

Interactive comment on “Response of a low subsiding intracratonic basin to long wavelength deformations: the Palaeocene–early Eocene period in the Paris basin” by J. Briaies et al.

Anonymous Referee #2

Received and published: 8 January 2016

The understanding of the origin of subsidence and of relationships between stratigraphy and basin geodynamics is a major thematic of both academic and industrial research since several decades. This is especially true in intracratonic basins, such as the Paris Basin, where origin of subsidence is still debated. The manuscript of Briaies et al. is of first interest since it concerns a geological period (Early Cenozoic) during which numerous major geodynamical events occurred in western Europe and then may impacted the subsidence of the Paris Basin. Overall, this manuscript is a very detailed discussion of the complex stratigraphic and geodynamic evolution of the Paris Basin during the early Cenozoic. The authors evidence variations in locations of subsiding areas over time and correlate them with geodynamic events related to the Pyrenean

C1819

convergence and the opening of the North Atlantic Ocean. This study also presents significant advances in the dating of cycles. Although I am not a native English speaker, I think that the English text is correct. This study is well done and shows the careful attention to fine detail required by such a study.

However some points can be improved. Detailed comments were annotated directly on the manuscript. The main points are listed below.

- Some precisions should be provided about possible erosion events during periods of negative accommodation. Is there evidences of erosion (reworked laterite profiles in the Provins Clays)? If so, how was estimated the thickness of eroded sediments for the calculation of accommodation space?
- Figures are clear and of good quality. However some modifications should be made. Shades of orange and yellow are not enough contrasting after printing (Figs. 1, 5, and 10). They must be modified.
- Some keys are lacking on figures and can be easily added.
- In my opinion the figure 3 in not essential.
- In contrast, some additional figures would improve the reasoning. A figure showing the successive depositional profiles would be useful in particular to understand how the authors consider the transition between lacustrine (with oysters?) and brackish environments during the basal Ypresian.
- A figure showing results of the stacking pattern is also lacking. Such a figure is essential because it constitutes the main argument for the construction of the 3rd order sequential framework. This figure would help to understand why the surface T2 was chosen as the 3rd order MFS while (as explained in the text and visible in the figure 5) the T3 surface corresponds to the maximum of backstepping of marine facies.
- Unconformities and maximum regressive surfaces must be differentiated in the figure 2 (as indicated in the figure 5). Actually, according to the legend, a maximum regressive

C1820

surface is located into a regressive 3rd order hemicycle. This is not possible.

- A critical point concerns the first 3rd order Ypresian cycle (Cy1). In the figure 2, 3rd order and 4th order cycles have the same duration. Either the 4th order cycles must not be represented, or the 3rd order cycle is in fact a 4th order cycle bounded by subaerial exposures during a period of low accommodation. This point must be clarified.

- The increase in accommodation in the southern part of the basin during the regression of Cy1 is not enough discussed. Was it due to a local increase in subsidence (origin? southward migrating flexure as mentioned p. 3612 or local activity of hercynian faults ?) or to an important aggradation of fluvial deposits in the proximal parts of the margin? In the first case how do the authors explain the local high sedimentation rate which counterbalanced the subsidence and allowed the persistence of continental deposits in the most subsiding area?

- The impact of local tectonics and possible activity of hercynian faults is poorly discussed in the chapter 5.3. I suggest to develop this chapter.

These points can be easily modified or detailed. Consequently I propose to accept the paper with minor corrections.

Best Regards

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/7/C1819/2016/sed-7-C1819-2016-supplement.pdf>

Interactive comment on Solid Earth Discuss., 7, 3587, 2015.