



Large pockmarks in the Landes Plateau (Bay of Biscay)

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The Bay of Biscay is a large wedge-shaped re-entrant of the eastern Atlantic Ocean and is bordered by dissimilar continental margins, the Cantabrian or north Iberian margin that trends W-E and marks the boundary of the Iberian plate, and the French or Armorican margin that trends NW-SE. In the western part of the bay, acoustic data consisting of multibeam bathymetry, TOPAS and Airgun single channel seismic profiles were collected during MARCONI cruise. These data have allowed an analysis of the Landes Plateau (French margin) seabed and a field of pockmarks (at least about 28 pocks) and collapse structures have been identified. These seabed features are located on the upper continental slope, between 1200 to 2000m water depths.

Pockmarks are near-circular in plan view with very large dimensions ranging from 800 to 1500m diameter and a relief from 10 to 50m depth. Common pockmarks cross section is V-shaped (symmetric) in seismic profiles, but in inclined seabed they appear partially asymmetric. They appear isolated or forming NE-SW aligned groups. Some of these groups became to create a unique elongate depression of very large dimensions (up to 4km). Collapse structures on seabed related to deep diapirism also have been defined. These structures form an irregular seafloor with sub-circular positive and negative relief that affect an area of tens of square kilometres. Pockmarks have been also identified inside that area.

Pockmarks are not exclusively found on the present seafloor of Landes Plateau. Ancient buried pockmarks vertically stacked are identified below the same point where seabed pockmarks are located. The seismic facies analysis indicates that superficial pockmarks are not presently active. Buried pockmarks are truncating Late-Miocene (down to 300ms) to Late-Pleistocene deposits whereas Late-Pleistocene to Holocene deposits mimics the V-shape seabed depressions without truncation of internal reflectors.

For Landes Plateau pockmarks field is proposed an origin of fluid up migration controlled by the availability of pathways (faults, fractures and weakness in the fabric of the overlying sediment) created in Neogene sediments by updoming and tension produced below. Buried Upper Paleogene series are affected in this part of slope to high deformation due to halokinesis, associated with abundant salt diapirism (Cholet et al., 1968). There are no geophysical evidences of gas accumulations in this area but the pockmark morphology suggests probably gas rise into uppermost sedimentary horizons. The “vertical spreading” in buried pocks, implies that they develop consistently above the same point during a long time period indicating no changes in the pathways used by fluid up migration. The presence of collapse structures, pockmarks inside these structures, the alignment of some pocks and their vertical spreading, all suggest that gas migration through fault associated to diapirs development. Nevertheless two incognita remain unresolved: the origin of gas and the factor that controlled the end of activity of pockmarks formation at Late-Pleistocene time.

REFERENCES

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