

Interactive comment on “Geomorphic signatures of the transient fluvial response to tilting” by Helen W. Beeson and Scott W. McCoy

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I've attached some figures that should help clarify my main comments.

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Discussion paper



After re-reading my original comments, I realized that they would have been clearer had I provided figures to illustrate my main points. My main comment regarding the northern Sierra Nevada was that canyons cannot be younger than the sediment found within them. Below is a revision of Figure 15B in my 2014 AJS paper; it shows a new Ar/Ar age for the volcanic deposit deep in the South Fork American River canyon, < 200 m above the bed of the modern river (this new age is 'in press'). Moreover, as I mentioned in my earlier comment, Eocene-Oligocene sediments can also be found < 170 m above the modern river bed in this canyon and near the present bed elevation in the Middle Fork as well. These three deposits are on published maps and reports, and the first two were addressed in my 2014 AJS paper. Therefore, incision of the American River drainage could not have begun 5 Ma (or 1.9 Ma); instead, these canyons are likely much older.

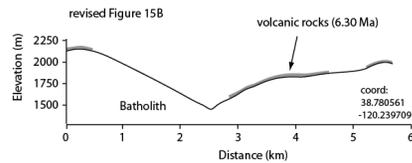
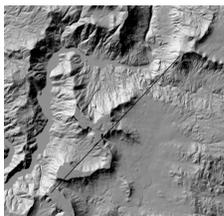


Fig. 1. Northern Sierra



My main comment regarding the southern Sierra Nevada was that it could not have experienced 2.3° of recent tilting. As noted by Huber (1981), the upper uneroded surface of a 10 Ma lava flow along the San Joaquin River (which is near where the authors did their analysis) forms a series of table mountains. The source of this flow was the Sierra Nevada (top-right of the map) and it flowed down into the Central Valley (bottom-left of the map). The line in this figure shows the transect plotted on the next page.

The upper surface of the flow is at an angle of 1.37 deg (first figure below). If we subtract the 2.3 deg of recent tilt hypothesized by the authors, the upper surface of the flow is now at -0.9 deg (ie. $1.37 - 2.3 = -0.9$; second figure below). This means that the lava would have flowed uphill, a result that refutes the hypothesis that there has been 2.3 deg of tilt over the past 10 Ma.

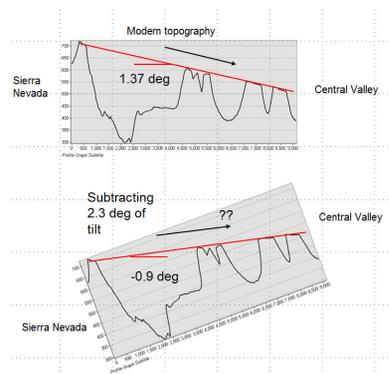


Fig. 2. Southern Sierra