

Interacting with Existing 3D Photorealistic Outcrop Models on Site and in the Lab or Classroom, Facilitated with an iPad and a PC

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Utilizing 3D photorealistic outcrop models for research and education is becoming more and more common in industry and academia. A system is presented for annotating on preloaded distortion-free photos used for model construction while in front of a real outcrop or a virtual 3D model in the lab or classroom. This interaction is accomplished through tracing geologic boundaries, writing notes and recording locations using an applet on an iPad. These geologic tracings are sent to a PC where 3D geometric information is extracted with a provided MatLab program. Annotations on the photo can then be visualized on the 3D model because control points from the model building process link 2D pixels on the photo with the 3D mesh by six transformation coefficients. The MatLab Program separates meaningful geological information based on pixel value defined by geologists for further analysis (strike/dip, rock type, etc). Therefore geological features can be attributed, annotated, quantitatively analyzed and visualized in 3D or 3D stereo with available software. The University of Texas at Dallas as well as other groups have been creating such 3D models with laser scanning, GNSS (Global Navigation Satellite Systems) and digital photography since 1998. This approach can be used on any photorealistic model built based on the transformation correlation between imagery and 3D geometry. A website www.utdallas.edu/iGeology provides access to several such models of road-cuts across the Arbuckle Anticline, Oklahoma. An instructor/project leader can access and setup the environment for students/users. This is not a field geologic logging/mapping system but designed for interacting with and extracting quantitative from existing virtual models for research and education. Computations taking place on the PC are transparent to the user, and therefore the system can be readily used in academia and industry at many different levels of expertise. The tablet's portability enables users to interact with the outcrop in the field or with a 3D display in the lab. Similar applications can be built on android tablets.