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Numerous deep-sea piezophilic bacterial strains have been isolated and characterized in an effort to understand the interaction between the deep-sea environment and its microbial inhabitants. Thus far, all psychropiezophilic bacterial isolates fall into the Proteobacteria gamma-subgroup according to phylogenetic classifications derived from 16S ribosomal RNA gene sequence information. The 11 species of cultivated psychrophilic and piezophilic deep-sea bacteria are affiliated with one of five genera within the gamma-subgroup: Shewanella, Photobacterium, Colwellia, Moritella and Psychromonas. The only two of these species were named to be Shewanella benthica and Colwellia hadaliensis prior to the reports by the JAMSTEC group. We describe microbial diversity of piezophilic bacteria species belonging to the those genera on the results of physiological analysis and chemotaxonomic analysis. As the result, piezophilic bacteria display some different character by each species. The effect on the growth rate of the pressure and the temperature was also different in each species. And, the change in the fatty acid composition at that time was also different in each species.

We are collecting the sample from various places in the deep-sea such as the hydrothermal vents, the chemosyntheses biological communities, and Mariana Trench in the part of the deepest in the world by using the submersible Shinkai 6500 and the unmanned submersible KAIKO system etc. operated by the JAMSTEC. Collected samples become many kinds like the bottom mud, sediment and the benthos. Many microorganism, such as piezophilic bacteria, psychrophilic bacteria and useful enzyme produce bacteria were isolated from these samples by XBR scientist. However, the microorganism that can be isolated in a present technology is less than 5% that exists in the deep-sea environment. Moreover, it is impossible to analyze all the characters of the isolated microorganism. We are preserving more than 4000 microorganism strains and more than 450 deep-sea samples in the liquid nitrogen tank now. These preservation samples are preserved as a resource in the future.