Enigmatic Sea Floor Mounds in Antarctica—analysis of bathymetry data from geophysical cruise NBP04-01

W.R. Magee, School of Earth Sciences, The Ohio State University, magee.41@osu.edu
T.J. Wilson, School of Earth Sciences, The Ohio State University, twilson@mps.ohio-state.edu

ABSTRACT
As part of the 2004 Nathaniel B. Palmer-0401 geophysical cruise, a structural geology enigma was identified on the Ross Sea floor off the Antarctica coast. Using multibeam bathymetry, a series of eight mysterious, "pepperoni-shaped" mounds were identified on the sea floor. My research entails the morphological study of these structures and the determination of their relationship to either nearby volcanism or subglacial features. Through the use of the IVS-Fledermaus® software program, bathymetric data obtained from the cruise was projected in a 3-dimensional model. Morphological data from the seafloor hills is compared to the attributes of glacial drumlins and volcanic tuya. Future work will include adding seismic and magnetic profiles of the area to the 3D model to constrain their composition and the internal subsurface structure associated with the hills. Once the origin of these features has been determined, a search for their existence in similar environments worldwide can be conducted in order to determine their uniqueness.

WHAT COULD THEY BE?
This particular region of the Ross Sea was once covered by a grounded ice sheet at the last glacial maximum. The two hypotheses that were developed for the origin of the mounds are subglacial eruptions related to nearby volcanism, called tuyas, or subglacial depositional features, drumlins. Each of these two potential candidates are shown in further detail in the following section.

CONCLUSIONS
After comparing the different characteristics of two subglacial processes, these enigmatic structures are surely a strange phenomenon. While their true identity is still unknown, a greater understanding has been achieved. The length, circular shape, steep sides, and flat top all suggest a tuya; however, the contradiction is the tapering geometry and height which point to a drumlin. Further studies with seismic and magnetic data may help determine the internal composition and distinguish between the two.

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REFERENCES