Geophysical Research Abstracts
Vol. 21, EGU2019-13411, 2019
EGU General Assembly 2019

Understanding the geomorpholgy of the Gulf of Vera (western Mediterranean): clues from offshore and onland structures

Gemma Ercilla (1), Jesus Galindo-Zaldivar (2,3), Javier Valencia (4), Victor Tendero-Salmeron (2), Ferran Estrada (1), David Casas (5), Belen Alonso (1), Elia d'Acremont (6), Menchu Comas (2), Juan Tomas Vazquez (7), Carlos Sanz de Galdeano (2), Patricia Ruano (2,3)

(1) Instituto de Ciencias del Mar, CSIC. Barcelona, Spain. (gemma@icm.csic.es, festrada@icm.csic.es, belen@icm.csic.es), (2) Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR), Granada, Spain.(jgalindo@ugr.es, vtendero@ugr.es, mcomas@ugr.es, csanz@ugr.es, pruano@ugr.es), (3) Departamento de Geodinámica, Universidad de Granada, Granada, Spain., (4) LYRA, Engineering Consulting, Vitoria, Spain. (javi.valencia.m@gmail.com), (5) Instituto Geológico y Minero de España, Madrid, Spain. (d.casas@igme.es), (6) Sorbonne Université, CNRS-INSU, Institut des Sciences de la Terre Paris, ISTeP UMR 7193, Paris, France. (elia.dacremont@sorbonne-universite.fr), (7) Instituto Español de Oceanografía-IEO, Fuengirola, Málaga, Spain. (juantomas.vazquez@ieo.es)

Based on seismic geomorphology, geomorphometry, sedimentology and tectonic analysis, new clues have been obtained to understand one of the margins with the most complex morphology in the Spanish Mediterranean. The physiography of the Gulf of Vera comprises a continental shelf break located at 20-200 m water depth and a relatively wide (60 km) continental slope that extends down to about 2500 m water depth, where it connects with the Algero-Balear basin.. The slope profile is irregular, with large escarpments, slope platforms and intraslope basins. Its morphology is defined by a great variety of tectonic and sedimentary features, being the most striking ones: i) three main elongated structural highs, with different trends (WSW-ENE to SW-NE) and nature (volcanic and metamorphic); ii) three large scale mass-transport deposits (MTDs) extending from the upper to the lower slope. Two of them are incised by prominent W-E canyons (up to 80 km long) whose enlargement is controlled by the gravitational instability of their walls; iii) minor-scale MTDs (few to tens of kilometres long) that spread practically throughout the rest of the continental slope; and iv) local contourites in the upper slope. In the adjacent basin, the most outstanding seafloor features are numerous alignments (mostly SW-NE) of piercement structures related to the Messinian salt diapirs.

The formation of those features is consequence of the deformation of the continental margin in the frame of the NW-SE Eurasian-African plate collision. In this setting, tectonic deformation is favoured by the presence of the thin continental crust of the continental margin, between the more resistant oceanic crust of the Algero-Balear basin and the thick continental crust of the eastern Betic Cordillera. The Gulf of Vera, that is located within the Aguilas tectonic indentation domain, is defined by northwestward indentation of the Internal Zones of the Betics and the related development of the sinistral Palomares fault. Contrasting with the W-E folds in the central-eastern Betic Cordilleras, the SW-NE to WSW-ENE elongated highs in the continental slope, represent antiformal structures that are consequence of the accommodation of the tectonic indentation. This recent deformation determines the tilting of the margin that may provoke changes in the slope gradients and in the margin base-level. This fact together with the presence of Messinian salts could be responsible of the significant sedimentary instability displayed by the Gulf of Vera continental slope. Those areas of the upper slope where the bottom currents activity is relatively more important, a contouritic slope terrace is sculpted. The tectonic indentation would have also conditioned the distribution and trend of the piercement structures related to the Messinian salt diapirs.