NEW METHODOLOGIES FOR THE PROMOTION OF GEOLOGICAL HERITAGE USING MULTIMEDIA TECHNOLOGY, 3D AND AUGMENTED REALITY

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The Internet and several hardware and software options that are currently available are very efficient ways for the promotion of geoparks, geoheritage and geosciences.

The aim of this paper is to present a new and interactive way of gathering data into a website, based on several new web and photogrammetric technologies, applied to the Terras de Cavaleiros Global Geopark (Portugal).

For this purpose, the open source language WebCL was used to make available a three-dimensional and fully interactive 3D model of the area, which allows the insertion of layers representing features such as geology, geomorphology, hypsometry, slope and many other layers. This model allows the access to several levels of information, with geographical context, made available by using clickable hotspots. Those layers include real landscape panoramic images, from which several embedded levels of information can be accessed through overlaid clickable hotspots and visual interpretation guides. These images, covering the entire surrounding environment, can be used on the field, pointing to the real observed features and, interactively, gather more knowledge about them. The point of view can be synchronized with the real landscape by using sensors from most nowadays-portable platforms. These sensors include GPS, accelerometers, gyroscopes and magnetic compasses. This way, these panoramic images can be used as augmented reality technology, acting like a virtual guide for the landscape. The information from both the 3D terrain model and the panoramic images, include text, videos, animated interpretative models, links to websites, etc. In some cases, were also produced 3D digital surface models, using photogrammetric 3D restitution techniques from images collected in field by using Unmanned Aerial Vehicles (UAV's). These models can be textured with real image information and are fully interactive, allowing the visualization from several viewpoints. This can represent a new way of visualize geological features that are not clearly or visible, or even impossible to see, from a ground viewpoint.

All this experience is easily accessible from locations were the network signal is stable and fast. Problems can occur in remote locations, common in geoparks, were there's no network signal or this signal has not enough quality to provide a pleasant experience. In this case, offline data can be provided or, in the case were there's a limited network signal, the placement of small QRCodes can allow the access of links with the contextual partial information about each site.