



## Geoconservation and scientific rock sampling: Call for geoethical education strategies

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Some geological outcrops have a special scientific or educational value, represent a geological type locality and/or have a considerable aesthetical/photographic value. Such important outcrops require appropriate management to safeguard them from potentially damaging and destructive activities. Damage done to such rock exposures can include drill sampling by geologist undertaken in the name of scientific advancement. In order to illustrate the serious damage scientific sampling can do, we give some examples of outcrops from Western Europe, North America and South Africa, important to structural geology and petrology, where sampling was undertaken by means of drilling methods without any protective measures. After the rock coring, the aesthetic and photographic value of these delicate outcrops has decreased considerably. Unfortunately, regulation and protection mechanisms and codes of conduct can be ineffective. The many resources of geological information available to the geoscientist community (e.g. via Internet, such as outcrops stored in websites like "Outcropedia") promote access to sites of geological interest, but can also have a negative effect on their conservation. Geoethical education on rock sampling is therefore critical for conservation of the geological heritage. Geoethical principles and educational actions are aimed to be promoted at different levels to improve geological sciences development and to enhance conservation of important geological sites. Ethical protocols and codes of conduct should include geoconservation issues, being explicit about responsible sampling. Guided and inspired by the UK Geologists's Association "Code of Conduct for Rock Coring" (MacFadyen, 2010), we present a tentative outline requesting responsible behaviour:

- » Drill sampling is particularly threatening because it has a negative visual impact, whilst it is often unnecessary. Before sampling, geologists should think about the question "is drill sampling necessary for the study being carried on?"
- » Do not take samples from the centre of a geological type locality or a site of especial scientific, didactic interest or aesthetical/photographic value. If an outcrop is spectacular enough to be photographed, then you should not core or sample the rock face that has been recorded. The same applies to outstanding outcrops stored in websites.
- » Sample other parts of the same or a neighbouring outcrop where there is less impact. Core samples must be discrete in location; take cores from the least exposed, least spectacular part of an outcrop and try to plug the holes using the outer end of the core, if possible.
- » Before sampling ask experts and authorities (e.g. Natural Reserve or National Park managers if the area is protected) for advise and permission.

### References:

MacFadyen, C.C.J., 2010. The vandalizing effects of irresponsible core sampling: a call for a new code of conduct: *Geology Today* 26, 146-151.  
Outcropedia: <http://www.outcropedia.org/>