Geophysical Research Abstracts, Vol. 5, 03670, 2003

SPATIAL CHARACTERISTICS OF A DENSE PROVINCE OF BURIED CORAL BANKS IN THE PORCUPINE SEABIGHT, WEST OF IRELAND

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Several provinces of carbonate mounds or deep-water coral banks have been discovered in the Porcupine Seabight along the continental margin W of Ireland. The mounds differ considerably in size, spatial density and morphology between the provinces, due to a difference in environmental conditions during their initiation and development.

The Magellan mounds, located in the N of the Porcupine Seabight, have been studied by means of industrial 3D seismic data and high-resolution 2D seismic records. All mounds in this province are rooted on one reflection, invoking a single mound start-up event, and are embedded in semi-parallel stratified (drift-) sediments. Most of them are buried already under ca. 20 ms TWT of these sediments, only a limited number of mounds reach the present-day seafloor.

The mounds, together with several morphological key reflections, were mapped from the seismic records, and were entered in a GIS. The variability of mound height, width and cross-sectional area was investigated over the area, together with the variability in spatial density of the mound structures. The spatial distribution of mound positions was tested by means of Ripley's K-function.

The spatial density of the Magellan mounds is very high, ca. 1 mound per km2. This value is constant over the area, and it has been estimated that the province contains more than 1000 mounds. The spatial variability in mound sizes and shapes indicates the importance of the interplay between current regime and sedimentation rate/pattern during mound development. In areas with stronger currents and/or less sedimentation stress, the mounds could develop into broader and multiple structures. In locations where the sedimentation stress was higher, they stayed narrow and developed a

simple, conical shape. Overall, the mounds have a N/S elongated shape, attributed to N/S directed currents.
On small inter-mound distances (<250 m), the mounds appear to be regularly spaced, due to competition for nutrients or space, or due to the fact that mounds, located that closely to each other, may have merged. From inter-mound distances of ca. 700 m onwards, the K-function indicates that there is significant clustering. The interaction between the (N/S-directed) currents and the mounds may have induced turbulence and enhanced currents in the water column, beneficial for mounds relatively close-by.