Environmental constrains on microbial methane oxidation activity and community structure in Gulf of Cadiz mud volcanoes

L. MAIGNIEN, N. BOON AND THE RV JAMES COOK JC10 SHIPBOARD SCIENTIFIC PARTY

LabMET, Ghent University, Belgium
(*correspondence: lois.maignien@ugent.be)

In the Gulf of Cadiz, mud volcanism is supporting the development of cold seep ecosystems based on the Anoxic Oxidation of Methane (AOM). Due to the variety of eruptive processes and geochemical settings, these mud volcanoes (mv's) constitute an ideal natural laboratory to study the AOM microbial community ecology. During the RV James Cook JC10 cruise, we targeted three mv's, with the aim to measure methane turnover, its potential controls and associated microbial diversity. Sulphate reduction and methane oxidation activities were measured using radio-labelled substrates immediately upon sediment recovery, whereas diversity survey was carried by mean 16s rDNA libraries.

Typical Methane and sulphate gradients associated with AOM were present in the sediment except at MERCATOR mv where dissolution of gypsum ($CaSO_4$) maintained high sulphate concentration along the entire core. The lowest activities were measured at MERCATOR mv, where salt concentration up to 10 times sweater concentration may inhibit the AOM reaction. At DARWIN mv, discrete AOM near-surface hot-spots sampled with the Remote Operated Vehicle ISIS resulted in highest activities and revealed the heterogeneous nature of this mv. Archaeal and bacterial 16S rRNA gene clone libraries showed that AOM communities differed considerably between these three mv' s. At DARWIN and CARLOS RIBEIRO mv's, AOM communities were relatively diverse and dominated by ANME-2, ANME-3 and associated sulfate-reducing bacterial phylotypes, whereas AOM diversity at MERCATOR was much lower and dominated by the ANME-1b phylotype. Overall, these results demonstrate the influence of several environmental parameters such as sediment geochemistry, seep relocalization following carbonate crust development and methane flux on the microbial activity and community structure at these cold seep sites.

Study of petrology and magmatic evolutions in west part of Shir Kuh batholite

SH. MAKVANDI[1], N. RASHID NEJAD[2] AND F. MASOUDI[3]

[1]Tarbiat Modares University, National geosciences database of Iran
[2]Tarbiat Modares University
[3]Tarbiat Moalem University

Western part of Shirkuh Granitoid Batholite is a peraluminous multiphase plutonic complex based on geochemistry and petrography studies. In this complex considered as S-type granites due to the presence of mica and garnet, silica range (65-75%), high A/CNK ratio, calc-alkaline characters and syncollisional volcanic arc setting. At the same time, younger phases are belived as I-type bodies because of their petrography, major elements, oxide trends and spiky spider diagrams.

Pertite texture is resulted in high-K replacement processes. This texture is the most common texture in Shirkuh Complex which is along to graphic overgrowth textures indicates that this complex is a subsolvus granite, crystallized in the high vapor pressure conditions. Furthermore, geochemistry analysis and petrography represent Hydrothermal Fluids invasion and metasomatic origin at least in some parts of this Batholite.