

## ***Interactive comment on “Drainage reorganization and divide migration induced by the excavation of the Ebro basin (NE Spain)” by Arnaud Vacherat et al.***

### **Anonymous Referee #2**

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GENERAL COMMENTS This study examines watershed migration as a result of capture between 2 of the largest Iberian drainages – the Ebro and the Duero. I think that the paper adds valuable insights into drivers of migration divide, but that these are currently somewhat lost in the manuscript. I suggest that the paper could be fronted and ended with a stronger abstract, introduction and discussion/conclusions that frame the wider implications of the study. This would include emphasizing why this study is important in terms of wider implications (eg type of capture Bishop 1995; implications for landscape Mather et al 2002,), ? I would argue that the key highlights need to be drawn out more clearly e.g. demonstrating the role of lithology as a limiter to incision (seen on smaller scale in other captures eg Shepherd 1982, Mather 2000). Where this

occurs within the basin will impact on how far any sea-level generated wave of incision can propagate up a basin and thus has wide ranging significance to other studies. This occurs in both the mid Duero and lower Ebro in the coastal ranges. I am not suggesting a major re-write here – more a subtle re-wording of the text to incorporate such points and widen the impact of the study.

SPECIFIC COMMENTS / Line 40, 76, 659 – what does ‘almost still endoheric’ mean? – you mean it retains the landscape signature? clarify / Line 41 – how does the Ebro enable enhoherism of the Duero? I don’t understand / Line 74, 578 – what is ‘unfilling’? This is not an established term - do you mean erosion? Incision? / Lines 87-88 is one reason why it is important to know this , but it is sandwiched admidst other information – a more explicit ‘why this is important’ for the study should be provided from the start (currently this is hidden in the text) / Lines 320-1 Contrasts in sharpness could also be attributed to lithological differences - expand. / Line 597 – you mean the headwaters of the modern Ebro rather than the Duero (as this reads)? – confusing / Lines 613-618 – so how does this compare to other captures – as these are headward these are incremental – overall drainage has time to adjust rather than mid-basin captures which tend to be more of a sudden impact eg smaller , well documented captures such as Sorbas Basin. Stokes et al 2002 / Some areas could be more succinct (do we really need to know about the Late Cretaceous climate in section 2.4?)

TECHNICAL COMMENTS / Line 71, 129, 189, 282, 284, 293, 520 onwards – use of ‘evidences’ should be evidence (it can only be singular!) / Line 72 since should be from / Line 99 on should be of / Line 107 ‘Since early stage collision, (not of) / Line 108 - ?carbonated alluvial sediments? – I do not understand / Line 119 – as well as what process underlies. . . / Line 122 – you mean upper Duero – there is much incision below this / Line 137 ‘in’ should be ‘of’ / Line 156 should be ‘accommodated’ and Hercynian / Line 158 – this event – what event? Clarify / Line 161, 209 onwards ‘deformations’ should be deformation / Line 162 – ‘such as the. . . .’ / Line 170 – . . .periods of quiescence. . . / Line 173 such as fluvial. . . . / Line 203 – took place should be ‘existed’

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/ Line 207 – ‘detritic’ not needed / Line 228 – network should be networks / Line 230 associated with (not to) / Line 233 precipitation not precipitations / Line 260 tongues are. . . . . / Line 300 - knickpoints do not ‘witness’ capture –they may provide evidence of migrating base-levels which may be associated with capture / Lines 304/5 require references to support these ages / Line 306 – ‘never been drained before’ – I think you mean never externally drained (it would have been drained ie had drainage)? / Line 322 – why ‘for instance’ ? / Line 331 – of not in / Line 358, 371, 635 – why ‘remarkable’ do you mean marked? / Line 389 – witnessed? Do you mean suggested by. . . / Line 391 –recorded = records / Line 398 with not to / Line 408 a lot = many / Line 487, little = small / Line 500, X value contrasts / Line 523 deduce not deduced / Line 525suggested rather than evidence / Line 526-7 implied by rather than well witnessed by / Line 533 – define long (temporal? Spatial?) / Line 536 – trends in not trend of / Line 550 precipitation not precipitations / Line 559 – alternations between (rather than alternance) / Line 560 glacier not glaciers / Line 574‘the to first order’ – does not make sense – reword / Line 584 you mean ‘climatic conditions similar to the. . .’? / Line 608 ‘The present drainage of the. . .’ / Line 637 helps with (not for) / Line 647 Then ? - not needed, remove / Line 655 – record (not recorded) / Line 658 ‘was open to the Atlantic Ocean from the. . .’ / Line 659 records not record

REFERENCES REFERRED TO ABOVE / Bishop, E 1995. Drainage rearrangement by river capture, beheading and diversion. *Progress in Physical Geography*, 19, 449-473. / Mather, A.E. 2000. Adjustment of a drainage network to capture induced base-level change. *Geomorphology*, 34, 271-289 / Mather. A.E., Stokes, M. & Griffiths, J.S. 2002. Quaternary landscape evolution: a framework for understanding contemporary erosion, SE Spain. *Land Degradation & Management*, 13, 1-21 / Shepherd, R. G. 1982. River channel and sediment responses to bedrock lithology and stream capture, Sandy Creek drainage, Central Texas. In: Rhodes, D. D.; Williams, G. P. (eds) *Adjustment of the Fluvial System*. Allen & Unwin, London, 255-275. / Stokes, M., Mather, A.E. & Harvey, A.M. 2002. Quantification of river capture induced base-level changes and landscape development, Sorbas Basin, SE Spain. In: Jones, S.J. & Frostick, L.E. (eds)

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Interactive comment on Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2017-53>, 2017.

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