Geophysical Research Abstracts
Vol. 21, EGU2019-8118, 2019
EGU General Assembly 2019

Learning outcomes from the EGU 2018 Public Engagement grant "Shaping geological 3D virtual field-surveys for overcoming motor disabilities"

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This work describes the innovative outreach initiative held at the University of Milano-Bicocca (Italy) related to the EGU 2018 Public Engagement Grant awarded for the project titled: "Shaping geological 3D virtual field-surveys for overcoming motor disabilities".
The Public Engagement project aims to create equal opportunities for all students in Earth and Environmental Sciences. The primary purpose of this granted project is to immerse the gamers, thanks to immersive virtual reality (VR), into a 3D geological environment, generated through the Aerial Structure from Motion Photogrammetry technique (for on-shore and near-shore sites), and by using data from ship-based acoustic and visual surveys (offshore). All students, also the ones with motor disabilities, can indeed benefit from the immersive VR, which allows all of them to receive the same level of learning experience thanks to virtual geological field trips. At a general level, such kind of activity represents also an excellent opportunity to experiment a new teaching technique through immersive VR.
The outreach event was attended by 40 people who had the opportunity to explore and interact with 3D onshore and offshore environments accompanied by a trained user. The students took pictures, collected geological data (e.g., attitude, length) and flew virtually above the area, just like a drone. The 3D geomorphological landscapes used in the activity were derived from unmanned aerial vehicles (drones) and field surveys in the framework of the Italian Argo3D project (http://argo3d.unimib.it/), the 3DTelc Erasmus+ project (http://3dtelc.lmv.uca.fr/), the EUFP7 CoralFISH project (http://eu-fp7-coralfish.net/), the Italian Marine Strategy activities and the MaRHE GIS and photogrammetry project (http://www.marhe.unimib.it/activities/marine-research-activities/environment/gis). The targeted areas were the Mt Etna and Mt Vesuvius volcanoes, the Santorini volcanic complex, glaciers from the Alps, fractures and volcanoes from Northern Iceland, coral reefs from the Maldivian Atolls and the Santa Maria di Leuca, cold-water coral Province (Ionian Sea).
Finally, the participants provided feedback on their 3D interactive experience via an anonymous questionnaire. The latter enabled us to improve our approach, create new strategies and enhance the use of VR for further educational applications. In agreement with the University's headquarters, we have planned on running this event annually, and we started collaborating with non-profit organizations to arrange ad-hoc events targeted to non-academic audiences, affected by motor disabilities.