

**European Federation of Geologists
(EFG)**

GEO-JOB MARKET SURVEY

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1. INTRODUCTION:

The objective of this document is to report on the status of Earth Sciences education and profession, with the aim to achieve the harmonization of Earth Sciences curricula, to inform on general aspects of Earth Sciences professional activities, to establish the map of different specialties, to promote the recognition of qualifications, and the mobility of professionals.

These general objectives could help to develop the following three main activities that EFG has included in its annual plan for the current year:

- a. Establish a Common Platform with the aim to facilitate the free circulation of professionals and to increase the visibility of qualifications.
- b. Establish the recognition of expertise, through the EurGeol title and obtain external accreditation of title: ISO
- c. Maintain an updated information level for the EFG Members on the status of the education and training in Earth Sciences.

The data that will be analysed in this report have their origin in a questionnaire on education and training that was sent several months ago to the EFG National Associations. Until now, we have response from United Kingdom, Hungary, Ireland, Sweden, Portugal, France, Slovenia, Spain, Finland, Belgium and Luxembourg, Greece, Italy, and Poland. But we do not have yet the response from: Czech Republic, Netherlands, Germany, Bulgaria, Iceland, Slovakia and Switzerland. We hope to have the responses in the forthcoming days.

To complete the information we have obtained with the data on each EU 25 member country it should be useful to contact the Geological Associations or Geological Surveys in Latvia, Estonia, Lithuania, Austria, Denmark, Malta, and Cyprus.

This is a first report on the earth sciences studies and profession, but due to the founded difficulties in obtaining detailed data EFG will prepare an application form for a Leonardo da Vinci Programme fund. Another source of information to develop this application, as a guide to improve the EFG questionnaire, will be a market research studio made by the Spanish National Association.

For the moment, the work developed is in relation to the education within the Bologna Process and to the professional specialties in which the geologists work in the different countries. We would try to give a view on the different points included in the questionnaire, linking with the current European policies in the matter.

2. EDUCATION:

The Bologna declaration was signed in 1999 by 29 countries in Europe, and then has been modified and signed by 32 countries in a ministerial meeting in Prague 2001, and by 40 countries in the ministerial meeting in Berlin 2003. This year has been carried out another ministerial meeting in Bergen where a new communiqué was signed by 45 countries.

The Bologna Process is the major process of higher education reform in Europe. The main objectives to establish an European area of Higher education are: the adoption of a system of easily readable and comparable degrees; the adoption of a system based on two main cycles: a first one geared to the employment market and lasting at least three years, and a second cycle (Master) conditional upon the completion of the first cycle; the establishment of a system of credits for greater flexibility in learning and qualification processes; the promotion of mobility for students, teachers, researchers and administrative staff; the promotion of European co-operation to develop comparable criteria and methodologies; the promotion of the European dimensions in higher education, curricular development, inter-institutional co-operation, mobility schemes and integrated programme.

The aim of the process is thus to make the higher education systems in Europe converge towards a more transparent system which whereby the different national systems would use a common framework based on three cycles - Degree/Bachelor, Master and Doctorate. For more information on the Bologna Process you can visit the website http://europa.eu.int/comm/education/policies/educ/bologna/bologna_en.html

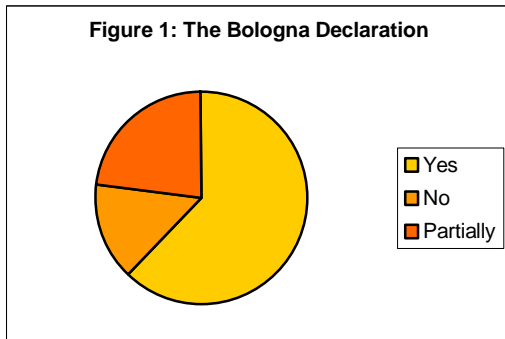
The tuning educational structures, from the document compiled by the Geology Subject Area Group of the "Tuning Higher Educational Structures in Europe", describe the general characteristics for a "European core curriculum" in Earth Sciences. The main characteristics for a curricula in geology are: to learn from the past, understand the present and predict and influence the future; use observation, analysis and imagination to make decisions; use and apply concepts, theories and methodologies of other sciences; qualities and abilities like communicate ideas and information, provide solution to problems, have view of the temporal and spatial dimensions in earth process, integrate field and laboratory evidence with theory; awareness of environmental processes; and understanding of the need to both exploit and conserve earth resources.

With the aim to compare the situation in the different European countries we have asked the National Associations within EFG, to answer a little questionnaire in the academic training. In this questionnaire we have included six questions about the recognized qualifications, the duration of education, if academic courses match the requirements of Bologna declaration, if the academic institutions have participate in the tuning process and the characteristics of a course.

- 2.1 Recognized qualifications (related to Annex 1: education and training questionnaire, question 10): The existing qualifications in the different countries are considered in general as a university degree in earth sciences.
- 2.2 Level of training to practice (related to Annex 1: education and training questionnaire, question 11): In most of the countries the minimum level of academic training is a bachelor degree, but in several countries like Finland or Poland is necessary to have a master degree. In Ireland, Belgium and Luxembourg is not necessary to have a university degree to practice.

Due to the confusion in the obtained data it would be of interest to study them in depth, confirming the responses with each country and enlarge the information.

- 2.3 Duration of education and Bologna process (related to Annex 1: education and training questionnaire, questions 12 and 13): As you can see in Figure 1, most of the European countries follow the Bologna declaration structure.



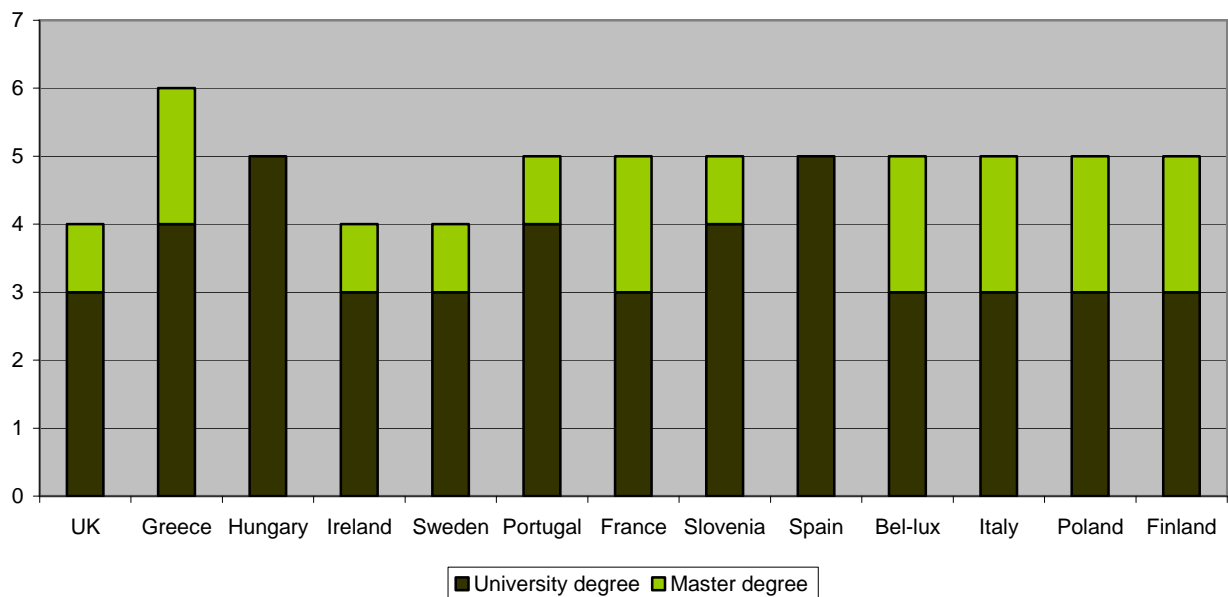
Only Spain and Portugal are still having the old national structure; and France, Hungary and UK follow only partially the Bologna declaration, with the objective to introduce it gradually in the earth sciences education.

In relation to the duration of degrees, as you can see in the graphic bellow (Figure 2) in those countries that follow the Bologna declaration (Greece, Ireland, Sweden, Slovenia, Belgium-Luxembourg, Poland, Italy and Finland) the length of earth sciences degrees fluctuate between three and four years for a bachelor, and one and two more years for a master.

In the rest of countries the duration of degrees last three or five years for a bachelor, and one or two for a master. In Spain and Hungary there is no master degree supposedly due to the length of the bachelor degree.

Due to the poor data obtained on postgraduate and doctorate education, we cannot analyse properly these data, so it would be of interest to improve the information by asking specifically on these items to the EFG members.

Figure 2: Duration of Earth Sciences Studies in Europe



2.4 Tuning (related to Annex 1: education and training questionnaire, question 14): “Tuning Educational Structures in Europe” is a project financed by the European Commission and particularly marked by the context of the Sorbonne-Bologna-Prague-Berlin process, through which politics aims to create an integrated higher education area in Europe, against the background of one European economic area. The need for compatibility, comparability and competitiveness of higher education in Europe has arisen from the need of students, whose increasing mobility requires reliable and objective information about educational programmes on offer. For further information on tuning visit the website <http://odur.let.rug.nl/TuningProject/>

Thirteen countries, including Ireland, Belgium, Finland, France, Italy, Netherlands, Portugal, Spain, United Kingdom, Austria, Denmark, Germany and Norway, have participated through different

universities, in the Geology Subject Area Group included in this project, but in general there is no national report on the subject.

Ten of these thirteen countries are represented in EFG through their National Associations. This information, obtained by the group in geology for the tuning structures, could be complementary to the information that could be got by request to the EFG members.

- 2.5 Characteristics of a course (related to Annex 1: education and training questionnaire, question 15): Normally, a course has between 70% and 75% geological content and fieldwork training between some days (like in France or Greece) and several months (like in Sweden or Slovenia).

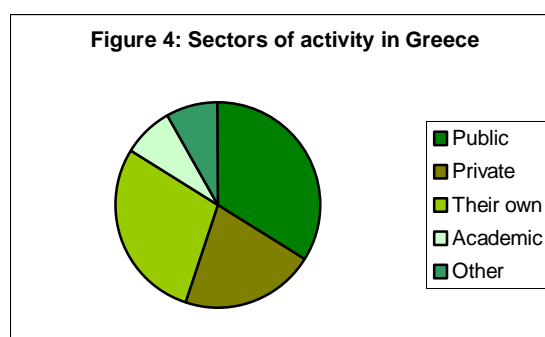
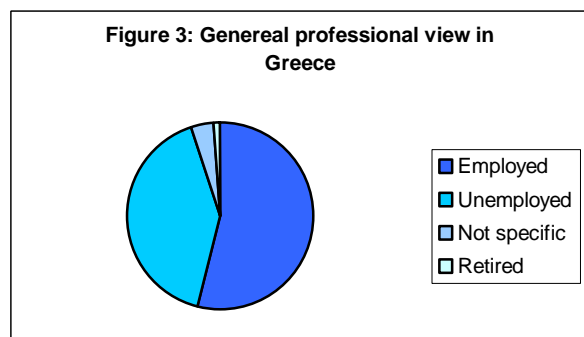
It could be of interest to study the geological contents in the different universities and countries.

3. PROFESSIONAL ACTIVITY:

The Lisbon European Council in March 2000 set the European Union the strategic goal, reaffirmed at the Stockholm European Council in March 2001, of becoming the most competitive and dynamic knowledge-based society in the world. This goal involves a series of ambitious reforms at national and European level that is called the Lisbon Strategy or the Lisbon Agenda. Key elements of the strategy to achieve it were the adaptation of education and training to offer tailored learning opportunities to individual citizens at all stages of their lives; the promotion of employability and social inclusion through investment in citizens' knowledge and competences; the creation of an information society for all; and the fostering of mobility. There is a new Communication from the Commission to the European Council: working together for growth and jobs - A new start for the Lisbon Strategy http://europa.eu.int/prelex/detail_dossier_real.cfm?CL=en&DosId=192503

To improve the development of these issues is necessary to know the current status of education and profession around Europe, and that is why EFG is developing this Geo-job market survey. Regarding the Earth Sciences professional activities is important to highlight the different work sectors (public and private); the different professional specialities (environment, hydrogeology, engineering geology, hydrocarbons, etc); the lifelong learning; and other items like gender equality.

3.1 Sectors of Activity: It should be of interest to have first a general view on the number of geologists employed, unemployed, that don't exercise a geological profession, and retired. Then, it could be of interest to know how many people work in the private sector, how many in the public sector, how many work for their own, and how many do it for academic institutions. For this point we don't have a lot of information yet, but we can give as an example the information in Greece (Figures 3 and 4).

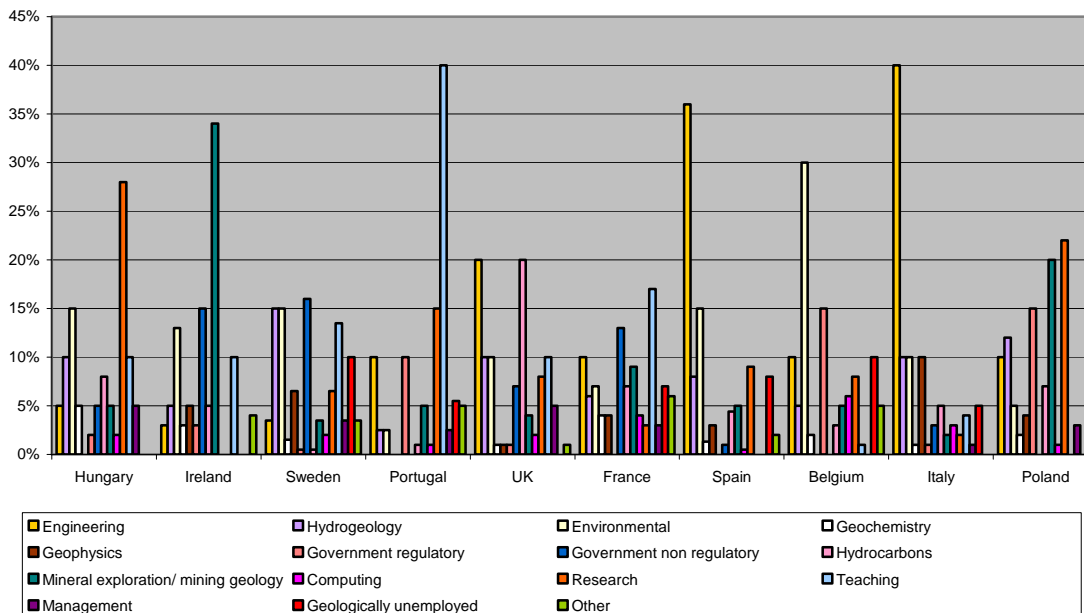


It should be of interest to have this information in each European country so this is one of the next tasks to improve within the geo-job market survey developed by EFG.

3.2 Professional Specialities (related to Annex 1: education and training questionnaire, question 3): In the previously mentioned questionnaire, EFG has asked for a percentage in each speciality to know which are the most relevant activities in each country. With this data EFG has obtained the table below, named Figure 5.

There are some countries that didn't have the exact information, but they have sent which are the main activities in their countries. So, in Slovenia the most important specialities are engineering, hydrogeology, mineral exploration, research and teaching; whereas in Finland the main activities are in relation with hydrogeology, environment, geochemistry, geophysics, mineral exploration, computing, research and teaching.

Figure 5: Specialties by country



The main activity in Hungary is research followed by environment; hydrogeology and teaching that are also relevant. In Ireland the more important speciality is mineral exploration, but government and environment are also outstanding. In Sweden there are some important issues like hydrogeology, environment, government and teaching with a relevant percentage of unemployment (10%). In Portugal, the main activity is teaching followed by research. In UK teaching and hydrocarbons are the most important issues, but we don't have all the information required because they could not obtain it, they would send more details back soon. In France there are several important issues including teaching and government, but there are near a 7% unemployed. In Spain the majority of professionals work in engineering geology and environment, and there are an 8% unemployed. In Belgium the most important issues are environment and government, and there are 10% unemployment. In Italy the main activity is, as in Spain, engineering geology followed by geophysics, environment, and hydrogeology. In Poland there is no only one activity highlighted, being more important research, minerals exploration, government, hydrogeology, and engineering geology.

We do not have data on unemployed geologists in Hungary, Ireland, United Kingdom, and Poland. It should be of interest to have all data on this subject with the aim to know the possibilities of mobility.

These data could help also to exchange information and examples of good practice in several activities. The management of this information could finish by developing a guideline in geological good practices around Europe.

3.3 Life long learning: Covers all learning activities, at any time in life and in a wide range of environments (education establishments, workplace, etc.), undertaken with a view to improving knowledge and skills which may be personal, civic, social or employment-related. The European Institutions would like to establish a European area of lifelong learning, with the aim to empower citizens to move freely between learning settings, jobs, regions and countries, making the most of their knowledge and competences, and to achieve the Lisbon Strategy aim of a knowledge-based society. This information has been obtained from the communication from the Commission (COM(2001)678) Making a European Area of Lifelong Learning a Reality. This Communication is available in http://europa.eu.int/prelex/detail_dossier_real.cfm?CL=en&DosId=169739

The European Commission stimulates this communication, by establishing six key elements for coherent and effective education and training strategies: building up partnership; elaborating analysis of

learning requirements; encouraging an increase in public and private investment in learning; making learning provision more accessible and more visible; giving learning a higher profile; introducing quality controls and indicators to measure progress.

EFG stimulates lifelong learning through its EurGeol Title demanding for both the title accreditation and the title renewal each three years, a minimum annual hours training.

In the EFG questionnaire (Annex 1: education and training questionnaire, question 17) there is one question regarding the continuing professional development, specifically on the requirements for post academic training to allow award the title. In several countries there is no requirements established like in Greece, Hungary, Portugal, France, Slovenia, Belgium and Poland. In Sweden and Spain the requirements are the same as for the EurGeol Title. In United Kingdom is necessary to have 60 points, for Ireland a minimum of 45 CPD annual hours is required, and in Italy at least 25 CPD annual hours.

Obtaining data on this item could be useful to improve the harmonization and exchange of expertise related to Lifelong Learning, in different European countries.

We could also improve data on postgraduate courses including those more demanded in the different countries, in which subjects, and how many people use to do them.

3.4 Other relevant areas to develop: Regarding the information obtained with the EFG questionnaire, it could be of interest to have a view on the number of women working and unemployed to compare these data with men data and favour the gender equality in the profession.

It could be of interest to know more about the existing mobility of professionals in each country and how is being implemented.

4. RECOGNITION OF QUALIFICATIONS:

The European Commission has put forward a proposal for a Directive (COM(2002)119) to clarify and simplify the rules in order to facilitate the free movement of qualified people between the Member States. The proposal constitutes the first comprehensive modernization of the Community system since it was conceived. This Communication is available at http://europa.eu.int/eur-lex/pri/en/lip/latest/doc/2002/com2002_0119en01.doc

A number of changes are proposed compared with the existing rules, including greater liberalization of the provision of services, more automatic recognition of qualifications and increased flexibility in the procedures for updating the Directive. The Commission also proposes to develop its cooperation with the Member States in order to keep citizens better informed about their rights and give them more help in getting their qualifications recognized.

The Parliament and the Council have approved this Communication last 6th June 2005.

Within this Directive has been created a system of Common Platforms defined as a set of criteria of professional qualifications, which attest to a sufficient level of competence for the pursuit of a given profession and on the basis of which those associations accredit the qualifications obtained in the Member States.

A Common Platform has the following objectives: to facilitate the free movement of professionals, to increase the visibility of qualifications, to establish different compensation measures depending on the personal conditions of professionals.

At this moment, EFG is working in the application of a common platform for professionals in earth sciences. We are in the first step, in which it will be necessary to have an inventory of national regulations including the following items: in which countries the profession is regulated; what level of qualification is provided and required to practice in each country; the different areas of activity and the content of training. The second stage will be to establish the platform including a common level of training and a common training content. The third step will be to adopt the platform by: presenting it to the European Commission; asking to the EU Member States through their groups of experts; submitting draft measures; adoption of a Commission decision and following-up the Commission decision.

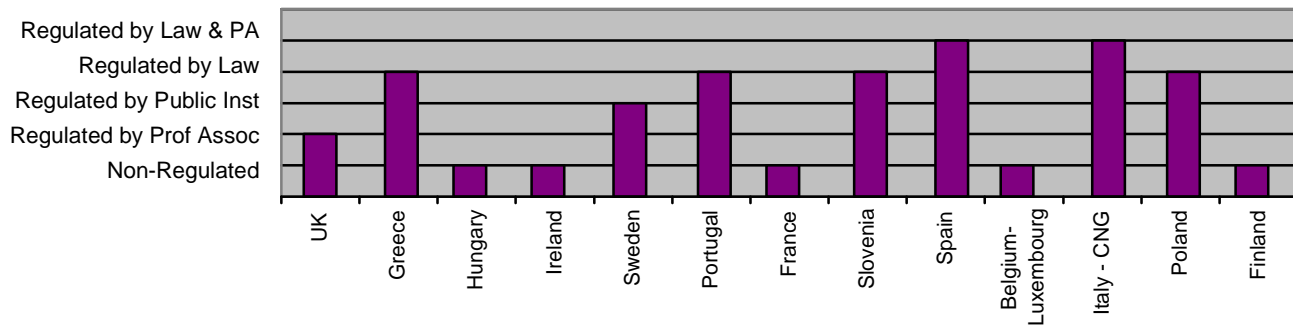
EFG is now in the first stage of this application, evaluating the results obtained by the questionnaire in the following issues:

4.1 Regulation of the profession in different countries (Annex 1: education and training questionnaire, question 5): Analysing the information obtained we can establish five different regulation levels:

- I. Countries where the profession is not regulated
- II. Countries where the profession is regulated only by the Professional Association
- III. Countries where the profession is regulated only by Public Institution
- IV. Countries where the profession is regulated by law
- V. Countries where the profession is regulated by law and implemented by the Professional Association

As you can see in the table below (Figure 6) the profession is not regulated in France, Hungary, Ireland, Belgium and Luxembourg, and Finland, that is several EFG members. In Sweden the profession is not regulated in general, but in Public Institutions they have administrative procedure to do it. In United Kingdom, the profession is not regulated officially, but the Geological Society award and regulates the Chartered Geologist Title (CGeol). In Greece, Portugal, Slovenia, and Poland the profession is regulated by law, but is not implemented by the Professional Association. In Spain and Italy the regulation is complete, both by law and by the Professional Association.

Figure 6: Regulation of the Profession



4.2 Level of qualification provided and required to practice: That is explained in the item Education (2), in the following points: level of training (2.2) and duration of studies (2.3).

4.3 Areas of activity are analysed within the Professional Activities (3); point regarding the professional specialties (3.2).

4.4 Content of training. That is explained in both items Education (2) in the points Tuning (2.4) and characteristics of a course (2.5); and Professional Activities (3), in the point regarding Lifelong Learning (3.3).

5. CONCLUSIONS:

Regarding the information obtained in the EFG Questionnaire on Education and Training and the made analysis of these data we can establish the following conclusions:

- 5.1 The structure of careers is very varied around Europe, so it would be needed to establish common general curricula through the Tuning structures and the EFG activity, as well as consider the Bologna Process for the length of studies. Is necessary to improve data on the level of training needed to practice, the postgraduate training and the characteristics of a career.
- 5.2 The professional activities depend on the geology and needs in each country, so there are different significant specialties in Europe. That could be interesting to exchange expertise between experts in concrete items. Is necessary to improve in obtaining general data (unemployment, public and private sectors, etc) in each country; specific information in those countries is missed; lifelong learning; and gender equality.
- 5.3 To obtain the recognition of qualification in Europe, it will be needed to present the application form to establish a Common Platform.
- 5.4 To achieve these objectives it should be very useful to develop a good geo-job market survey, including the required data in education, specialties and regulation of profession
- 5.5 The EFG structure allows establishing representative groups for a statistic study in Europe through its National Associations. With such a statistic study for each country EFG could develop the questions we have presented in this study.

ANNEX 1: EDUCATION AND TRAINING QUESTIONNAIRE

In order for the Federation to prepare the submission for the EurGeol title to be recognised as the Common Platform in professional practice, it is necessary to map the education and training required in each country to achieve the national titles, and therefore the EurGeol title. This same information is also required to prepare for EFG to apply for accreditation of the title through ISO.

<p>NATIONAL ASSOCIATION</p>	
<p>1. Name of responding country and National Association</p>	
<p>2. How many members in your national association.</p> <ul style="list-style-type: none"> • Professional members (and title) • Learned members (and title) • Amateur members • Other classes (provide details) 	
<p>3. What are main activities of practising geologists in your country, and what proportion in each (approximate proportions)</p> <ul style="list-style-type: none"> • Engineering • Hydrogeology • Environmental • Geochemistry • Geophysics • Government regulatory • Government non regulatory • Hydrocarbons • Mineral exploration/ mining geology • Computing • Research • Teaching • Management • Geologically unemployed • Other 	
<p>4. Does your National Association operate the EurGeol application system (eg through a National Vetting Committee)</p>	
<p>PROFESSIONAL PRACTICE</p>	
<p>5. Is the profession of geology regulated in your country. Is this regulation by: Law Administrative Procedure</p>	
<p>6. Is the possession of a professional geological title required to sign geological reports submitted to government and financial regulatory organisations or other clients</p>	

7.	Is that title regulated	
8.	Is this title recognised in other jurisdictions (if yes list)	
9.	What professional activities require the possession of the title	
ACADEMIC TRAINING		
10.	What qualifications are recognised for the purposes of awarding the professional title	
11.	What level (BSc, MSc, other) of academic training is required to practice	
12.	What is duration of education to acquire this level of training	
13.	Do academic courses in the universities match the requirements of the Bologna declaration	
14.	Have academic institutions in your country participated in the Tuning Process (IF YES provide copy of the national report submitted)	
15.	What are characteristics of course (eg minimum geological content, minimum fieldwork requirement)	
POST ACADEMIC TRAINING		
16.	What level of professional experience is required to practice	
17.	What are requirements for post academic training (CPD) to allow award of title (hours or points total or annually)	
18.	Is a Code of Ethics operated nationally,	
19.	Are disciplinary procedures and bodies in place for enforcement of Code of Ethics	