Introduction

The global atmospheric CO₂ concentration is rising. The atmospheric concentrations of other radiatively important trace gases (e.g., N₂O, CH₄) is also rising.

Many scientists are concerned that, due to the greenhouse effect, the global climate is changing. This figure appears on the United States’ National Academies website.

Recognizing this fact, as plant scientists, what can we do in the face of potential climate change caused by the greenhouse effect?

What can we do?

As plant and soil scientists, what can we do? Increase our understanding of the role plant systems play in the exchange of greenhouse gases between the earth’s surface and the atmosphere.

Quantify surface-atmosphere fluxes of CO₂, CH₄, & N₂O in various agricultural systems.

As plant and soil scientists, what can we do? Elucidate the influence of relevant biological and environmental controlling factors in regulating these fluxes.

Ultimately, manage these systems so as to mitigate increasing atmospheric concentrations of trace gases (through, e.g., soil carbon sequestration).

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In fall 2005, due to decreasing yields in the continuous maize site, as well as increasing disease incidence, we changed the management of site 1 from no-till to a single plowing following harvest.

<table>
<thead>
<tr>
<th>Irrigated continuous maize (Site 1)</th>
<th>2-year average 2002-2004</th>
<th>2-year average 2004-2006</th>
<th>2-year average 2006-2008</th>
<th>2-year average 2008-2010</th>
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</thead>
<tbody>
<tr>
<td>Net Biome Production (NBP) g C m²</td>
<td>-51 to -29</td>
<td>-149 to -131</td>
<td>-99 to -82</td>
<td>40 to 51</td>
</tr>
</tbody>
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