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Space-time evolution of a growth fold (Betic Cordillera, Spain). Evidences from 3D geometrical modelling

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We present a study that encompasses several software tools (iGIS©, ArcGIS©, Autocad©, etc.) and data (geological mapping, high resolution digital topographic data, high resolution aerial photographs, etc.) to create a detailed 3D geometric model of an active fault propagation growth fold. This 3D model clearly shows structural features of the analysed fold, as well as growth relationships and sedimentary patterns. The results obtained permit us to discuss the kinematics and structural evolution of the fold and the fault in time and space.
The study fault propagation fold is the Crevillente syncline. This fold represents the northern limit of the Bajo Segura Basin, an intermontane basin in the Eastern Betic Cordillera (SE Spain) developed from upper Miocene on. 3D features of the Crevillente syncline, including growth pattern, indicate that limb rotation and, consequently, fault activity was higher during Messinian than during Tortonian; consequently, fault activity was also higher. From Pliocene on our data point that limb rotation and fault activity steadies or probably decreases. This in time evolution of the Crevillente syncline is not the same all along the structure; actually the 3D geometric model indicates that observed lateral heterogeneity is related to along strike variation of fault displacement.