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How not to miss a great opportunity? A closer look at teaching geosciences in formal education systems

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Pre-university education is the most comprehensive channel of communicating verified and uniform science information to young people. Despite this foundational role, how that science is taught in schools seems often overlooked, with more attention devoted to the efficacy of alternative education pathways. We argue that effective formal science education is crucial as it nurtures future willingness to embrace new scientific information, shapes perceptions, and promotes “intellectually sustainable” attitudes towards the abiotic environment and its dynamic nature. In particular, inquiry-based teaching is necessary for students to be open to life-long learning and critical thinking as adults when they inevitably confront the effects of climate change, increasing risks from natural hazards, environmental change and simultaneous expansion of social media as a basic, if not primary, source of information about the world. Based on the analysis of Polish education system and curricula, and on interviews with geosciences teachers participating in targeted workshops, we identify systemic aspects of formal education that influence effectiveness of science communication likely to affect student attitudes, with particular regard to geohazards, related risks and to environmental protection. Factors that influence effectiveness of that education include (i) adequate knowledge transfer between fast-developing geosciences and the education system, (ii) progress in geosciences education and didactics research, (iii) long-term teacher training, (iv) progress in development and availability of innovative education tools, (v) development, construction and topicality of geosciences curricula content, (vi) degree of freedom by the teachers in interpretation and following the curriculum content, and (vii) consistency in curriculum content throughout the education cycle and across subjects that include geosciences topics. Coordination of these aspects is challenging, especially since each is designed, driven, supervised and often financed by different actors. Particular attention should be given to the timely incorporation of current scientific knowledge into school curricula to avoid significant time lags in the content of communicated information and resultant collation of contradictory messages that students receive. Finally, we emphasize the urgent need for development of post-diploma education programmes and similar initiatives that will support geosciences teachers