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Microbial cell distribution in the Guaymas Basin subsurface biosphere, a young marginal rift basin with rich organics and steep temperature gradient

Yuki Morono¹, Andreas Teske², Christophe Galerne³, Diana Bojanova⁴, Virginia Edgcomb⁵, Nicolette Meyer⁶, Florian Schubert⁷, Laurent Toffin⁸, and the IODP Expedition 385 Scientists*

¹JAMSTEC, Kochi, Japan (morono@jamstec.go.jp)

²Department of Marine Sciences, University of North Carolina at Chapel Hill, USA

³GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany

⁴Department of Earth Sciences, University of Southern California, USA

⁵Department of Geology and Geophysics, Woods Hole Oceanographic Institution, USA

⁶Department of Earth System Science, Stanford University, USA

⁷Section Geomicrobiology, German Research Centre for Geosciences (GFZ Helmholtz Centre Potsdam), Germany

⁸IFREMER, Brest, CNRS, Laboratoire de Microbiologie des Environnements Extrêmes, France

*A full list of authors appears at the end of the abstract

Guaymas Basin is a young marginal rift basin in the Gulf of California characterized by active seafloor spreading and rapid sediment deposition, including organic-rich sediments derived from highly productive overlying waters and terrigenous sediments from nearby continental margins. The combination of active seafloor spreading and rapid sedimentation within a narrow basin results in a dynamic environment where linked physical, chemical, and biological processes regulate the cycling of sedimentary carbon and other elements. This continuum of interrelating processes from magma to microbe motivated International Ocean Discovery Program Expedition 385 and is reflected in its title, "Guaymas Basin Tectonics and Biosphere."

During IODP Expedition 385, organic-rich sediments with sill intrusions on the flanking regions and in the northern axial graben of Guaymas Basin (in eight sites) were drilled and core samples were recovered. Those cored samples were examined for their microbial cell abundance in a highly sensitive manner by density-gradient cell separation at the super clean room of Kochi Core Center, Japan, followed by direct counting on fluorescence microscopy. Cell abundance in surficial seafloor sediment ($\sim 10^9$ cells/cm³) was roughly 1000 times higher than the bottom seawater ($\sim 10^6$ cells/cm³) and gradually decreased with increasing depth and temperature. In contrast to the cell abundance profile observed at Nankai Trough (IODP Exp. 370), the gradual decrease of cell abundance was observed up to around 75°C, and we detected microbial cells even at hot horizons above 100°C.

We will present the overview of the microbial cell distribution in the Guaymas Basin and discuss its relation to the current and past environmental conditions, e.g., temperature and sill-intrusion, etc.

IODP Expedition 385 Scientists: Andreas P. Teske; Daniel Lizarralde; Tobias W. Höfig; Ivano W. Aiello; Janine L. Ash; Diana P. Bojanova; Martine Buatier; Virginia P. Edgcomb; Christophe Y. Galerne; Swanne Gontharet; Verena B. Heuer; Shijun Jiang; Myriam A.C. Kars; Ji-Hoon Kim; Louise M.T. Koornneef; Kathleen M. Marsaglia; Nicolette R. Meyer; Yuki Morono; Raquel Negrete-Aranda; Florian Neumann; Lucie C. Pastor; Manet Peña-Salinas; Ligia L. Pérez Cruz; Lihua Ran; Armelle Riboulleau; John A. Sarao; Florian Schubert; S. Khogenkumar Singh; Joann M. Stock; Laurent M.A.A. Toffin; Wei Xie; Toshiro Yamanaka; Guangchao Zhuang