Learning geology using VR: student feedbacks on the VirtuaField applications

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Aix Marseille University launched the VirtuaField project whose objective is to integrate DOMs into a VR application to provide students with a pedagogical tool enabling learning field practice.

Indeed, students have few occasions to train in the field during their academic curricula. Field trips are expensive and require a complex logistics. Nowadays, the photogrammetry or LIDAR techniques allow geoscientists to obtain High-Resolution 3D representations of outcrop geometries and textures, often termed as Digital Outcrop Models (DOM). DOMs are already used as pedagogical supports for practical exercises on computers such as fault throw or seismic occurrence calculation, or modelling 3D geological structures from outcrop interpretations. However, these exercises do not cover all required skills to gain autonomy and consistence in the field, such as the pertinent observation sampling. The computer engines are not convenient support for that task because the visualization, although in 3D, still depends on a 2D screen and does not preserve the 1:1 scale, which is of paramount importance for Geoscience interpretations.

The Virtual Reality (VR) technique is the ultimate way to provide a full 3D view, which can preserve the 1:1 scale, while benefiting from the numerical nature of the support (DOMs, DEM).

First prototypes were provided by the VR2Planets company from the case study of La Fare les Oliviers (SE France), which shows diffuse fractures and fracture corridors, in addition to sedimentological and geomorphological structures. The prototypes have been tested in training experiences with volunteer students. Surveys have been performed in order to obtain feedbacks from students on the ability of the VirtuaField application to gain field skills, but also on the more pertinent way to design the pedagogical tools. The synthesis of these feedbacks will be presented as well as a first outline of the pedagogical guidelines on using VR tools for educational purposes.