samples, from Facies F4, demonstrates oxygen-stratified water conditions. The samples of the second group, belonging to F6, show a significant content of woody and coaly organic matter components, which represent an important terrestrial input. The thermal maturity estimation derived from measured vitrinite reflectance (%Ro) and the thermal alteration index (TAI) places the studied interval in the early oil-generation window. These results correlate to similar values obtained in nearby study areas.

The entire succession shows three cycles: two complete transgressive-regressive cycles overlying a third, incomplete, cycle at the base of the local stratigraphic column, within a succession deposited in an external mixed marine ramp setting. Each cycle comprises an initial set of retrogradational parasequences, followed by a maximum flooding surface (MFS) and a subsequent progradational parasequence set. The MFS was recognized on the basis of parasequence stacking patterns and the abundance of amorphous organic matter components, which indicate oxygen-stratified marine conditions and limited sediment input. The uppermost cycle is truncated by an erosive surface, which defines a sequence boundary, below the fluvial facies of the Lower Troncoso Member (Huitrín Formation). ■

Bioturbation on Antarctica's Explorers Cove Seafloor: Why Animal Activity has a Greater Impact on the Sedimentary Record than Animal Abundance

Kimberly Mead

Little is known about the sedimentologic and taphonomic processes occurring under semi-permanent sea ice in Explorers Cove (EC), Antarctica. We analyzed the amount of seafloor bioturbation by point-counting disruption on a cm-scale grid superimposed on 26 quadrants ($1m^2$) and by assessing the Bedding Plane Bioturbation Index (BPBI) for each quadrant. All quadrants had BPBI of 5 and averaged 77% points disrupted. Two epifaunal animals, the scallop, *Adamussium colbecki,* and the ophiuroid, *Ophionotus victoriae*, are responsible for this disruption. *A. colbecki* produces "divots" 3 cm deep. *O. victoriae* leaves 2 mm deep imprints.

Bioturbation rate is a function of animal density and animal activity. Range of scallops per 20 m^2 transect (n=16) is 4 to 192. Rates of animal activity are poorly constrained. The estimated minimum number of divots that *A. colbecki* would produce is $2m^{-2}y^{-1}$, the maximum $24m^{-2}y^{-1}$. This translates to 157 to 1884 cm^2 reworked per m^2y^{-1}. *O. victoriae* is estimated to disrupt 281 to 5900 cm^2 per m^2y^{-1}. The activities of *O. victoriae* and *A. colbecki* together could produce a 100% bioturbated quadrant in 5 to 61 years, consistent with the absence of lamination in EC cores.

Bioturbation by *A. colbecki* and *O. victoriae* is pervasive in EC quadrants and decoupled from the abundance of these organisms. As demonstrated in this study, the record of animal activity is more likely to be encountered in the stratigraphic record than is skeletal material. This underscores the importance of linking animals to their bioturbation when documenting climate change. ■

Analysis of Seismic Attenuation in Porous Layered Fluid-Saturated Medium

Elmira Chabyshova

Petroleum reservoirs are usually described as porous fluid-saturated media. Seismic wave attenuation in such media can be described using Biot theory.

The values of attenuation at seismic frequencies obtained from calculations using Biot theory are much lower than those predicted by experimental data. Such discrepancies are typically explained by the presence of fractures, a second fluid, second rock inclusions, layered structure, etc., in otherwise homogeneous isotropic porous media saturated with fluid.

Some of the most popular models of porous, fluid-saturated media modified by the introduction of different kinds of heterogeneities are described in this paper. Seismic attenuation values calculated using such models with heterogeneities are closer to the values observed in experimental data. However, those heterogeneities introduce new medium parameters necessary in order to describe the modified model mathematically. Those parameters are difficult or impossible to estimate in practical applications.

The proposed method of attenuation estimation at seismic frequencies is based on asymptotic analysis initially introduced by Silin and Goloshubin (2010). Such asymptotic analysis gives a simplified solution to Biot media. It allows calculation of

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