



## **Fluid escape re-occurrence in the Niger Delta: a possible link with sea level variations**

T. Marsset (1), B. Marsset (1), P. Vagner (1), L. Simplet (1), M. Voisset (1), D. Drapeau (2)

(1) Ifremer (Institut Français de Recherche pour l'Exploitation de la Mer), Plouzané, France

(2) TOTAL, Pau, France

([tania.marsset@ifremer.fr](mailto:tania.marsset@ifremer.fr)/ Phone : 33 2 98 22 45 70)

Surveys performed recently by Total and Ifremer on the distal part of the Niger delta provide a rich data set that characterizes the morphology of fluid escape features such as volcanic mud flows and carbonate mounds.

Geophysical data including 3D High Resolution and near bottom Very High Resolution seismic (Marsset et al., 2004) revealed a relationship between the spatio-temporal distribution of these fluid escape features and the tectonic and sedimentary evolution (Marsset et al., submitted a and b). The spatial distribution shows that the fluid escape are located over major faults that affect the top of anticlines related to compressive gravity-driven tectonic. The temporal distribution shows a re-occurrence of the fluid escape features at particular stratigraphic levels whose seismic properties suggest highly consolidated sediments. These levels are located in the lower part of hemipelagic sediments which alternate with turbidite deposits including channel/levee systems. These observations imply that the faults strongly control the fluid expulsion and that the fluid activity mainly operates during the quiescent sedimentary period between two turbidite events.

The turbidite/hemipelagic cycles are observed at the regional scale and reflect alternating terrigenous-fed/-starved periods. From ages extrapolated from sedimentation rate obtained in cores, the turbidite/hemipelagic cycles are attributed to high amplitude relative sea-level variations and/or major climate changes (third order cycles i.e. one

million years cyclicality based on Vail et al., 1977). The particular stratigraphic levels where fluid escape features appear are interpreted as condensed sections of 3rd order depositional sequences formed during the terrigenous-starved periods.

Marsset, B., Le Gall, Y., Derrien, M., Didailler, S., Regnault, J.P., 2004. Deep Towed High Resolution seismic surveying. Caractérisation in-situ des fonds marins. SeaTechWeek Colloque, 21-22 Octobre 2004, Brest.

Marsset, T., Marsset, B., Vagner, P., Sultan, N., Voisset, M., Cauquil, E., submitted a. Geohazard investigation on the Niger continental slope: new insights from near bottom geophysics. Marine Geology.

Marsset, T., Marsset, B., Vagner, P., Simplet, L., Voisset, M., Cauquil, E., Submitted b. Relationship between fluid escape periodicity and cyclic sedimentation pattern in the Niger delta. Marine Geology.

Vail, P.R., Mitchum, R.M., Thompson, S., 1977. Seismic stratigraphy and global changes of sea level, Part 3: relative changes of sea level from coastal onlap, in: Payton, C.E. (Ed.), Seismic Stratigraphy – Applications to Hydrocarbon Exploration. Am. Assoc. Petrol. Geol. Mem., 26, 63-82.