

Interactive comment on “The Ogooue Fan (Gabon): a modern example of deep-sea system on a complex sea-floor topography” by Salomé Mignard et al.

D. M. Hodgson (Referee)

d.hodgson@leeds.ac.uk

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The Ogooue Fan (Gabon): a modern example of deep-sea system on a complex sea-floor topography by Mignard, Mulder, Martinez, and Garlan General comments: The manuscript by Mignard et al. presents recently collected bathymetry, sidescan, and core data from the understudied Ogooue Fan, offshore Gabon. These data permit the authors to present an interesting case study clearly. They demonstrate that changes in seabed topography above a stepped slope, formed by volcanic seamounts and mud diapirs/volcanoes, strongly influence the location of erosion and sediment bypass, and deposition, and therefore the distribution of facies and environments of deposition.

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There is nothing particularly new here – several modern/recent, ancient subsurface, and exhumed systems have shown similar patterns that indicate how sensitive turbidite systems are to subtle gradient changes. Nonetheless, more case studies will help the community advance understanding of threshold controls (e.g. gradient and confinement). With that in mind, and given the quality of data, there needs to be much more quantitative information on gradients, gradient changes, and dimensions of the erosional and depositional feature reported. Also, even though this is a case study, it does add to generic aspects of these system types, however the introduction is too parochial in scope.

Specific comments: 1. Abstract: there is a random sentence to fix – wrong place? But the abstract can be more – more numbers, and clearer on what is novel here, beyond more knowledge of this particular system. What are the wider implications? 2. The introduction needs a rewrite. This is far too parochial in scope, and focused on the geological setting of the system, rather than providing a context for the analysis of stepped submarine slope systems in general. What is the ‘gap’ that can be addressed, or at least contribute to? There are several assertions or facts made where supporting references should be cited. 3. Suggest that a wider set of papers that deal with stepped slopes be cited and compared. What are the similarities and differences? For examples Deptuck, M.E., Sylvester, Z., and O’Byrne, C., 2012, Pleistocene seascape evolution above a “simple” stepped slope profile – Western Niger Delta, in Prather, B.E., Deptuck, M.E., Mohrig, D., Van Hoorn, B., and Wynn, R.B., eds., Application of the Principles of Seismic Geomorphology to Continental-Slope and Base-of-Slope Systems: Case Studies from Seafloor and Near-Seafloor Analogues SEPM (Society for Sedimentary Geology) Special Publication 99, p. 199–222, <https://doi.org/10.2110/pec.12.99.0199>. Hay, D., 2012, Stratigraphic evolution of a tortuous corridor from the stepped slope of Angola, in Prather, B.E., Deptuck, M.E., Mohrig, D., Van Hoorn, B., and Wynn, R.B., eds., Application of the Principles of Seismic Geomorphology to Continental-Slope and Base-of-Slope Systems: Case Studies from Seafloor and Near-Seafloor Analogues SEPM (Society for Sedimentary Geology) Special Pub-

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lication 99, p. 163–180, <https://doi.org/10.2110/pec.12.99.0163>. Brooks, H.L., Hodgson, D.M., Brunt, R.L., Peakall, J., Poyatos-Moré, M. and Flint, S.S., 2018. Disconnected submarine lobes as a record of stepped slope evolution over multiple sea-level cycles. *Geosphere*. Jobe, Z.R., Sylvester, Z., Howes, N., Pirmez, C., Parker, A., Cantelli, A., Smith, R., Wolinsky, M.A., O'Byrne, C., Slowey, N., and Prather, B., 2017, High-resolution, millennial-scale patterns of bed compensation on a sand-rich intraslope submarine fan, western Niger Delta slope: *Geological Society of America Bulletin*, v. 129, p. 23–37, <https://doi.org/10.1130/B31440.1>. 4. Please check for accuracy of use of turbidite (deposit) and turbidity currents (flow). Turbidity current deposit is fine, turbidite flow is not, turbidite deposit is superfluous. 5. In several places meandering is used to describe a channel form. You should use sinuous which is descriptive. Meandering is an interpretation, and a controversial one in deep-water, so should be avoided without supporting evidence. 6. Some numbers are used, but mainly for gradients. Overall, however, I would like to see much more quantitative information stated, with gradients, changes in gradients, widths and depths/thicknesses of erosional and depositional features, sinuosity. This would really help elevate the paper, and allow worker to compare different systems, and consider thresholds etc., and to quantify relatively long, deep, shallow, etc. Also, on figure 5, we need more methodological information on how the levee height and channel depth (check spelling) are derived. Which levee, as seem asymmetric? How is base levee defined/identified? Using seismic data? Is depth measured from base levee? 7. Cape Lopez lobe: This is not really ponded, according to your interpretations, as some of the flows are able to escape the confinement and pass downdip. This is a more confined step – and intraslope or perched basin, similar to several on the African margin (e.g. Jobe et al., 2017, and at outcrop, e.g. Sychala et al., 2015). 8. The echofacies interpretations are not done in isolation. You are using the interpretations of other studies, including your groups, which are sometimes calibrated with core. Therefore, need to cite supporting literature of these echofacies interpretation (as with sedimentary and seismic facies).

Technical corrections: Several nomenclatural points to be consistent on: Seabed, C3

seafloor, and sea-floor used. Stick to one. Suggest use external levee, and internal levee or terrace deposit to be clear. Misuse of the term inflection point – this is steepest part of a curve not a break-in-slope. Also, fan, system, apron, are used, with various descriptors, turbidite, deep-sea. Be consistent. Numerous suggested changes in grammar, spelling, and sentence structure are contained on the attached annotated pdf file. Supporting references for terms, such as sediment bypass, lobe complexes, etc.

David Hodgson University of Leeds, UK

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2018-99/se-2018-99-RC1-supplement.pdf>

Interactive comment on *Solid Earth Discuss.*, <https://doi.org/10.5194/se-2018-99>, 2018.