OLD CARBON VS. NEW CARBON IN CLIMATE CHANGE

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Ben W. Ebenhack, University of Rochester
Daniel M. Martinez, University of Rochester

INTRODUCTION

One of the commonly accepted precepts of the climate change problematique is that biofuels are universally superior to fossil fuels due to a purported closed carbon cycle (CCC) for biomass. Some authors and policy makers refer to 'new carbon' having no net impact on climate change, only 'old carbon.' This assumption which drives some policy planning, begs some important questions.

On a geologic time scale, fossil fuels are a subset of biomass. Time, heat, and compaction have transformed raw biomass materials into more homogeneous materials with higher energy densities. At what point, then, is material transformed from an environmentally benign biomass fuel into 'old carbon' that is somehow excluded from the CCC? How are the cycle boundaries defined to be closed, in a system in which net biomass growth is lost annually through deforestation -- sometimes attributable to harvesting that biofuel?

This paper explores the concept of the CCC for fuel crops, its legitimacy in the context of the real global carbon balance, and its implications for energy choices using 'new carbon' sources. A graphic representation of a simple numerical model balance is presented to address this problem. The balance increases in complexity as alternate uses of land and fates of carbon for biomass cropping schemes are included. The time horizons on which carbon balances are most important to the issue of climate change is discussed.

The notion is advanced that energy planning to ameliorate climate change is best undertaken to use combustion fuels based on their lifecycle net efficiencies rather than on a notion of a CCC for some but not for others. We suggest that this is an artificial distinction which should be largely dismissed.