Spatial distribution of chemosynthetic fauna determined by extensive AUV digital-image survey within a 15 km2 portion of the central graben of a salt-formed ridge in the Gulf of Mexico

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The continental slope of the Northern Gulf of Mexico has supported extensive exploration for and development of hydrocarbons since the early 1980's. Due to the very complex geology which is greatly impacted by salt tectonics, successful development requires a very advanced level of geological and ecological investigation (Kassarie et al submitted). Such industry investigations are typically more numerous and extensive that research for strictly scientific purposes. This contribution reports on an AUV digital-image survey of a 3km by 5 km area of seafloor lying within a 2.5km wide central graben (Jackson and Hudec 2017) of a 15km long ridge. One hundred fifty-four N-S and 9 E-W continuous linear mosaics were created from more than 500,000 digital images taken at an elevation of 5m above the seafloor. These were reviewed and the condition of bottom as well as chemosynthetic fauna recorded. Geospatial analysis was carried out using ArcMap 10.5. In spite of the topographic complexity of the central graben 96.6% of the surveyed area was mud bottom. Mussels were the most common chemosynthetic fauna encountered but covering only 0.47% of the area. Tubeworms were far less common. Organisms were clustered in relatively small sections within areas of high bottom reflectivity suggesting that active points of adequate methane flux are small features. A more enigmatic finding were shell beds which carpeted bottom in the vicinity of living chemosynthetic animals, but also occurred in isolated small clumps removed from high-reflectivity bottoms. These may represent transient populations in areas that experienced short-duration seepage. Using open databases, the survey area is compared to general patterns of salt bodies and positive seafloor anomalies in the N Gulf.