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## ***Interactive comment on “Neogene tectonics and climate forcing of carnivora dispersals between Asia and North America” by H. Jiang et al.***

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This paper aims to address the possible linkage between the Eurasian (EA) -North American (NA) carnivora exchanges and changing tectonics and paleoclimate. The authors first clarified four distinct dispersals occurred around ~20 Ma, 13-11 Ma, 8-7 Ma and 4 Ma, which was already synthesized by Qiu (2003). They then presented a comprehensive review on the tectonic and paleoclimatic evidence in East Asia around these four time intervals. It seems to me that based on the balance of tectonic and paleoclimatic evidence, the authors attributed the early Miocene dispersal to tectonic forcing, the 13-11 Ma and ~4 Ma migrants to global cooling, and the 8-7 Ma exchange to combination of tectonic and climatic factors. This is the first time to link paleontology, paleoclimatology and tectonics together to understand the co-evolution of paleontology

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and environment.

As a paleoclimatologist, it's hard for me to understand the specific relationship between tectonic/climatic forcing and carnivora exchanges. For example, how did tectonic activities around 20 Ma in the margins of Himalaya-Tibetan Plateau (Lines 13-16 of Page 6) result in the migrations of some species from EA to NA (as shown in Figure 1). Similar confusion is also existed in how global cooling during 13-11 Ma (Lines 4-5 of Page 8) and  $\sim 4$  Ma (Lines 1-3 of Page 13) led to exchanges between EA and NA Carnivorans. More detailed explanation regarding the underlying processes is needed, e.g., due to adaptation to changing environments or boundary conditions.

The tectonic evidence shown in Figs. 2 and 6 can be combined together as panels A and C, and two additional panels should be added to show the tectonic evidences around 13-11 Ma and  $\sim 4$  Ma as B and C. Once tectonic evidence of these four time intervals were displayed together, the readers can get a distinctive understanding of tectonic evolution over the Tibetan Plateau.

In addition, I would suggest that a synthesis of global climate (e.g., Fig.5), regional climate (a representative curve from Figs 3 and 4), regional tectonics (an alternative expression the Figs. 2 and 6) and EA-NA Carnivora exchanges (i.e., Fig.1) should be incorporated together to provide a thorough understanding of the objective of this paper, rather than show these four kind of evidence separately.

Finally, I'm curious about two points shown in Fig.1: (1) why only carnivoran migrated from EA to NA during early and late Miocene (one-way arrows), whereas the exchanges between EA and NA occurred  $\sim 13$  Ma and  $\sim 4$  Ma (two-way arrows); and (2) How was the timing of these migration events determined and what's the age errors?

Overall, this topic is quite interesting and suitable for publication, after more comprehensive explanations are provided about the intrinsic linkage between migration and environmental change.

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Interactive comment on Solid Earth Discuss., 7, 2445, 2015.

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