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Digital field mapping for stimulating Secondary School students in the recognition of geological features and landforms

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Digital field mapping has certainly provided geoscientists with the opportunity to map and gather data in the field directly using digital tools and software rather than using paper maps, notebooks and analogue devices and then subsequently transferring the data to a digital format for subsequent analysis. But, the same opportunity has to be recognized for Geoscience education, as well as for stimulating and helping students in the recognition of landforms and interpretation of the geological and geomorphological components of a landscape. More, an early exposure to mapping during school and prior to university can optimise the ability to "read" and identify uncertainty in 3d models.

During 2014, about 200 Secondary School students (aged 12-15) of the Piedmont region (NW Italy) participated in a research program involving the use of mobile devices (smartphone and tablet) in the field. Students, divided in groups, used the application Trimble Outdoors Navigators for tracking a geological trail in the Sangone Valley and for taking georeferenced pictures and notes. Back to school, students downloaded the digital data in a .kml file for the visualization on Google Earth. This allowed them: to compare the hand tracked trail on a paper map with the digital trail, and to discuss about the functioning and the precision of the tools; to overlap a digital/semitransparent version of the 2D paper map (a Regional Technical Map) used during the field trip on the 2.5D landscape of Google Earth, as to help them in the interpretation of conventional symbols such as contour lines; to perceive the landforms seen during the field trip as a part of a more complex Pleistocene glacial landscape; to understand the classical and innovative contributions from different geoscientific disciplines to the generation of a 3D structural geological model of the Rivoli-Avigliana Morainic Amphitheatre.

In 2013 and 2014, some other pilot projects have been carried out in different areas of the Piedmont region, and in the Sesia Val Grande Geopark, for testing the utility of digital field mapping in Geoscience education. Feedback from students are positive: they are stimulated and involved by the use of ICT for learning Geoscience, and they voluntary choose to work with their personal mobile device (more than 90% of them own a smartphone); they are interested in knowing the features of GPS, and of software for the visualization of satellite and aerial images, but they recognize the importance of integrating and comparing traditional and innovative methods in the field.