C-29 A NEW TECHNIQUE FOR 3D RESTORATION OF FLEXURAL SLIP FOLDS

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A new structural restoration and forward modelling flexural slip technique for three-dimensional (3D) digital models has been developed. The flexural slip method preserves volume in 3D, line length (of the template surface and layers parallel to this surface) in a given unfolding direction and orthogonal bed thickness. The model surfaces need not be parallel to each other. These constraints allow 3D fault-propagation, fault-bend and detachment folds to be restored or forward modelled.

The algorithm utilizes a 3D surface model composed of irregular, triangulated meshes. For a given model, a parallel, sinuous slip system is calculated from a fixed surface through all the vertices of the triangulated meshes in the specified unfolding direction. The slip system is unfolded and the triangle vertices are transformed with the system to their restored locations, to generate an unfolded 3D surface model.

The 3D restoration technique is showcased by using a case study of a German, evaporite-cored compressional fold. The restorations illustrate the sequential growth of the fold through late Mesozoic and Tertiary time. By incorporating compaction in the restorations, the distinction between compactional fold growth and tectonic fold development is presented.

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