Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

BPT02-17 会場:421 時間:5 月 1 日 15:00-15:15

Benthic Foraminifera from the deep-water Niger delta (Gulf of Guinea): Assessing acitivity of hydrate pockmark

Benthic Foraminifera from the deep-water Niger delta (Gulf of Guinea): Assessing acitivity of hydrate pockmark

Fontanier Christophe[1*] ; Koho Karolina[3] ; Goni-Urriza M.[4] ; Deflandre B.[5] ; Galaup S.[6] ; Ivanovsky A.[5] ; Gayet N.[7] ; Dennielou B.[2] ; Gremare A.[5] ; Bichon S.[4] ; Anschutz P.[5] ; Duran R.[4] ; Reichart G.-J.[8] ; Sultan N.[2]
FONTANIER, Christophe[1*] ; KOHO, Karolina[3] ; GONI-URRIZA, M.[4] ; DEFLANDRE, B.[5] ; GALAUP, S.[6] ; IVANOVSKY, A.[5] ; GAYET, N.[7] ; DENNIELOU, B.[2] ; GREMARE, A.[5] ; BICHON, S.[4] ; ANSCHUTZ, P.[5] ; DURAN, R.[4] ; REICHART, G.-j.[8] ; SULTAN, N.[2]

[1]IFREMER/Universite de Nantes/Angers/Le Mans, [2]IFREMER, Laboratoire Environnements sedimentaires, [3]Faculty of Geosciences, Utrecht University, [4]Universite de Pau et des Pays de l' Adour, [5]Universite de Bordeaux, [6]Ecole d'ingenieurs en Environnement, Georessources et Ingenierie du Developpement durable,, [7]IFREMER, Laboratoire Environnements Profonds, [8]Royal Netherlands Institute for Sea Research
[1]IFREMER/Universite de Nantes/Angers/Le Mans, [2]IFREMER, Laboratoire Environnements sedimentaires, [3]Faculty of Geosciences, Utrecht University, [4]Universite de Pau et des Pays de l'Adour, [5]Universite de Bordeaux, [6]Ecole d'ingenieurs en Environnement, Georessources et Ingenierie du Developpement durable,, [7]IFREMER, Laboratoire Environnements Profonds, [8]Royal Netherlands Institute for Sea Research

We present an ecological study of foraminifera from 4 deep-sea stations sampled in a pockmark field from the deep-water Niger delta (Gulf of Guinea, Equatorial Atlantic Ocean). All stations are located very close to each other (less than 1.2 km distance). Both sites GMMC-01 and GMMC-02 settle in an active pockmark where methane seepages were recorded by ROV observations. A third station (GMMC-03) is located in a topographic depression which is interpreted as a collapsed pockmark where no gas seepage takes place. The site GMMC-04 is a reference station, without past or present seepages. The main objective of this study is to define whether fossilizing benthic foraminifera are reliable and relevant proxies to detect gas emission in relation to hydrocarbon resources. We focus on living (stained) and dead individuals from present environments, and combine our observations with an outstanding analysis of stable isotopes (δ^{13}C, δ^{18}O) in tests of living and dead foraminifera. Our observations show that degraded organic matter with low bio-availability is present at all stations with a preferential burial of organic compounds in topographic depression (GMMC-03 station). Mudclast breccias cemented by authigenic carbonates (mainly aragonite) are recorded at both station of active pockmark (GMMC-01 and -02). There, prokaryotic consortia involved in both sulphur and methane cycles underline that both sulphide production and methane oxidation take place in the sediment close to sediment-water interface. Compared to the reference site GMMC-04, living foraminifera recorded at active and inactive pockmark show only minor changes in terms of diversity, standing stocks and faunal composition. However, the δ13C signal of some living and dead (but well-preserved) foraminiferal species (*Ceratobulimina contraria, Melonis barleeanus, Uvigerina peregrina*) is moderately depleted in active pockmark compared to both other stations. This depletion may be related to (1) a discrete geochemical imprint of anaerobic methane oxidation in upper sediments and (2) a potential effect of prokaryotic ^{13}C-depleted biomass as a potential food source for benthic foraminifera. Overgrowth of authigenic carbonate on badly preserved foraminifera generates an important shift to lower δ^{13}C values. Whereas living faunas reflect "snapshot" environmental conditions at the sampling period (November 2011) when seepages were likely discrete, dead faunas (modern thanatoceonosis) carry a reliable message integrating temporal variability of gas emission. They reveal major faunal differences that are quite reliable to detect gas hydrate seepages in different pockmark stages with some key-species (i.e., *Bulimina marginata*, *Bolivina albatrossi*) underlining periods of enhanced methane emission and pockmark collapsing.