



Paris, 23 February 2012



**IUGS**  
Earth Science for the Global Community



United Nations  
Educational, Scientific and  
Cultural Organization



## Earth Science education events

*Workshop on Earth Science education globally*

*Connections between research and education: the essential, synergistic element for the future*

## **IUGS-Commission on Geoscience Education, Training and Technology Transfer**

**Jesús Martínez-Frías\***

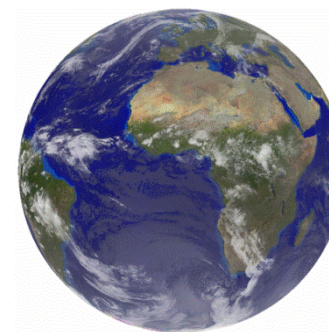
**IUGS COGE**

\*Chair, IUGS/COGE. Chair, Department of Planetology and Habitability. Centro de Astrobiología CSIC/INTA, Associated to the NASA Astrobiology Institute.  
Tel: +34 91 5206418, Fax: +34 91 5201621 E-mail: [jmfrias@cab.inta-csic.es](mailto:jmfrias@cab.inta-csic.es)

**The IUGS Commission on Geoscience Education, Training and Technology Transfer (COGE)** was established **in 2004** to examine and develop programs to assist developed and developing countries to maintain, expand or introduce better Earth Science education, outreach and technology transfer within their country.

## Objectives

- **Identify gaps** in education, training and technology transfer both conceptually and geographically.
- Together with other relevant bodies in or outside the IUGS family, **develop strategies** for the coordination of existing and the development of new programmes in geoscience education, training and technology transfer based on the identified gaps.
- **Produce a 5-year Action Plan** together with an annual plan of action including budget.
- **Organise meetings**, conferences and workshops **for geoscience educators** and to disseminate information on new trends and topics in the field of geosciences.
- **Develop specific programmes** on the continuation and coordination of training courses, especially through generation of **teaching materials** and provision of training courses.
- **Encourage publications of handbooks or textbooks** at an international level to help bridge recognised gaps in the **training of and education for geoscientists**.
- **Facilitate the harmonisation of geoscience presentation** with different cultures in order to enhance the development of **ethics in geoscience education**.
- **Assist in the distribution of geoscience teaching materials**, including books, videos, equipment, etc.



Jesús Martínez-Frías, <i>Chair</i>	Spanish National Research Council, Spain
Chris King, <i>Vice Chair</i>	Keele University – United Kingdom
Jennifer Nocerino, <i>Secretary/Treasurer</i>	Geological Society of America - USA
Ochir Gerel, <i>IUGS Vice President.</i>	Mongolian University of Science & Technology
Adriana Niz	University of Catamarca, Argentina
Chan-Jong Kim	Seoul National University - South Korea
Greg McNamara	Geological Society of Australia
Alan Morgan	Waterloo University - Canada
Ian Clarke	University of Adelaide - Australia
Gary Lewis, <i>Former Chair</i>	Geological Society of America - USA
R. Shankar	Mangalore University - India
Miguel Cano	Bicol University, Philippines
Ashvin Wickramasooriya	South Eastern University of Sri Lanka



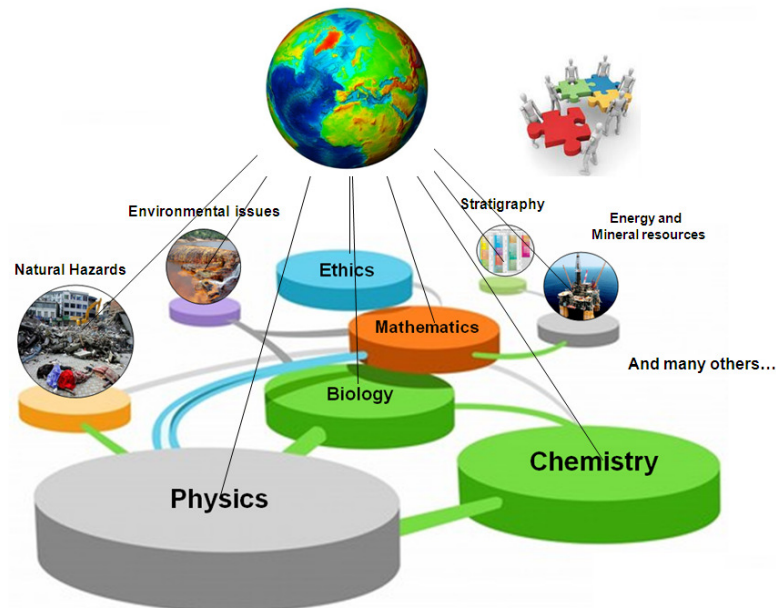
It is important to emphasize that it was recently proposed (and it was positively considered as an official recommendation), to invite representatives from Africa on the Commission, encouraging gender balance.



## Partnership/Networking



## Interdisciplinary approach



## Capacity Building (Field, Laboratory, Seminars)



## Geoethical approach

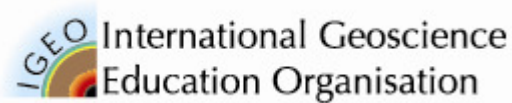




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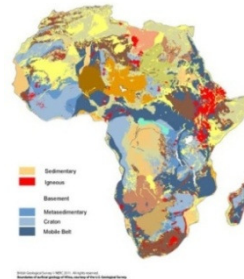
*Paris, 23 February 2012*



## I.- Earth Learning Idea

**IUGS-COGE** main partners to date are *IGEO*, AGID, and International Earth Science Olympiad (IESO). The Earth Learning Idea (ELI) website was accomplished by three individuals on a voluntary basis, but it has received support of \$1000 USD from IUGS/COGE. The ELI website <http://www.earthlearningidea.com/>, where the IUGS logo is highlighted in the Acknowledgements, **received almost half million visitors since 2008. The Earth Learning Idea had been accessed in 166 countries and 8,483 towns/cities globally.**

There had been 457,354 pdf downloads of Earth Learning Idea activities globally, averaging nearly 20,000 per month over the past year, with 38,436 downloads in February 2011.



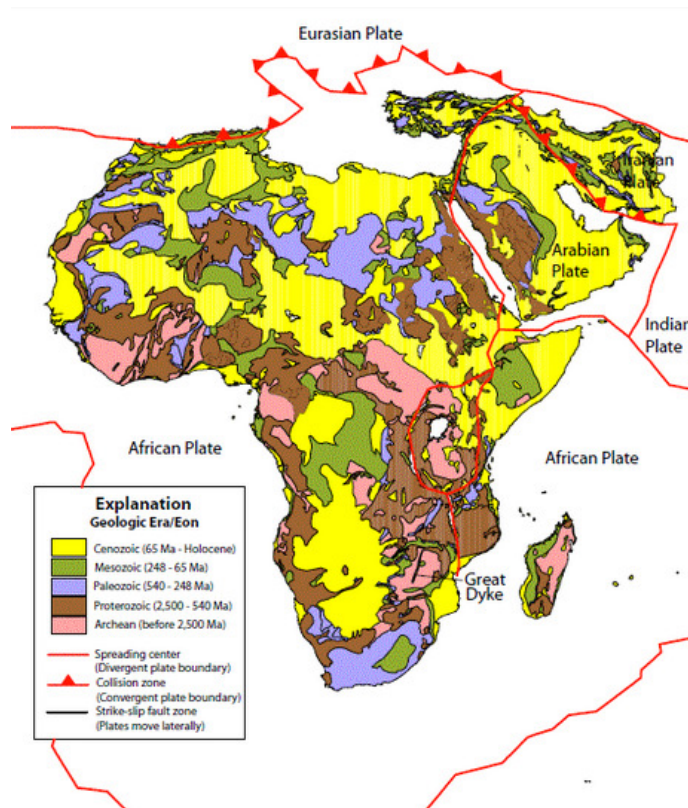
## II.- GEO-ERA

- The **GEO-ERA (GEOscience Education Roadmap for Africa)** attempts to provide the entire African continent with a **mid-long term plan** to advance the target of geoscience education, training and technology transfer.
- GEO-ERA will develop under a **multi-institutional framework** taking into account the significant previous work carried out by other institutions.
- GEO-ERA will provide a common framework for understanding basic theoretical and practical geoscientific issues (field activities → Geoparks), from a **multidisciplinary point of view and with a geoethical approach**, taking into account that “*Africa is one*” but also that the different countries and regions require “*taylor-made*” analyses”.
- **GEO-ERA will be developed by Africans** by which the partnership as one of main partner of the Geological Society of Africa (**GSAf**) is crucial.
- GEO-ERA will increase the currently still scarce visibility of the contributions linking “Geoscience Education” and “Africa” through the **publication of thematic contributions in prestigious journals (i.e. Science, Nature, Journal of African Earth Sciences, Episodes)**.

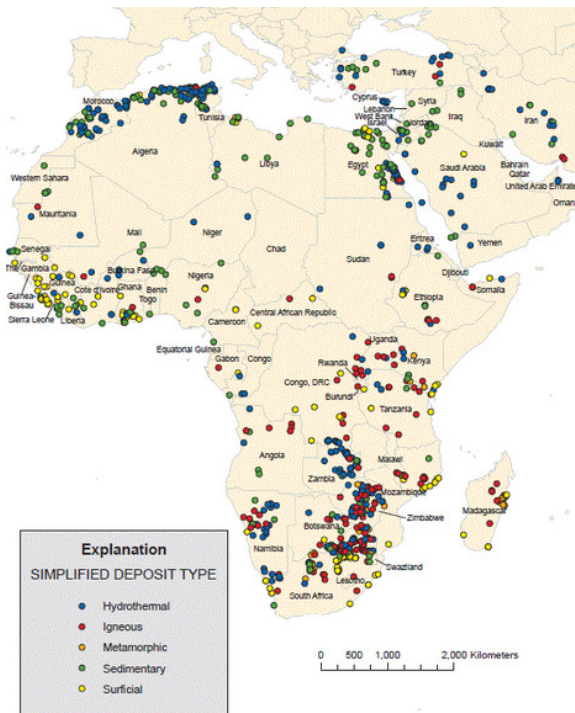


A collaboration regarding geoscience education with **SGA (African Metallogeny Courses)** was already initiated → IUGS COGE.

Ouagadougou, Burkina Faso, from  
12 to 18 March 2012.




Modified from Kirkham et al. (1995)



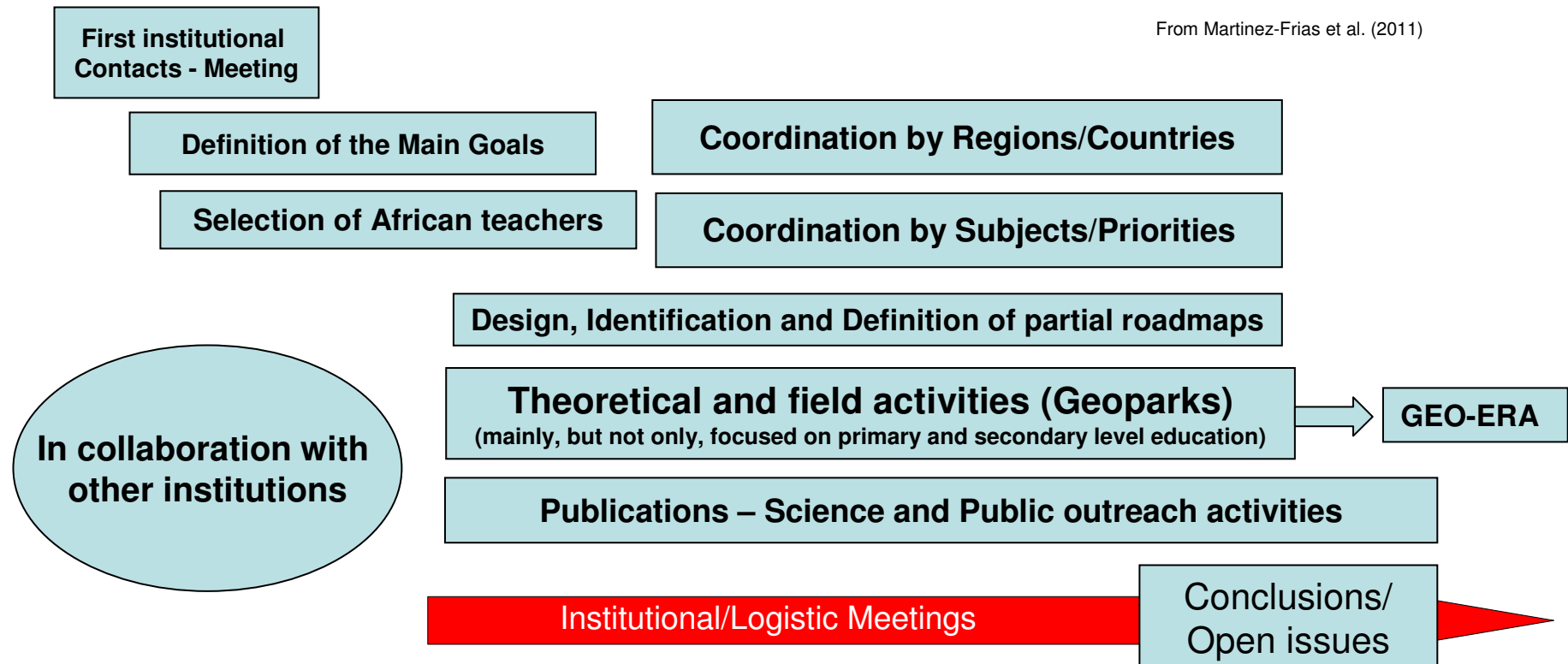
Taylor et al. (2009)



# GEO-ERA

2012	2013	2014	2015	2016
				

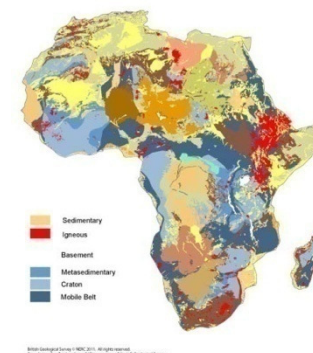
From Martinez-Frias et al. (2011)





Field: Source Titles	Record Count	% of 8	Bar Chart
JOURNAL OF AFRICAN EARTH SCIENCES	4	50.000 %	<div></div>
2010 IEEE INTERNATIONAL GEOSCIENCE AND REMOTE SENSING SYMPOSIUM	1	12.500 %	<div></div>
5TH GLOBAL CONGRESS ON ENGINEERING EDUCATION CONGRESS PROCEEDINGS	1	12.500 %	<div></div>
ASSOCIATION OF ENGINEERING GEOLOGISTS SPECIAL PUBLICATION	1	12.500 %	<div></div>
IEEE INTERNATIONAL SYMPOSIUM ON GEOSCIENCE AND REMOTE SENSING IGARSS	1	12.500 %	<div></div>
LAND SUBSIDENCE CASE STUDIES AND CURRENT RESEARCH PROCEEDINGS OF THE DR JOSEPH F POLAND SYMPOSIUM ON LAND SUBSIDENCE	1	12.500 %	<div></div>
SOUTH AFRICAN JOURNAL OF SCIENCE	1	12.500 %	<div></div>

Field: Source Titles	Record Count	% of 9	Bar Chart
JOURNAL OF AFRICAN EARTH SCIENCES	3	33.333 %	<div></div>
ASSOCIATION OF ENGINEERING GEOLOGISTS SPECIAL PUBLICATION	1	11.111 %	<div></div>
ASTRONOMICAL SOCIETY OF THE PACIFIC CONFERENCE SERIES	1	11.111 %	<div></div>
EPISODES	1	11.111 %	<div></div>
GEOSPATIAL HEALTH	1	11.111 %	<div></div>
GFF	1	11.111 %	<div></div>
LAND SUBSIDENCE CASE STUDIES AND CURRENT RESEARCH PROCEEDINGS OF THE DR JOSEPH F POLAND SYMPOSIUM ON LAND SUBSIDENCE	1	11.111 %	<div></div>
SCIENCE EDUCATION AND OUTREACH FORGING A PATH TO THE FUTURE	1	11.111 %	<div></div>
SOUTH AFRICAN JOURNAL OF GEOLOGY	1	11.111 %	<div></div>



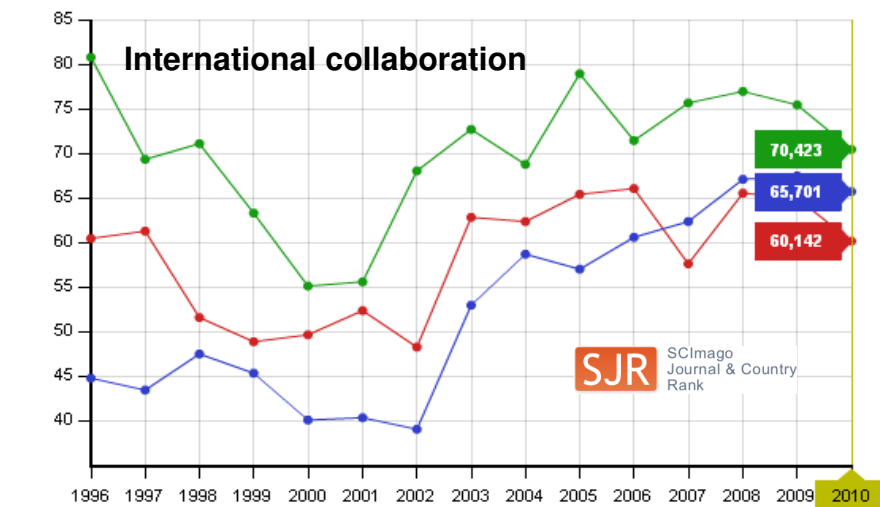
## “Geoscience education” and “Africa”: 8 items!

Field: Institutions	Record Count	% of 8	Bar Chart
UNIV PRETORIA	2	25.000 %	<div></div>
CHELTENHAM GLOUCESTER COLL HE	1	12.500 %	<div></div>
ELIZABETH CITY STATE UNIV	1	12.500 %	<div></div>
FREE STATE UNIV	1	12.500 %	<div></div>
GEOCON	1	12.500 %	<div></div>
NELSON MANDELA METROPOLITAN UNIV	1	12.500 %	<div></div>
UNIV CAPE TOWN	1	12.500 %	<div></div>
UNIV WITWATERSRAND	1	12.500 %	<div></div>

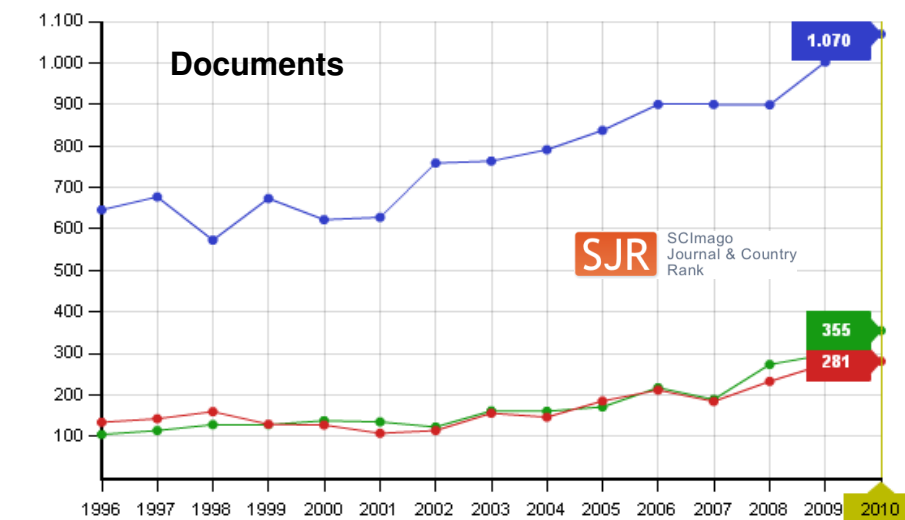
## “Geological education” and “Africa”: 9 items!

Field: Countries/Territories	Record Count	% of 9	Bar Chart
SOUTH AFRICA	4	44.444 %	<div></div>
ENGLAND	2	22.222 %	<div></div>
SWEDEN	1	11.111 %	<div></div>
SWITZERLAND	1	11.111 %	<div></div>
TANZANIA	1	11.111 %	<div></div>
USA	1	11.111 %	<div></div>

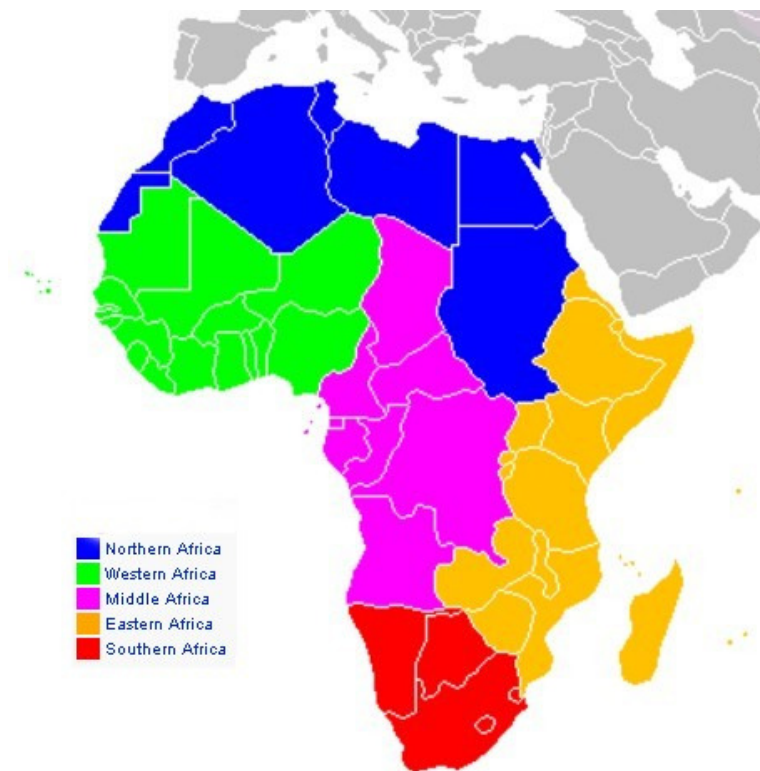
## AFRICA (Earth Sciences): (1996-2010)



✓ Northern Africa ✓ Central Africa ✓ Southern Africa



✓ Northern Africa ✓ Central Africa ✓ Southern Africa





### **III.- Promoting school-level Geoscience Education across Africa – a joint proposal by UNESCO, IUGS-COGE and IGEO**

It is possibly not surprising that there was a lack of consensus on how the, 'education system of the continent could be moved to include earth sciences in the curriculum' because:

- this is a large and intractable problem which may require different strategies in different regions;
- most of the delegates to the UNESCO 'Regional scoping workshops' came from Higher Education or government;
- few of the organisations or delegates involved were able to give a perspective on school-level geoscience education.

For these reasons, **UNESCO** has consulted with **IUGS-COGE** and **IGEO** to establish the most effective strategy for intervening in educational systems across Africa to promote [school-level geoscience education](#). This proposal results from these discussions. The main thrust of the proposal involves the [week-long 'Launchpad' symposium](#), which will invite teams of representatives from all African countries who are able to participate. Crucially, each team will involve, a high level 'mover and shaker', a teacher-trainer and a practising teacher together with, if possible, an industrial sponsor.

*The objective of the symposium will be to share African educational scenarios and worldwide 'success stories' early in the week, developing towards sessions later in the week during which each team will develop a 'geoscience school-level education plan' for their own countries to be run and monitored in the succeeding years.*

A key part of the plan involves the African teams developing school-level geoscience educational solutions for their own countries, based on their own experience and expertise, with support being provided by members of the three organisations who have experience of such initiatives.

The project will be led by *Professor Chris King, proposed Vice-Chair of IUGS-COGE and past-Chair of IGEO*. Prof. King is working with contacts in the oil industry in Africa to develop first a scoping bid and later a full bid to cover the symposium and its aftermath. So since, if the bids for funding are successful, the three organisations will not be asked for substantial funds to support the initiative, **the current priority is for each of the organisations to endorse the initiative (without such endorsements, bids to industry are unlikely to be successful).**

So far, IUGS-COGE Commissioners have offered their enthusiastic support, which has been mirrored by the Senior Officers of IGEO.



## IV.- Geoscience education and Geoethics

**IUGS/COGE** has worked closely with **AGID** for fostering partnership and joint projects regarding **Geoethics**:

- a) creation of AGID National Chapter in Spain (mainly devoted to Geoethics), where the IUGS logo is highlighted;
- b) coordination and housing of the *international website on Geoethics* ([http://tierra.rediris.es/Geoethics Planetary Protection/](http://tierra.rediris.es/Geoethics_Planetary_Protection/));
- c) participation of COGE members (*Ochir Gerel and Jesus Martinez-Frias*) in the Geoethics International Section of the Mining Pribram Symposium (October, 2011),
- d) taking part in the making of the “**International Declaration of Geoethics**” (point 3 of the Declaration indicates: “*To strengthen the links of geoethics with the new aspects of the geosciences education*”).
- e) co-chairing the Symposium “2.5. Geoethics” (34th IGC, Brisbane, Australia - *Ochir Gerel and Jesus Martinez-Frias*)



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### ***INTERNATIONAL DECLARATION ON GEOETHICS***

#### ***RECOMMENDATIONS:***

- *To emphasize the significance of geoethics in the context of facing extraordinary natural hazards and disasters in the course of recent years.*
- *To incorporate a geoethical approach to needed new legal aspects (including insurance policy) and to an ethical way of thinking.*
- *To strengthen the links of geoethics with the new aspects of the geosciences education.*
- *To recommend the inclusion of geoethical subjects into deontological codes.*
- *To emphasize the liaison with the mining engineers activities.*
- *To remark a need of searching new priorities for the 3rd Millenium fitting the World Millenium Goals.*
- *To recommend links for incorporating geoethics into any activity related with the abiotic world.*



## V.- IAGD - IUGS/COGE partnership and joint project

- A new collaboration between **IAGD** (International Advisory for Geoscience Diversity) and **IUGS/COGE**, was recently (3 December 2011) proposed.
- It is especially related to students and professionals with disabilities worldwide. In a first stage, the collaboration would consist on developing instructional workshops specifically for faculty who may need assistance in modifying course materials to accommodate students with disabilities.
- The highlight of this particular workshop will be the instruction from actual students with disabilities in the presentation. The students will be there to discuss exactly what they need and how accommodations can be made to include them.
- A more long-term idea might be to have a collaborative meeting, with the global research community, relative to access and inclusion in the geosciences, that also promotes current students and their efforts to complete geoscience coursework.



## Planned participation in the next IGC Brisbane, Australia

IUGS-COGE will have a significant role in the 34th IGC as main responsible for the **Symposium 1.2. Geoscience Education** in the framework of **Theme 1: Geoscience for Society**. Four members of COGE are involved in the symposium (*Jesus Martinez-Frias*, Chair and Convenor, *Gary Lewis*, Former Chair and co-Convenor, *Chris King*, proposed Vice-Chair and Keynote speaker and *Greg McNamara*, Member and Keynote speaker). Likewise, *Chris King* (proposed Vice-Chair) will contribute as co-Convenor in the **Symposium 2.3. Developing geoscience education and awareness for the benefit of society** in the context of the Theme 2: Geoscience Benefiting Low Income Countries.

### 1.2 Geoscience education

Jesus MARTINEZ-FRIAS [jmfrias@cab.inta-csic.es](mailto:jmfrias@cab.inta-csic.es) (Spain), Gary LEWIS (USA), Sarah GAINES (USA), Julian THOMSON (New Zealand) and Bronte NICHOLLS (Australia)

This Symposium is an opportunity to highlight incentives and resources available for teaching earth science in primary and secondary schools in particular, but is also an opportunity to reflect on geoscience teaching at tertiary level as well.

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<http://www.iugscoge.com>

## Commission on Geoscience Education, Training and Technology Transfer

Webmaster: Greg McNamara



### Explore COGE

#### Education & Outreach

- [Education resource links](#)
- [Education conference links](#)

#### Training & Technology Transfer

- [Training resource links](#)
- [Training conference links](#)

#### Commission membership

#### Contact us

### Geology knows no borders

The [International Union of Geological Sciences \(IUGS\)](#) is one of the largest and most active non-governmental scientific organizations in the world.

The IUGS Commission on Geoscience Education, Training and Technology Transfer (COGE) was established in 2004 by the IUGS to examine and develop programs to assist developed and developing countries to maintain, expand or introduce better earth science education, outreach and technology transfer within their country.

2011

The February 2011 report from COGE to the IUGS is available [here](#). (72kb pdf file)

### News

Geology news online

<http://bit.ly/aDaQ5B>

Science news online

<http://bbc.in/cY2021>

Useful links

IUGS Activities

<http://bit.ly/hSwmIV>

IUGS Calendar

<http://bit.ly/gxUhU>

Jesús Martínez Frías, Chair, IUGS/COGE



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# Thank you!

\*Chair, IUGS/COGE. Chair, Department of Planetology and Habitability. Centro de Astrobiología CSIC/INTA, Associated to the NASA Astrobiology Institute.  
Tel: +34 91 5206418, Fax: +34 91 5201621 E-mail: [jmfrias@cab.inta-csic.es](mailto:jmfrias@cab.inta-csic.es)