activities. Lesvos is a strategic island and supporting the University of the Aegean is a vital responsibility of the Hellenic government. The idyllic island life style offers a great recruitment tool for staff and students, and the distance from Athens should not be perceived as an impediment for its future growth.

## The Members of the Committee

Name and Surname	Signature
1. _____	
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