We thank the AE for providing feedback on the revised version of this manuscript. Page and line numbers in the response below refer to the 'marked changes' manuscript.

COMMENT: The revised manuscript is much improved and in general the reviewer comments were adequately taken into account. Besides minor editorial suggestions (see bellow) I suggest that the authors clarify one important point in the abstract/introduction/conclusion. Much of the discussion of the implications of the authors' findings depends upon how one defines "source region". This is especially important when discussing the temporal variations observed in very large catchments (Garcon et al., 2013 and Lupker et al., 2013), which primarily reflect variations in the sourcing of the sediment within the catchment, not really temporal variations of the composition of the "source regions". Overall I think it would be better to frame this discussion in the context of lithological units, as opposed to source regions, as these are actually controlling the Nd and Sr isotopic compositions.

REPLY: We understand the AE's comment that one source region can contain multiple lithological units. However, in the context of discussing the Mesozoic sources to the Paleocene-Eocene formations we think 'source' is more appropriate than 'lithological unit' because the identity and number of those units is not known. In the context of modern day sedimentary processes we refer to 'formations'. We clarify in the introduction that in the context of this paper 'source regions' are "geographical regions with relatively homogenous lithology" (P2 L8).

COMMENT: It would also be good to explicitly mention the key role played by crustal recycling processes in setting the composition of the different lithological units (see Delinger et al., EPSL 2015), as this is very nicely illustrated here for Sr and Nd isotopes.

REPLY: We have added a sentence to the conclusion to explicitly mention this point "Thus sedimentary processes in the past have influenced the Sr and Nd isotopic composition of the present formations." (P13 L4)

COMMENT: The last sentence of the abstract should be rewritten: seasonal variations of the composition of river sediments are old news and generalizing from this rather local study seems a bit of a reach.

REPLY: We agree that seasonal variations in the Sr isotopic composition of river sediments are well-established. However, to our knowledge, there are only four studies published on seasonal variations in suspended sediment Nd isotopic compositions, and therefore consider this an important aspect of this work to highlight. We have rewritten this sentence to focus on Nd and have changed "sources" with "end-members". (P1 L15-17)

COMMENT: P5 L30: delete "were"

REPLY: Changed (P5 L30)

COMMENT: P6 L1: Neodymium isotope ratios are …

REPLY: Changed (P6 L1)

COMMENT: P6 L26: there is a large range (the statement remains true no matter how long ago the measurements were made)
REPLY: Changed (P6 L26)

COMMENT: P7 L3: It has been observed that in a …
REPLY: Sentence changed to "In a compilation of river sediments from all over the world, the clay fraction **ε**Nd value was observed to be greater than the silt-sized fraction by an average of 0.8 epsilon units (Bayon et al. 2015)." (P7 L3-4)

COMMENT: P9 L23: in "burying the lower down Frysajodden Formation", "down" seems misplaced
REPLY: Deleted "down" (P9 L16)

COMMENT: P9 L24: which conveys sediment from the head to the toe of the glacier
REPLY: Inserted "from" (P9 L17)

COMMENT: Figure 2: the caption incorrectly states that the catchment boundary is a red dashed line (it is in fact a red solid line).
REPLY: Changed "red dashed" to "solid red".