



## Teaching and learning the geological knowledge as a part of the science education general field

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Since the early 50s of last century the Teaching of Science has undergone a process of continuous development, (Gutiérrez, 1987; Aliberas, Gutierrez and Izquierdo, 1989) to become a scientific discipline largely accepted as such by many different universities worldwide. Besides, the proliferation of publications, magazines, conferences, symposia, meetings, and so on, proves this assertion. In these publications and meetings the Teaching of Science (or Science Education in more general terms) is addressed as a new field of research, teaching and educational innovation focused on the processes of teaching and learning of the experimental sciences (all of them: Physics, Chemistry, Biology and Geology). The study of this discipline is undertaken from different pedagogical, epistemological, psychological and sociological approaches. From this general perspective we can say that over the last two decades each of the sciences has developed specific characteristics so that, today, we could speak about specific didactics for each one of them. In the case of Geology (or Geoscience) Teaching there have been significant contributions from the following fields of research: the students' prior ideas (constructivist approach), the history of geology (as a subject-specific field) and from epistemology (Pedrinaci, E. 2000). The body of geoscience knowledge has an internal logic (as happens with the other science subjects) that allows us to organize the contents to teach, selecting, arranging and establishing proper relations between them. Still geology has a central, transverse, inter-and transdisciplinary character for its relationship with the other sciences. This character makes it appear as one of the disciplines with a huge potential to combine different methodologies of teaching and learning and different learning models already tested in the research field of Physics, Chemistry or Biology Education. Moreover, the most recent term coined for it "geosciences or earth and space sciences" emphasizes still further such character receiving the contributions of physics, chemistry, biology and environmental science in a kind of scientific-technical mixture which enriches the discipline itself and constitutes a fundamental basis for the evolution of knowledge in its broadest sense (Martinez Frias et al. 2008). In this paper we propose to show some of the experiences and didactic innovations in the teaching of geology found in the scientific literature in recent years and likewise part of an author's own work on the establishment of analogies on the time variable based on Carl Sagan's cosmic calendar. With these analogies we try to approximate geologic times to the understanding of high school and first university courses students (Aguirre-Perez, C. 2008)

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