SECOND GLOBAL SURVEY OF THE STATE OF GEOSCIENCE EDUCATION

The Second International Geoscience Education organization (IGEO) survey will be used to:

- *Build on and extend the results of the initial survey*
- *Identify countries in which pilot Earth Science educational initiatives by IGEO, supported by the International Union of Geological Scientists (IUGS) and others, are most likely to be successful*
- *Identify Earth Science outreach initiatives that have been successful – with a view to promoting these elsewhere in the future*
- *Provide benchmarks of good practice in the Earth science content of the curriculum, for different countries/regions*

Please respond to this questionnaire as the Earth science representative for your country/region. Feel free to work with your colleagues in providing a response. If your country is divided into separate political regions with different approaches to geoscience education, and you are responding on behalf of the whole country, try to provide an overview response. If you are responding on behalf of a particular region – just address that region. Use the comment sections to clarify points or add information. If you have questions on how to answer a particular section, feel free to email them to Bronte Nicholls - nicholls.bronte2@saugov.sa.gov.au

Please indicate 'Yes' – Y, 'No' – N or 'Not applicable' – N/A. If the answer to the first question is any section is 'No' (N) – please go on to the next section.

…….

COUNTRY/REGION
Country/Region Name:

CONTACT DETAILS
Contact/Author(s) name(s):

Contact Details:

…….

VITAL FACTORS FOR THE SUCCESS OF A PROFESSIONAL DEVELOPMENT PROGRAM FOR TEACHERS

The IGEO Strategy Document for launching a new Earth science educational initiative successfully in a new country or region indicates a series of 'vital factors' that have to be present, or planned for, for the initiative to be successful, as follows:

- *Earth science content in the National Curriculum/standards;*
- *an individual or small team to drive the initiative;*
- *appropriate teaching materials relevant to that country/region to underpin the initiative;*
- *significant funding from, and partnership with, an industrial/charity organization;*
- *a network of support across the country;*
- *access to teachers;*
- *training workshops appropriate for the educational environment;*
- *piloting of the strategy and the workshops;*
- *training of workshop deliverers;*
- *effective central administration and*
- *ongoing monitoring and research.*

The questions below seek to establish if these factors are present.

NATIONAL CURRICULUM/STANDARDS

- Does your country/region have a National Curriculum or National Standards in education that are compulsory across the whole country/region?

- Does Earth science form part of the compulsory curriculum for

5 – 7 year olds?	7 - 11 year olds?	11 - 14 year olds?	14 - 16 year olds?	16 - 18 year olds?

Comment:

KEY INDIVIDUAL OR TEAM

- Is there an individual or small team present in the country/region able and willing to drive a new professional development initiative amongst teachers?

- What are the names and contact details of the individual(s)?

APPROPRIATE TECHING MATERIALS

- Are appropriate teaching materials (such as textbooks, worksheets, practical activities) available in the country/region to support Earth science teaching?

- At what age levels are the materials available? Give examples and comment, where possible

Age	Example(s)	Comment
5 – 7 year olds		
7 - 11 year olds		
11 - 14 year olds		
14 - 16 year olds		
16 - 18 year olds		

FUNDING AND PARTNERSHIP

Without a significant internal source of funding and support, a professional development initiative is unlikely to be successful.

- What are the chances of obtaining significant levels of funding from internal sources (industry/charities/government, etc.) within the country/region? Which of these are likely to want to develop a supportive partnership approach?

Local funding sources are:	Example(s) of possible funders	Possible funder is 'likely' or 'not likely' to want to develop a supportive partnership approach	Comment
Highly likely			
Likely			
May be possible			
Unlikely			
Highly unlikely	X	X	

NETWORK OF SUPPORT

- Is/are there (an) organization(s) in place which could and probably would provide support across the country/region for an Earth science professional development initiative? (These could include, organizations for teachers of science/geography/Earth science, geological societies, geological surveys, museum networks, etc.) Add rows to the table, if necessary.

1. Name of organization 2. Type of organization	3. Organization contact details 4. Support that might be provided	5. Comment

ACCESS TO TEACHERS

- For a professional development initiative to be successful, teachers must be given access to the training provided. To access reasonable numbers of teachers of Earth science, which of the following strategies would be necessary?
  - Training would have to be provided at central locations
  - Training would have to be provided to teachers in their own schools
  - Training would have to be provided free of charge (or at minimal cost)
  - Teaching materials would have to be provided at a cost
  - Teaching materials would have to be provided free of charge (or at minimal cost)
  - If teachers or schools were willing to pay for professional training, around how much would they be willing to pay, per day?
- Comment

A NETWORK OF WORKSHOP DELIVERERS

If a network of professional development delivers were to be provided across the country/region:

- How much would a deliverer expect to be paid for a day's work?
- If they used their own vehicle to travel to schools or central locations, how much would travelling expenses be in normal circumstances?
- Comment

CENTRAL ADMINISTRATION AND MONITORING

- If a person were employed full time to administer the initiative and to monitor performance, what would the likely salary costs per year be?
- Where could such a person be based most appropriately?
- Who would supervise the person?
- Comment

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EARTH SCIENCE OUTREACH

This section seeks to identify successful outreach initiatives that might be transferable to other countries/regions.

- Which organizations/strategies promote Earth science outreach in your country/region?

Indicate how effective each is by: very effective = VE; effective = E; fairly effective = FE
Indicate how widespread each is by: very widespread = VW; widespread = W; fairly widespread = FW

Type of organization		How effective is it?	How widespread is it?	Example	Comment
Museums with Earth science content					
Interactive science centers with Earth science content					
National parks with an Earth science focus					
Parks with an Earth science focus	Local				
	Regional				
	National				
Networks protecting Earth science sites					
Public understanding organizations focussing on Earth science					
Local "rockhound" group					
Group aimed at children					

- Which Earth science outreach programs have been particularly successful?

Add extra rows as necessary

Program	Program description including support structures	Likely reasons for success

- Is/are there (an) organization(s) in place which could and probably would provide support across the country/region for an Earth science outreach initiative? (These could include, geological societies, geological surveys, museum networks, science/geography organizations, etc.) Add rows to the table, if necessary. *(Note: If the response to this question is the same as in the 'VITAL FACTORS FOR THE SUCCESS OF A PROFESSIONAL DEVELOPMENT PROGRAM FOR TEACHERS' above – just indicate – 'as above')*

1. Name of organization 2. Type of organization	3. Organization contact details 4. Support that might be provided	5. Comment

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BENCHMARKING
If your country/region has a National Curriculum or National Standards that are compulsory across the country/region, please indicate which terms appear and at what levels and in which area of the curriculum.

If it is in the science curriculum, write S - if in the geography curriculum, write G - if in the general curriculum write GC - if it is not in the curriculum, write N.

Term	Term is present (S, G, GC or N)	Term is present for: (S, G, GC)				
		5 – 7 year olds	7 – 11 year olds	11 – 14 year olds	14 – 16 year olds	16 – 18 year olds
General material/process terms (37)						
Mineral						
Fossil						
Rock						
Soil						
Atmosphere						
Carbon cycle						
Water						
Water cycle						
River/lake						
Sea/ocean						
Coast/beach/cliff						
Mountain/hill						
Valley						
Wind/eolian						
Ice/glacial						
Rock cycle						
Weathering						
Erosion						
Deposition						
Lithification/compaction/ cementation						
Sediment/sedimentary						
Metamorphic						
Igneous						
Volcano/volcanic						
Eruption						
Magma						
Lava						
Ash						
Melting/melt						
Partial melting/melt						
Fractional crystallization/ magmatic differentiation						
Earthquake						
Seismic/P/S waves						
Focus/epicentre						
Fold/folding						
Fault/faulting						
Deformation						
						Add
						other
						key
						terms
						as
						necessary

Total no. of general material/ process terms included						
Plate tectonic and Earth structure terms (12)						
Plate tectonics/tectonic plate						
Lithosphere						
Asthenosphere						
Subduction						
Magnetic stripes						
Polar wandering						
Mountain building/orogeny						
Continental/oceanic plate						
Crust						Add
Mantle						other
Core						key
Outer core/inner core						terms
						as
						necessary
Total no. of plate tectonic and Earth structure terms included						
Natural resource and natural hazard terms (28)						
Energy source/supply						
Renewable/non renewable						
Sustainable/sustainability						
Groundwater						
Pollution						
Acid rain						
Ore						
Mine/mining						
Quarry/quarrying						
Borehole/well						
Fossil fuel						
Coal						
Oil/crude oil						
Gas/natural gas						
Hydroelectric power						
Solar power						
Wave power						
Wind power						
Power from biomass						
Landslide/landslip/rock fall						
Lahar						
Nueé ardente						
Tsunami						
Storm						
Flood						
Natural hazard						
Prediction/forecast						Add
Disaster planning (or similar)						other
						key
						terms
						necessary
Total no. of natural resource and natural hazard terms included						

Geological time and evolution terms (8)						
Geological time/timescale						
Dating						
Correlation						
Stratigraphy						
Earth history						
Evolution						Add
Natural selection						other
Fossil record						key
						terms
						necessary
Total no. of geological time and evolution terms included						
Rock types (19)						
Sandstone						
Limestone						
Shale/mudstone/clay						
Conglomerate						
Coal						
Peat						
Slate						
Schist						
Gneiss						
Marble						
Quartzite/metaquartzite						
Granite						
Gabbro						
Basalt						
Dolerite						
Volcanic ash						
Andesite						Add
Rhyolite						other
Peridotite						key
						terms
						necessary
Total no of rock type names included						
Approach – terms used in an Earth science context or in a general context that applies to Earth science (20)						
Sort/sorting						
Identify/identification/recognise						
Classify/classification						
Describe/description						
Measure						
Explore						
Explain/explanation						
Fieldwork/in the field						
Plan						
Observe						
Experiment with						
Interpret						
Analyze						
Give evidence						
Predict						

Apply						
Evaluate						
Enquiry						
History of science						Add
Map/mapwork						other
						key
						terms
						necessary
Total no of Earth science-related approach terms included						
Total no of terms included overall (124)						

……

EDUCATIONAL SYSTEM BACKGROUND

- How many years of education are compulsory or what level of education is compulsory?
  - Comment

- Are there local, regional or national tests, which provide baseline information on student learning in the Earth sciences or geosciences?
  - Are these tests compulsory?
  - How are the resulting test data used?

- Are optional Earth science or geoscience courses offered in schools/colleges?
  - At what age are they available?
  - Are they available to all/most/a few/hardly any pupils across the system?
  - What curriculum/syllabus do they offer – all the same/several different ones/a wide variety?

- Do Earth science/geoscience courses satisfy college or university science entrance requirements?

- Comment on the educational system background

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UNDERGRADUATE AND GRADUATE GEOSCIENCE EDUCATION

Do colleges/universities offer:	Approximate number?	Comment
▪ undergraduate degrees in the geosciences or closely related fields?		
▪ geoscience graduate (postgraduate) degrees?		

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GENERAL COMMENT

Please use this area to share other information on your country's geoscience education programs.
Many thanks indeed for your contribution.

This questionnaire should be completed electronically and returned within a month of receipt to:

Dr. Ian Clark,
Dean Teaching and Learning,
School of Natural & Built Environments,
University of South Australia,
Mawson Lakes Boulevard,
Mawson Lakes SA 5095,
Australia

Phone 618 8302 5245
Fax 618 8302 5082

OR VIA E-MAIL to: "Ian Clark" <Ian.Clark@unisa.edu.au>