
In situ explorations of pockmarks and their ecosystems on the Sonora transform ridge (Guaymas basin)

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Résumé

In the Guaymas basin along the Sonora transform ridge, multibeam bathymetry associated with acoustic anomaly mapping, were used to identify possible cold seep sites. Where water column anomalies exist, the AUV was deployed to produce fine-scale bathymetry and backscatter maps of less than 2 m resolution. Based on these maps, the submersible Nautilie conducted *in situ* visual explorations which helped us to identify the accurate location and type of seepages on the ridge and the dominant taxa associated with seeps (chemosynthesis-based, symbiont-bearing fauna).

- A pockmark 40 m in diameter and 3 m in depth was identified on the **Madero site**, where high-resolution data and *in situ* explorations produced unprecedented views. The chemosynthetic fauna sampled show Vesicomidae bivalves (*Phreagena soyoae* and *Calyptogena pacifica*) with few bacterial mats within proximity. Gas and oil bubbles were observed escaping from carbonate blocks.

- The summit area comprises two active vent fields: **Ayala**, located on the north-east facing wall and **Juarez**, on the south-west facing wall. The summit is constituted of massive carbonate outcrops reaching 5 to 7 m high, with isolated hard and dark pieces of rock sometimes stuck in the carbonates (possibly consolidated sediments). In situ investigations revealed the presence of a dense Vesicomidae clam population at Ayala site (*P. soyoae* dominant, *C. pacifica*, *Archivesica gigas*) and Siboglinidae polychaete tubeworms (*Lamellibrachia barhami* and *Escarpiia spicata*), on the Juarez area.

- Two hundred meters west of the **Vasconcelos** site materialized by large white and grey bacterial mats and numerous Vesicomidae bivalves (*A. gigas* dominant, *P. kilmeri*), lies "pockmark 4" 60 m in diameter and 2 m in depth. A quick overview of this site shows localised white patches of bacterial mats, with scattered, empty vesicomid shells.

- The **most western pockmark** (950 m to the NW of Vasconcelos site), 100 m in diameter and 3 m in depth, is clearly identified on the bathymetry and backscatter data. Unfortunately, it was not explored in situ and no water column acoustic anomalies were

*Intervenant

reported at this site.

The discovery of several active fluid emission sites on the transform ridge of Sonora, highlights the different types of seeps and emphasizes the pockmark structure as one of the main types present here. The *in situ* explorations also revealed the diversity of chemosynthetic and symbiotrophic fauna that inhabit the seeps in this area.