Student talk

HYDROCARBON SEEPS FROM THE UPPER CRETACEOUS (CAMPANIAN–MAASTRICHTIAN) WESTERN INTERIOR SEAWAY

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Hydrocarbon seeps are complex systems, created by various geological events with each locality seemingly different than the next. Hydrocarbon seeps, also known as Teepee Buttes, bioherms, cold seeps or methane seeps, were first recognized in the late 1800's in North America (Gibert and Guliver 1895), but it was not until the first discovery of modern seeps in the 1980's that researchers began to really understand these unique ecosystems. Seeps are common in the Western Interior Seaway (WIS) along the eastern flank of the Rocky Mountains and around the Black Hills region from the uppermost, middle Campanian through the lower Maastrichtian (Landman et al. 2012). During this time period, thousands of seeps on the seafloor created distinct environments that allowed marine fauna to flourish, with some seeps being small and habitable while others were massive, toxic or anoxic. Most seeps appear to occur in seep fields, with several to hundreds of seeps occurring together. Current research has mapped these localities along the front range of the Rockies from central Colorado to central Montana with some areas containing a high concentration of seeps, while other areas have only a low number of individual seeps. While some seeps show no evidence of complex fauna indicating that all carbonate precipitation was below the sediment/water interface or the environment was not favorable to attract higher fauna, most seeps are dominated by bivalves (inoceramids and chemosynthetic lucinids), whereas others have yielded an extensive variety of life. The fauna at the seeps can be diverse including sponges, bacteria, algae, protozoans, dinoflagellates, bryozoans, cnidarians, annelids, echinoderms, mollusks, crustaceans, fish, marine reptiles and probably soft bodied organisms that are not preserved. The possible geologic circumstances that could lead to the formation of the seeps in the WIS include faulting, dewatering of the sediments below, destabilization of trapped methane clathrate (methane hydrate or ice), or sediment loading, which may have facilitated upward transport of chemically modified pore waters.

References

Gibert, G.K. and Gulliver, F.R. 1895. Tepee Buttes. Geological Society of America Bulletin 6: 333–342.

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