In Situ 3D Acoustic Imaging of Baldcypress Tree Stumps, Northern Gulf of Mexico

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Abstract

For numerous reasons, the Alabama underwater forest is seen as a unique and highly important study area, providing a detailed record of the Pleistocene environment. However, the true extent of the preserved forest and spatial density of buried cypress stumps is not well known, with only localized exposures situated between shore oblique Holocene sand ridges having been well studied. In this presentation, we present the results of using ultra-high-resolution 3D seismic technology to obtain acoustic images of both exposed and buried areas. The imaging of these buried cypress stumps was performed using the 3D Chirp subbottom profiler. Producing a high-fidelity 3D acoustic image of the seafloor and shallow subsurface, the 3D Chirp system allows the underwater forest to be mapped continuously over areas > 10000 square-meters with 0.125 m trace spacing and a vertical resolution of c. 0.1 m. These data permit the dimensions, burial depth, and extent of the buried tree stumps to be quantified, even when buried under several meters of marine sand. The results from 2 data volumes will be presented, demonstrating how the forest can be traced from exposed areas, extending under the shore oblique sand ridges, expanding our understanding of the distribution and wider preservation of the underwater forest.