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

Anonymous Referee #2

Received and published: 26 February 2017

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 CO2 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.
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

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)?