

Genesis and evolution of the Ibiza slide

Vansteenberge Stef¹, David Van Rooij¹, Thomas Vandorpe¹ and Pere Puig²

¹ Renard Centre of Marine Geology, Department of Geology and Soil Science, Ghent University, Krijgslaan 281 S8, 9000 Ghent, Belgium
E-mail: Stef.Vansteenberge@UGent.be

² Institut de Ciències del Mar (CSIC), Passeig Marítim Barceloneta 37, 08003 Barcelona, Spain

Ibiza, or Eivissa, is the third largest island of the Balearic archipelago in the western Mediterranean Sea and is located 80km off the coast of eastern Spain. The Balearic Islands are part of the Balearic Promontory, a SW-NE orientated elevated land mass which is separated from the Spanish mainland by the Valencia Through. The Ibiza slide is a submarine mass-wasting remnant on the seabed slope at the southern edge of the Valencia Through and at the NE of the Ibiza Island.

Submarine mass-wasting is an important process in gravity-driven sediment dynamics along sloping seabeds. Understanding the mechanisms of mass wasting is of high importance for marine sciences, due to its large contribution in transporting sediments to deeper parts of the basin and because of mass-wasting is an important source for geohazards such as tsunamis. One main characteristic of slides is that the internal structure is more or less retained, unlike other types of mass-wasting such as debris flows or turbidity currents. Slides can be triggered by processes that lower the internal sediment strength (e.g. change in pore water and gas pressures, rapid sediment deposition, etc.) as well as external forces that exceed the internal strength (e.g. storm waves, earthquakes, etc.).

The study contains two main goals. The first is the structural analysis of the slide, being the spatial characterization within the Ibiza slope system. Secondly, a model is constructed for the timing and genesis (i.e. the possible triggers) of the Ibiza slide with respect to the geodynamic and palaeoceanographic evolution of the Balearic Islands.

The morphology and structure of the Ibiza slide are determined by seismic profiling. Two different types of seismic data are available. Single channel seismic data, obtained with a sparker seismic source, provides high resolution subsurface images. High resolution sub-bottom profiles were acquired with a TOPAS (topographic parametric sonar) seismic profiler. Processing of the seismic profiles is done with 'The Kingdom Suite' and 'RadExPro' software. Other data include a detailed multibeam bathymetric map with corresponding backscatter images and recent hydrographic data.

The time model is deduced by relative stratigraphic analysis of the slide and the surrounding sedimentary units on the processed profiles. Constraints on the genesis and trigger mechanisms of the slide can be given by the seismic profiles as well as the bathymetric map. Multibeam data revealed pockmarks, or crater-like depressions in the seabed caused by fluid seepage, in the vicinity of the slide area. This indicates fluid migration as a possible trigger for the Ibiza slide.

References

- Lastras G. *et al.*, 2004. Shallow slides and pockmark swarms in the Eivissa Channel, western Mediterranean Sea. *Sedimentology*. 51:1-14.
- Lee H.J. *et al.*, 2007. Submarine mass movements on continental margins. *Continental margin sedimentation: from sediment transport to sequence stratigraphy*. 213-275.