Oral | Symbol B (Biogeosciences) | B-PT Paleontology

[B-PT24_29AM2]Evolution of Chemosynthetic Ecosystem in Earth History

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Chemosynthetic communities have changed in their taxonomic composition and spatial distribution through the Earth history, but the causes and backgrounds remain to be unclear. Topics and information in various studies will be exchanged between geology, paleontology, geochemistry, and biology.? We also hope to raise some seeds of co-works on evolutionary study on chemosynthetic ecosystem.

12:15 PM - 12:30 PM

[BPT24-P01_PG]Distribution and internal structure of the nodules occuring in the Shimanto sedimentary rocks,Muroto Peninsula,Shikoku

3-min talk in an oral session

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Nodules has often been discovered on the deep-sea floor. The mechanism of their formation however is not yet clear. Nodules found in the outcrops of the Tertiary Shimanto belt in Muroto Peninsula are found as concretions that can easily be separated from the host rock. Those nodules very likely record the formation process at the deep-sea floor, and also the accretional process thereafter. This study aims to show the origin of the nodules through the spatial distribution, the occurrence, the shape, and the internal structure of the nodules sampled in Muroto Peninsula. Spatial distribution of carbonate nodules were investigated along the coastline of Muroto Peninsula. Nodules were found in almost every outcrop, the abundance, however, varied from one locality to another. Outcrops with abundant nodules had more than 50 nodules within the area of 100 m2. Six localities were discovered with abundant nodules. Four of them were mudstone outcrops, and two the alternation of sandstone and mudstone. Most nodules occurred in the mudstone layers within the alternation of sandstone and mudstone. It is indicated that the distribution of nodules as are mainly controlled by lithology. The localities were scattered along the coastline of Muroto Peninsula. Comparing the distribution with the temperature estimated using vitrinite reflectance by Laughland and Underwood (1993), the distribution of nodules was not correlated with the thermal structure of the Shimanto Belt.The length of the long axis of the nodules were 12-250 mm and the length of the minor axis were 10-180 mm, most of them with aspect ratios of 1.3 to 1.4. The aspect ratio is the ratio of the long axis diameter to the short axis diameter of an ellipse. At one outcrop, all nodules withthe short axis diameter of 40mm or less were long in shape, with the aspect ratios 3 or larger. This can be explained if the nodules were originally equivalent in size and weredeformed during the accretinal process. The locality is where high vitrinite reflectance has been

reported(Laughland and Underwood, 1993).Surface of section of 18 nodules were examined. Dark colored matrix, which was similar to the country mudstone, composed most of the interior of the nodules. One of the nodules had small whitish core near the center. The size of the core was approximately 4 mm in length with irregular shape. Triangular or quadrangular pyrite grains, with the length of the sides approximately 50-450 μ m um, are often found scattered within the nodules. The shape of the pyrite grains indicated chemical origin. Heterogeneity was observed in the matrix: darker and lighter colored bands with 1 to 2 mm width were observed. The chemical mapping image of the matrix obtained using EDS showed that different colored bands contained different mineral assemblage. One band was mainly composed by quartz and calcite, the other was presumably rich in clay minerals. In conclusion, nodules were formed mainly in the mudstone layer in Shimanto Belt of Muroto peninsula, indicating that the nodules were originally formed near the surface of the mud of the quiet deep-see floor. One of the nodules had small whitish core near the center, indicating the origin of the nodules being trace fossils produced by probable annelid worm. Observation of the internal structure indicated that the activity of the habitant of the trace likely accelerated the concretion of the mud in the vicinity.

ReferencesLaughland and Underwood (1993) Geological Society of America Special Paper 273, 1-24, 25-43