1. Introduction: Interannual variability in modeled (CASA) C flux is in part caused by interannual variability in NDVI (FPAR) (Fig. 1).

2. Justification: Is interannual variability in NDVI explained by climate? Here we examine the sensitivity of NDVI to interannual variability in precipitation and temperature.

3. Data:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Spatial (°)</th>
<th>Temporal</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIMMS 3g NDVI</td>
<td>0.05</td>
<td>Semi-monthly</td>
<td>1981-2010</td>
</tr>
<tr>
<td>GPCP precipitation</td>
<td>2.5</td>
<td>Monthly</td>
<td>1979-2009</td>
</tr>
<tr>
<td>CRU climatology</td>
<td>0.5</td>
<td>Monthly</td>
<td>1961-1990 (base)</td>
</tr>
<tr>
<td>GISS temperature anomaly</td>
<td>2</td>
<td>Monthly</td>
<td>1880-2010</td>
</tr>
</tbody>
</table>

   - Data sets used: long record; global coverage; consistent with data sets of higher quality (Fig. 2); Use of TRMM precipitation (40°N-40°S, 0.25°, semimonthly, 1998-2010) gives the same result.

4. Methods:

   4.1. Conducted Pearson’s correlation analyses at pixel level with varying lags (of NDVI response to climate) on:
   - 1982-2009 NDVI – precipitation anomaly time series (monthly, 1*1);
   - 1982-2010 NDVI – temperature anomaly time series (monthly, 0.5°*0.5°);

   4.2. Accounted for first-order temporal autocorrelation following Dawdy and Matalas (1964). Only significant correlation coefficients (r values with corrected p values <0.05, two-tailed t-test) are shown.

5. Results:

   5.1. NDVI – precipitation anomaly correlations:

      - Strongest for 1-month preceding precipitation; Significant in 36% of land pixels; Positive in arid and semiarid areas where grasslands and shrublands are the dominant land cover types.

      - Significant for current month temperature (Fig. 6&7); Not associated with land cover types.

6. Conclusion:

   - This study confirms a mechanism producing variability in modeled NPP:
     - NDVI (FPAR) interannual variability is strongly driven by climate;
     - The climate driven variability in NDVI (FPAR) can lead to much larger fluctuation in NPP vs. the NPP computed from FPAR climatology (Fig. 8).

References:

Acknowledgements: The work is supported by NASA’s Carbon Monitoring System project and Carbon Cycle Science element of the Terrestrial Ecology Program.