

## ***Interactive comment on “Patterns and controls of inter-annual variability in the terrestrial Carbon budget” by Barbara Marcolla et al.***

### **Anonymous Referee #2**

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#### General comments

This manuscript describes an analysis of the interannual variability (IAV) of net ecosystem exchange (NEE), based on three different and complementary, but not completely independent, data sources: FLUXNET, MPI-MTE (a bottom up gridded product derived from FLUXNET), and a top-down CO<sub>2</sub> inversion-based product. This is an interesting topic, given the importance of understanding the controls on year-to-year terrestrial-atmosphere carbon exchange, and appropriate for Biogeosciences. The ms is reasonably well written, and the technical analysis generally strong. If there's nothing terribly surprising in the results, it's a useful analysis of both likely patterns of, and controls on, the IAV of NEE, and the strengths and weaknesses of the different NEE products themselves.

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There are some weaknesses. Some areas of the text, and a critical point or two in the methods, are unclear. Neither the MPI-MTE nor the inversion products seem ideal for this kind of IAV analysis, although I recognize that this is all there is to work with; still, the authors should address this. In addition, the conclusion should be re-done or removed; on a related note, the strengths and weaknesses of these NEE data products might be better, and more succinctly, summarized based on the analyses performed.

These are, however, relatively minor points, as I found this a strong ms overall.

### Specific comments

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1. Lines 118-120: not as clear as it should be. Interannual variability computed with a 12-month window? How is this possible, as that's only 1 year?
  2. L. 171-172: move to figure caption, or methods
  3. L. 197: "area of"
  4. L. 241-243: unclear
  5. L. 250-: separating paragraphs, or indenting their first lines, would make this easier to read
  6. L. 286-: these aren't conclusions, just a recapitulation of results; remove
  7. Figure 2: Rain (in axis title) or Precipitation (in caption)?
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