



HAL
open science

Rapid paleoenvironmental variations in NE Brazil during the Lateglacial. Insights from TpS2, S3CO2 and S3CO Rock Eval parameters.

Jérémy Jacob, Jean-Robert Disnar, Mohammed Boussafir, Didier Kéravis, Abdel Sifeddine, Ana Luiza Spadano Albuquerque, Bruno Turcq

► To cite this version:

Jérémy Jacob, Jean-Robert Disnar, Mohammed Boussafir, Didier Kéravis, Abdel Sifeddine, et al.. Rapid paleoenvironmental variations in NE Brazil during the Lateglacial. Insights from TpS2, S3CO2 and S3CO Rock Eval parameters.. 22nd IMOG Meeting, Sep 2005, Séville, Spain. 2 p. <insu-00442940>

HAL Id: insu-00442940

<https://insu.hal.science/insu-00442940v1>

Submitted on 24 Dec 2009

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

Rapid paleoenvironmental variations in NE Brazil during the Lateglacial. Insights from TpS2, S3CO₂ and S3CO Rock Eval parameters.

Jérémy Jacobi¹, Jean-Robert Disnar¹, Mohammed Boussafir¹, Didier Kéravis¹, Abdelfettah Sifeddine², Ana Luiza Spadano Albuquerque³ and Bruno Turcq³.

¹ Laboratoire de Géochimie Organique, Institut des Sciences de la Terre d'Orléans (ISTO) - UMR 6113 du CNRS, Bâtiment Géosciences, 45067 Orléans Cedex 2, France.

² IRD/Bondy, 32 avenue Henry Varagnat, 93143 Bondy Cedex, France.

³ Departamento de Geoquímica, Universidade Federal Fluminense, Morro do Valonguinho s/n, 24020-007 Niterói, RJ, Brazil.

Abstract

The Rock-Eval pyrolysis technique was first developed as a rapid mean for evaluating the petroleum potential of source rocks, via the measurement of bulk organic parameters such as Total Organic Carbon (TOC), Hydrogen Index (HI), Oxygen Index (OI) and the maximum pyrolysis temperature Tmax (Espitalié et al., 1985; Lafargue et al., 1998). This method was then used to rapidly estimate organic matter quality and quantity in sedimentary series for paleoenvironmental studies (Talbot and Livingston, 1989). Recently, it has been proposed that there could be more information gained from the Rock-Eval parameters (Disnar et al., 2003). When considering also the recent analytical developments available from the Turbo6 version of the apparatus, there is a large field of investigation that remains unexplored in paleoenvironmental studies. Here we present results from the sedimentary infill of Lagoa do Caçó (Northern Brazil) that records paleoenvironmental changes since the Last Glacial Maximum (Jacob et al., 2004). The present study focuses on the Lateglacial interval (ca. 17,000 to 11,000 cal yrs BP), a time period where different Rock-Eval parameters such as TpS2 (Tmax equivalent), HI and OI produce controversial information. In order to better understand the meaning of these parameters, we propose an original mean of obtaining more pertinent information. S3CO₂/S3CO ratio and TpS2 surprisingly display similar trends over the considered period, in two different cores. Furthermore, the evolution of these parameters is comparable with that of $\delta^{18}\text{O}$ in the ice core record of Sajama (Bolivia) during the Lateglacial (Figure 1). Although the significance of these parameters and the origin of these variations remain to be cleared, our results confirm a pattern of rapid climate variability over the South American Tropics during the last deglaciation, as seen in the Northern Hemisphere.

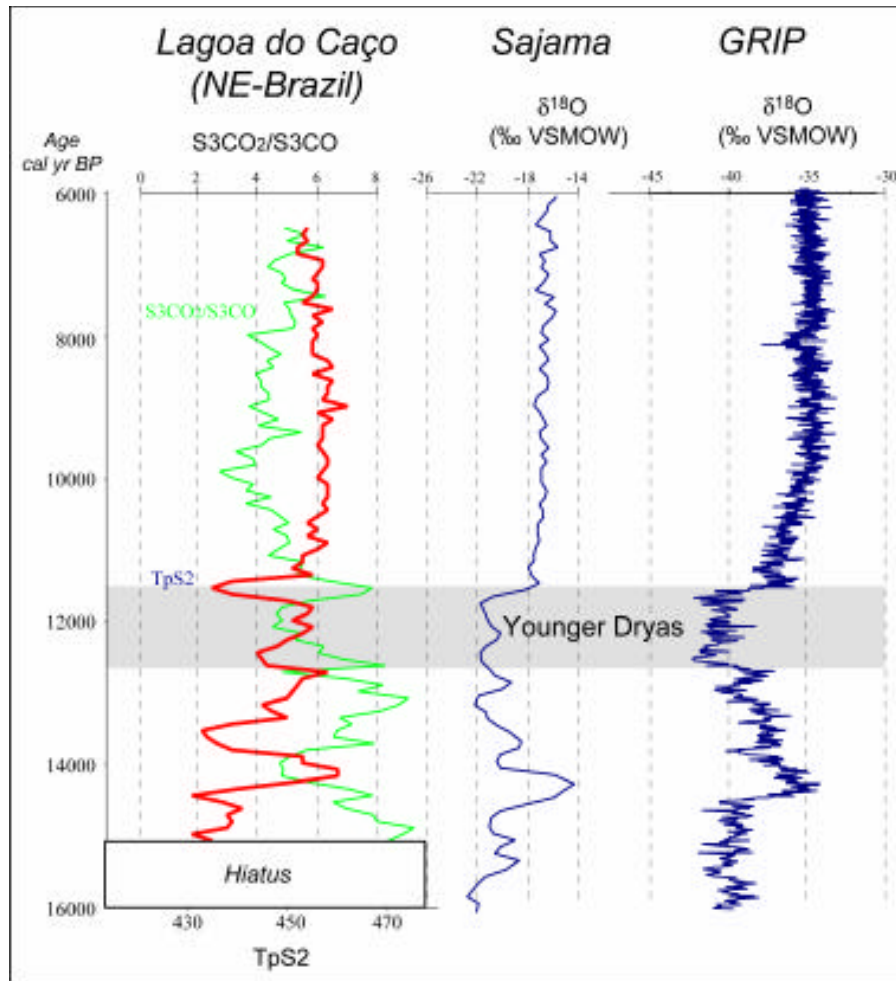


Figure 1: Comparison of S3CO₂/S3CO and TpS2 Rock Eval parameters variations in the Lateglacial interval of core 98-3 (Lagoa do Caço, NE Brazil) with South American (Sajama) and Greenland (GRIP) ice core δ¹⁸O records.

P. jeremy.jacob@univ-orleans.fr

References:

- Disnar, J. R., Guillet, B., Kéravis, D., Di-Giovanni, C. and Sebag, D., 2003. Soil organic matter (SOM) characterisation by Rock-Eval pyrolysis: scope and limitations. *Org. Geochem.* 34, 327-343.
- Espitalié, J., Deroo, G. and Marquis, F., 1985. La pyrolyse Rock-Eval et ses applications; première partie. *Rev. Inst. Fr. Pét.* 40, 563-579.
- Jacob, J., Disnar, J.R., Boussafir, M., Sifeddine, A., Albuquerque, A.L.S. and Turcq, B. Major environmental changes recorded by lacustrine sedimentary organic matter since the Last Glacial Maximum under the tropics (Lagoa do Caço, NE Brazil). *Pal., Pal., Pal.* 205, 183-197.
- Lafargue, E., Marquis, F., Pillot, D., 1998. Rock-Eval 6 applications in hydrocarbon exploration, production, and soil contamination studies. *Rev. Inst. Fr. Pét.* 53/4, 421– 437.
- Talbot, M.R. and Livingstone, D.A., 1989. Hydrogen index and carbon isotopes of lacustrine organic matter as lake level indicators. *Pal., Pal., Pal.* 70, 121-137.