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Chemoherm formation and chemosyntetic fauna related to hydrothermal venting during continental rifting

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We present data of a new type of hydrothermal seafloor vent formed during continental rifting and supporting chemoherm formation and chemosynthetic communities. A $\sim$110 Ma Albian reef platform was cut by extensional faults during the opening of the Bay of Biscay. Sediments in the subsiding hangingwall of the fault blocks consist of chemosynthetic carbonates with abundant vent fauna that alternate with carbonate breccias and calcarenitic deposits. Contemporaneous dolomitization along the fault zone and in rock-fall breccias abutting the fault paleo-scarpment suggests synsedimentary hydrothermal-fluid discharge. Precipitation of ankerite in shallow fluid conduits and δ^{18}O and δ^{13}C isotope data from vent fauna and chemical precipitates further supports hydrothermal fluid venting at the seafloor. In this fossil vent mixing of hydrothermal fluids and seawater in a continental shelf (water depth $<$ 100m) regulated microbial productivity and proliferation of chemosynthetic communities similar to those currently observed in deep-sea water hydrothermal vents at mid-ocean ridges.

The well-preserved vent-related chemoherms are characterized by ferrugineous microbial-sponge-serpulid carbonate constructions. Typical carbonate mounds range from 2-8 m high and 5-20 m wide. They consist of iron-rich micrite with scarce silt-size bioclasts and planktonic foraminifers, bacterially-induced peloidal micrite and Fe-biofilms. Associated benthic fauna are abundant worm tubes, siliceous sponges, bryozoans, brachiopods and bivalves. Large clusters of worm tubes are embedded in a matrix of Fe-biofilms formed in-situ by activity of possibly neutrophilic Fe-oxidizing bacteria. The interaction between chemosynthetic bacteria and high amounts

of dissolved Fe in the seawater could lead to precipitation of Fe-oxides preserved as hematite (Fe_2O_3). Large amounts of dissolved silica in the seawater were also needed to support the mass-occurrence of siliceous sponges spatially associated with the microbial mounds. The hydrothermal vent chemoherms and fauna of the outcrop were sealed by marly slope deposits formed during progressive deepening of the fault hangingwall block.