



Available online at www.sciencedirect.com

SCIENCE @ DIRECT®

C. R. Geoscience 335 (2003) 1049–1050



Perspective

The Atlantic oceanic influences in the Paris Basin during the Jurassic

Olivier Dugué

Laboratoire de morphodynamique continentale et côtière, Département de géologie, université de Caen, UMR 6143 CNRS, 14032 Caen cedex, France

The paper by Huault et al. [5] draws attention on Jurassic marine palaeo-circulation, mainly reconstructed in the Anglo-Paris Basin using the ammonite distribution [3] between the northern, cold Arctic Ocean and the southern warm Tethyan Ocean. The study of the repartition of the Jurassic ammonites shows that the boreal ammonites followed the Cornubian and Armorican borders, while the Tethyan ammonites may have reached the Paris Basin through different seaways, such as the Burgundy, the Poitou or the Western Approaches. Few sedimentological studies have yet been carried out on the origin and transport of distant materials in the Anglo-Paris Basin. However, the biostratigraphical reconstructions [7] and mineralogical comparisons [2] along the Armorican platform have given early indications of a possible lateral seaway associated with the Arctic–North Atlantic rift. New palynological [5] and mineralogical [6] studies of the Callovo-Oxfordian series on the eastern border of the Anglo-Paris basin have confirmed the role of this seaway in the transport and exchanges of biota and clay.

The sedimentation in the Anglo-Paris Basin was controlled by eustatic sea-level changes and subsidence patterns along pre-existing fault systems such as the ‘Sillon marneux’ [4,8] or Channel basin [9], a permanent and subsident structure that controlled both the transport and distribution of faunas and sediments in the northern part of the Paris Basin in the

Jurassic [2,7,8]. It was connected to the east with the Seine–Sennely fault system, which separated the Armorican and the Ardennes blocks, and to the west with the Western Approaches graben and then to the Proto-Atlantic [4,8]. The northward opening of the Arctic–North Atlantic rift [9] allowed a narrow marine connection to develop between the Arctic and Tethyan oceans as early the Early Jurassic. No direct communications with the North Sea were established until the end of the Malm [9].

Since the Jurassic clay minerals are dominantly of a detrital origin in the Anglo-Paris Basin [2,6], their mineralogical signatures are likely to reflect the combined effects of eustatism, climate, nearshore hydrodynamic processes and pedogenetic evolution on adjacent landmasses [1]. The study of their distribution may be one of the most important guides to the operation of the oceanic transport processes. The large volume of clay-sized sediment that was deposited over much of the Anglo-Paris Basin during the different Jurassic stages (Sinemurian, Toarcian, Callovian, Oxfordian, Kimmeridgian) may have had source areas that were much more distant (e.g., Fennoscandia, Laurentia–Greenland). These fine sediments were dispersed to neighbouring basins throughout Jurassic times.

Significant progress on the operation of Jurassic palaeo-currents in the Anglo-Paris basin will be made when the relationships between the clay mineralogy, sand supplies, benthic and pelagic fauna, palynological distributions, etc. are compared to the geodynam-

E-mail address: olivier.dugue@geos.unicaen.fr (O. Dugué).

ics reconstructions as well as to the changes in climate and global sea-level.

References

- [1] H. Chamley, *Clay Sedimentology*, Springer Verlag, Berlin, 1989, p. 623.
- [2] O. Dugué, Comportement d'une bordure de massifs anciens et cortèges de minéraux argileux : l'exemple de la bordure occidentale du bassin Anglo-Parisien au Callovo-Oxfordien, *Palaeogeogr. Palaeoclimatol. Palaeoecol.* 81 (1991) 323–346.
- [3] Groupe français d'étude du Jurassique, in: E. Cariou, P. Hantzpergue (Eds.), *Biostratigraphie du Jurassique ouest-européen et méditerranéen : zonations parallèles et distribution des invertébrés et microfossiles*, Bull. Centres Rech. Elf Explor. Prod. 17 (1997) 440.
- [4] F. Guillocheau, C. Robin, 17 co-authors, Meso-Cenozoic geodynamics evolution of the Paris Basin: 3D stratigraphic constraints, *Geodin. Acta* 13 (2000) 189–246.
- [5] V. Huault, M. Élie, R. Ruck-Mosser, Variabilité spatiale du signal palynologique dans le bassin de Paris à la limite Dogger–Malm, *C. R. Geoscience* 335 (2003) 401–409.
- [6] P. Pellenard, J.-F. Deconinck, D. Marchand, J. Thierry, D. Fortwengler, G. Vigneron, Contrôle géodynamique de la sédimentation argileuse du Callovo-Oxfordien moyen dans l'Est du bassin de Paris : influence eustatique et volcanique, *C. R. Acad. Sci. Paris, Ser. Ila* 328 (1999) 807–813.
- [7] M. Rioult, R. Chirat, Ammonites jurassiques sur la bordure occidentale du Bassin anglo-parisien. Contrôle et modalités de leur répartition, *Bull. Soc. Linn. Normandie* 117 (1999) 49–60.
- [8] M. Rioult, O. Dugué, R.J. du Chêne, C. Ponsot, G. Fily, J.-M. Moron, P.R. Vail, Outcrop sequence stratigraphy of the Anglo-Paris Basin, Middle to Upper Jurassic (Normandy, Maine, Dorset), *Bull. Centres Rech. Explor.-Prod. Elf Aquitaine* 15 (1) (1991) 101–194.
- [9] P.A. Ziegler, *Geological Atlas of western and central Europe*, Shell Internationale petroleum Maatschappij B.V., Amsterdam, 1990, p. 239.