

FIGHTING FOR GEOSCIENCE EDUCATION IN SPAIN

Amelia Calonge, José Luis Barrera, Marcos Aurell and Jesús Martínez-Frías

For the last 20 years, the geosciences have been included as part of the standard high school curriculum in Spain. Students have not been required to learn a lot about the field, but there has been some emphasis on geoscience principles. Then, last year, the Ministry of Education proposed a law that would remove geoscience from the list of required courses taught in secondary schools. If the law were approved, a student could reach university without having had a single course in any geology-related subject. This would constitute nothing less than a geoeducational extinction event in Spain.

The proposal of this new law has greatly concerned the geological, scientific, academic and professional communities of Spain, who have protested it. Earlier this year, after a major response from the Spanish geological community, the ministry presented a second version of the law, in which the geosciences are given more consideration, but it still represents a reduction in geoscience exposure.

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The serious problem affecting geoscience education in Spain can only be understood in the framework of the country's larger educational crisis. Over the last three decades, in virtually every parliamentary term, the incoming

government has launched a new educational program, which prevents the strategic, long-term vision required to maintain consistency and quality in the educational system.

Principal factors affecting geoscience education are:

- Certain scientific disciplines, like geology and biology, are considered "weak" compared to other "hard" sciences, like physics and chemistry, and are thus less favored for inclusion in academic programs.
- More so than for other disciplines, academic standards for the natural sciences are left to local control, which, in some cases, allows biased teaching methods marked by ideological interventionism and indoctrination.
- Some Spanish geologists, who have not fully realized the significance of these problems, have remained silent.

It is no wonder that, based on dropout rates, Spain was ranked third among European countries with regard to "school failure," just after Malta and Portugal, in a recent UNESCO report.

Education in Spain is compulsory for all pupils under age 16, and schooling is organized into three stages, roughly equivalent to elementary, middle and high school in the United States. In primary school (6 to 12 years old), the students take a general science class called

"conocimiento del medio" (environment knowledge) with only scarce geological content (mainly earth materials).

In compulsory secondary school, or ESO (12 to 16 years old), the same thread is followed and a single science subject, again with little geological content (nature science), is taught in the first two years. In the last two years of this cycle, the subject "biology and geology" is separated from the other sciences, becoming an optional subject in the last year; thus, only some students learn about plate tectonics and the theory of evolution.

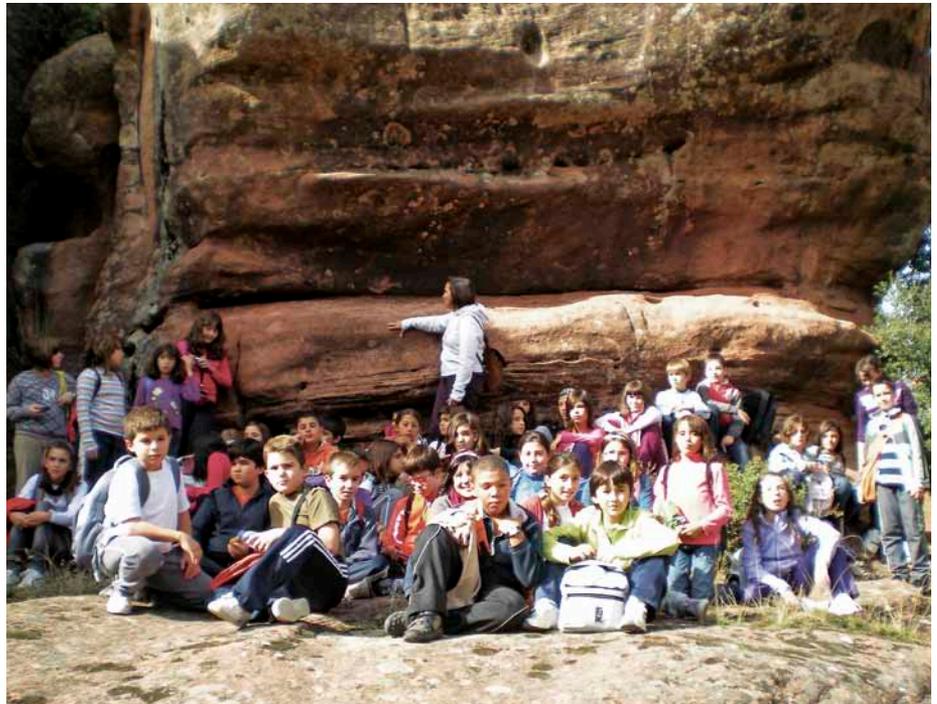
Once the compulsory ESO is finished, young people can choose whether to attend two more years of high school ("bachillerato"). In recent years, about 73 percent of students have opted to go on to high school, but only 45 percent of them have graduated. At this level, earth science is an optional subject, usually taught in one of the technical bachilleratos: scientific, bio-sanitary or scientific-technological. Other bachilleratos, including humanistic, linguistic and artistic, require no earth science course at all.

The first version of the Ministry of Education's new law, called the "Organic Law to Improve the Quality of Education (LOMCE)," proposed to cut biology and geology from the secondary school program, meaning students would only study physics and chemistry. Students could thus finish compulsory education without learning any geoscience. But the situation was even worse in the optional bachillerato, where neither a single mandatory course with geoscience content would be required, nor an optional geoscience course even offered. A Spanish student would have been able to graduate high school following the "sciences route" without having studied a single subject related to geology and biology.

Following the recommendations made by the main international geoscientific institutions — including

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The authors contend that all students should have some geology education, including hands-on experiences and field opportunities, like this primary school trip to Alto Tajo Natural Park in Guadalajara, Spain, coordinated by Amelia Calonge.



the IUGS Commission on Geoscience Education, the International Geoscience Education Organisation, the European Federation of Geologists, and the U.S. National Science Foundation Earth Science Literacy Initiative — Spanish scientific associations and societies demanded that the LOMCE be amended. They requested that the bachillerato sciences route include a specific geology course; that all bachillerato students have a mandatory class related to biology and geology, regardless of the selected route; and that all ESO students have at least one course with geoscientific content.

Such a collective protest by the geological community had not happened before in Spain, and the mobilization has started to yield results. The second version of the LOMCE law now places geology at the same level as other basic scientific subjects, both in the first and second parts of high school. However, the situation is not completely resolved, as the sciences in general are given unfavorable treatment.

The law is still in draft form and is currently being considered in parliament, so the outcome remains uncertain. Accordingly, we have met with the main parliamentary groups involved, which, despite their differences, have been very receptive so far. Thus, while the current situation allows us to harbor faith, it is still necessary to continue mobilizing the geological community to speak up for itself.

If we do not teach our children about science, and especially earth science, how will they be able to solve the international challenges associated with the consequences of natural disasters, increasing populations, decreasing resources and the potential consequences of climate change? Take a look at any newspaper and you will see that two out of three scientific news items, and quite a few social news items, are related to the geosciences — particularly in relation to health, the environment and natural disasters.

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compulsory education with at least a basic geoscientific literacy that allows them to comprehend, appreciate and participate in critical issues that affect us all.

Calonge is president of the Spanish Earth Science Teaching Association and professor of paleontology and geology at the University of Alcalá. Barrera is vice president of the Spanish Association of Professional Geologists, main editor of its journal *Tierra & Tecnología*, and a member of UNESCO's International Commission on the History of Geological Sciences. Aurell is president of the Geological Society of Spain, professor of stratigraphy and sedimentology at the University of Zaragoza, and associate editor of the *AAPG Bulletin*. Martínez-Frías is chair of the IUGS-Commission on Geoscience Education-Training and Technology Transfer, head of the department of planetology and habitability at the Centro de Astrobiología, and former vice chair of the UN Commission on Science and Technology for Development. The views expressed are their own.