



Analyzing and Influencing Carbon Sequestration in Harvested Wood Products

Ben Jones, Hannah X Laws, Kelly Loucks, Andrew Sullivan

Department of Mathematical Sciences



Abstract

- Sequestration of carbon in forests is a process that can pull large quantities of carbon out of the atmosphere or prevent its release to the atmosphere, 87% of total **CO₂** removals in 2014. Carbon mitigation efforts have thus focused much attention on reforestation, forest management, and forest based products. According to the most recent report to the **UNFCCC**, an estimated 18.7% of the total carbon in woody materials is contained in harvested wood (**HWP** and **SWDS**).
- The amount of carbon in **HWP** and **SWDS** depend on how much wood is harvested, what types of products are produced, how the products are used, the lifetime of the wood products, and how the wood is processed at the end of its primary product lifetime.

Purpose

- Information is intended to aid in international discussions and any agreements about managing greenhouse gas emissions and sinks.
- Also provides national level methods and estimates of carbon sinks and emissions associated with HWP.
- The package provides quick accessibility, allowing data to be updated, modified, and manipulated with ease.

Different Decays Plot

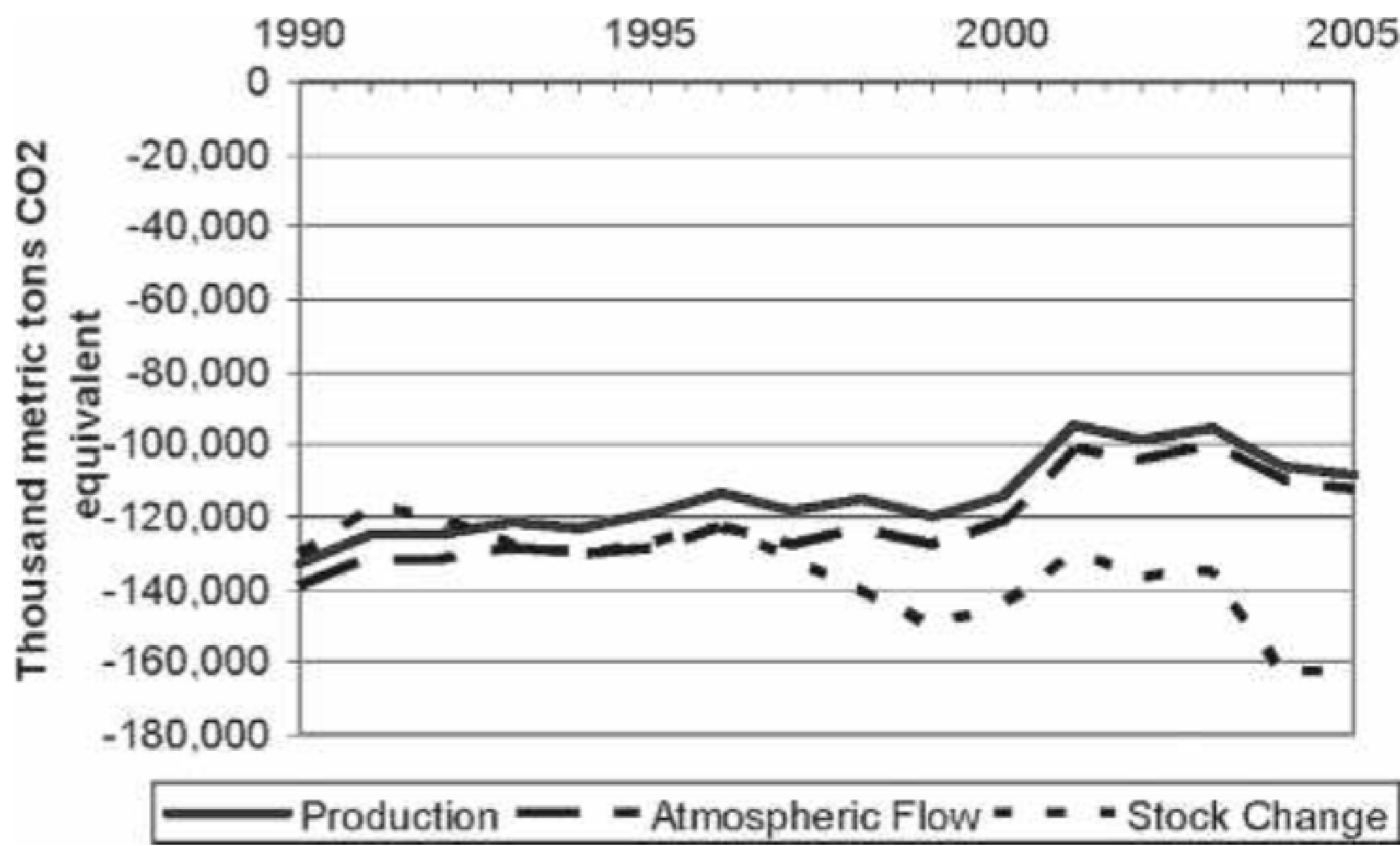


Figure: Figure caption

Future Plot and Targeted Change

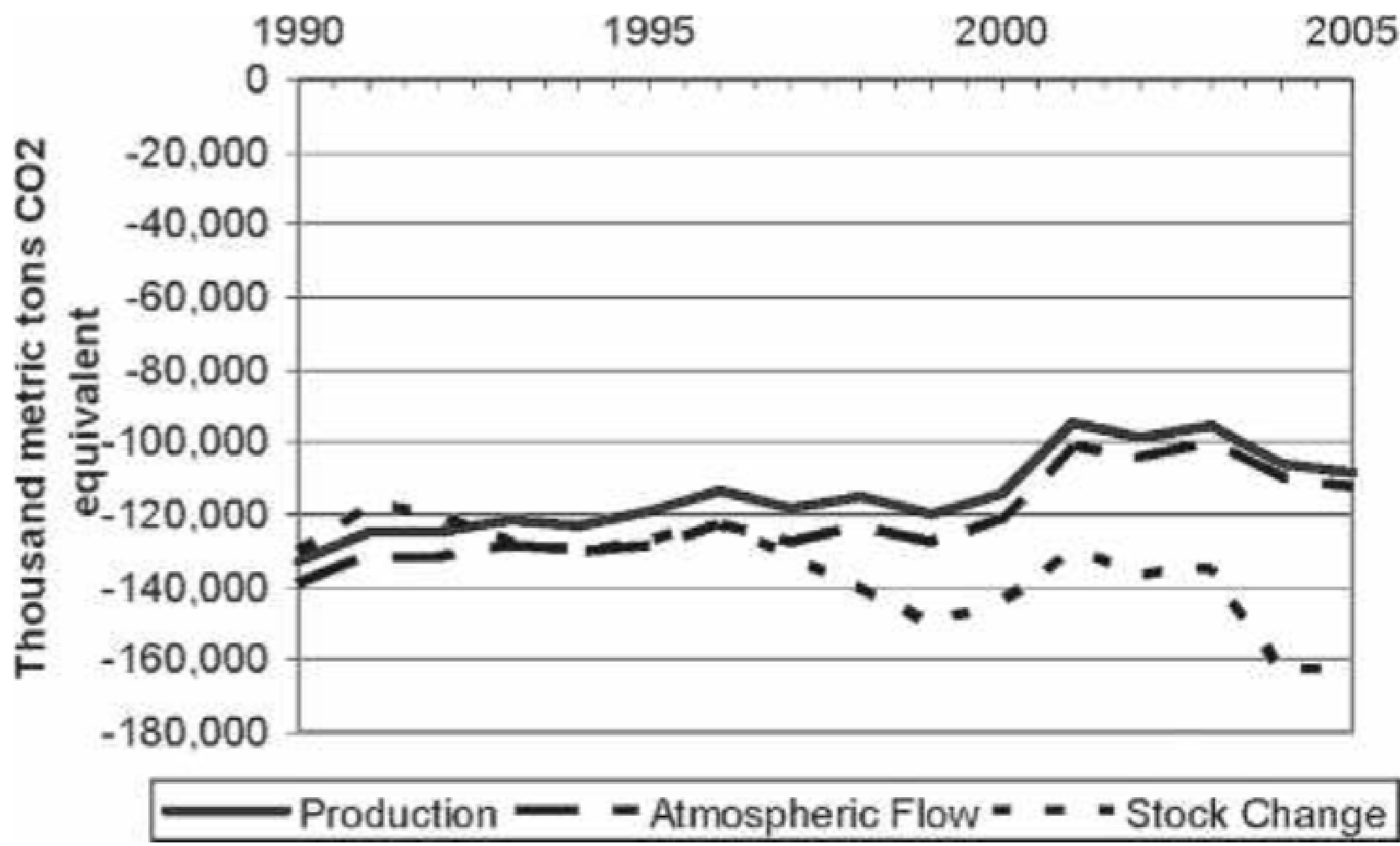


Figure: Figure caption

Recent Analysis

- In 2005, the contribution to removals was 30 Tg (million metric tons) C (carbon) and 31 Tg C for the Production and Atmospheric Flow Approaches, respectively, and 44 Tg C for the Stock Change Approach. This range is 17 to 25 percent of C removals by forests, or would offset 42 percent to 61 percent of residential natural gas C emissions in 2005.
- The contribution has declined under the Production and Atmospheric Flow Approaches since 1990 and has increased under the Stock Change Approach. The Stock Change estimate has increased because it explicitly includes C in increasing net imports of wood and paper products.

Sources of Data and Equations

- WOODCARB II Software in Microsoft Excel®
Note: Base level data was given in spreadsheet.
- Harvest Quantities:

$$E = mc^2 \quad (1)$$

- Imports, Exports, etc.:
- Decay of HWP:

Decay with Time Plot

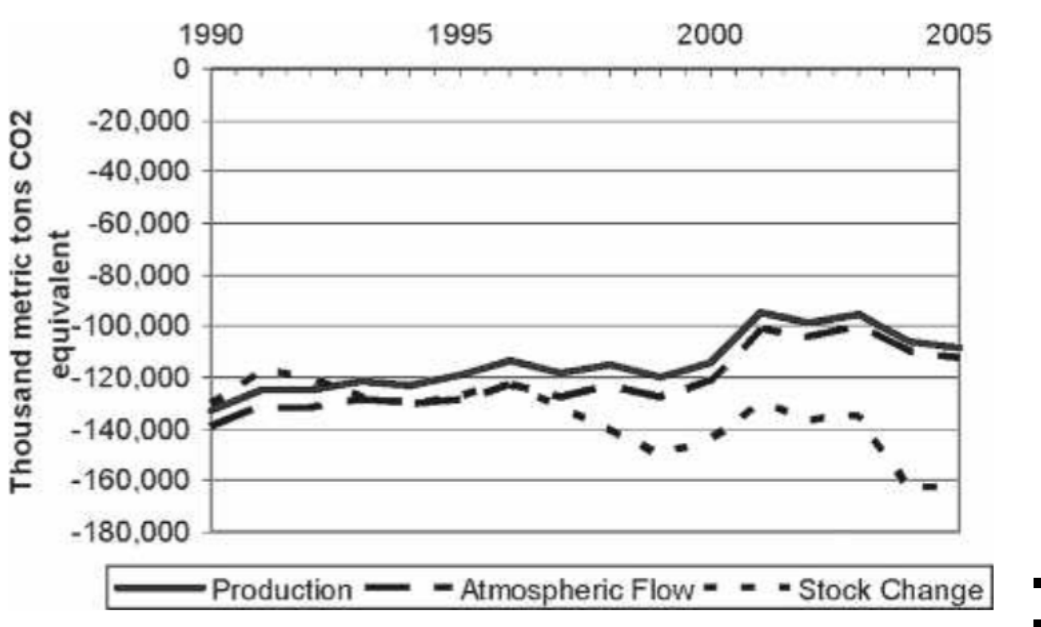


Figure: Figure caption

Conclusions

-
-
-
-

Possible Extensions

-
-
-

Acknowledgements

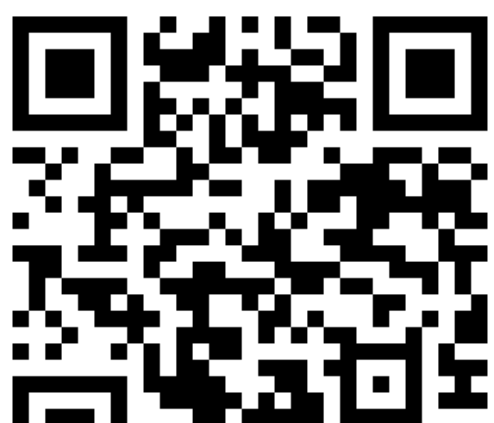
This work was funded by a Research Joint Venture Agreement with the USDA Forest Service, Northern Research Station.
This work also was funded by a Research Joint Venture Agreement with the USDA Forest Service, Southern Research Station.

Contact Information

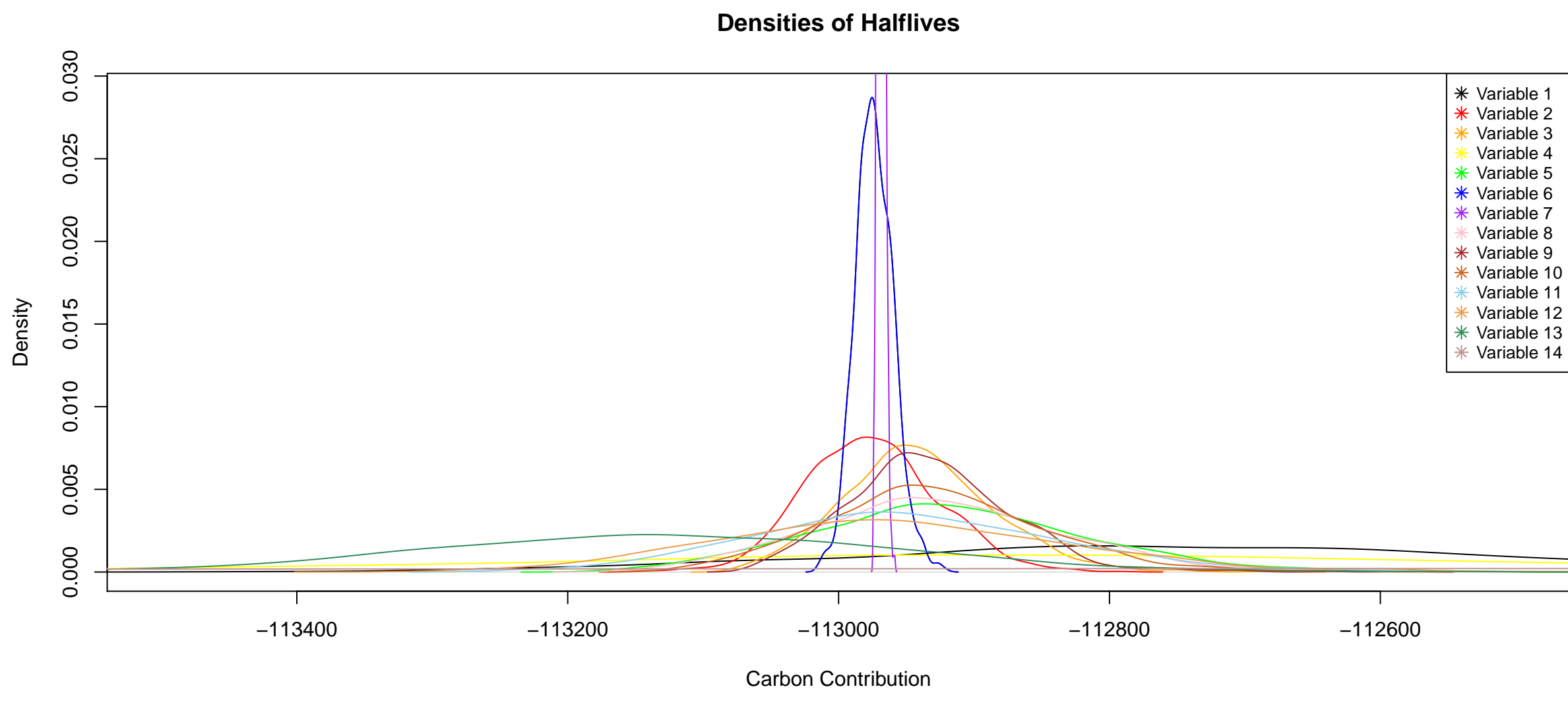
- Web: <https://mathsci.appstate.edu>
- Email: marlandes@appstate.edu
- Phone: +1 (000) 111 1111

Access to Package and Webpage

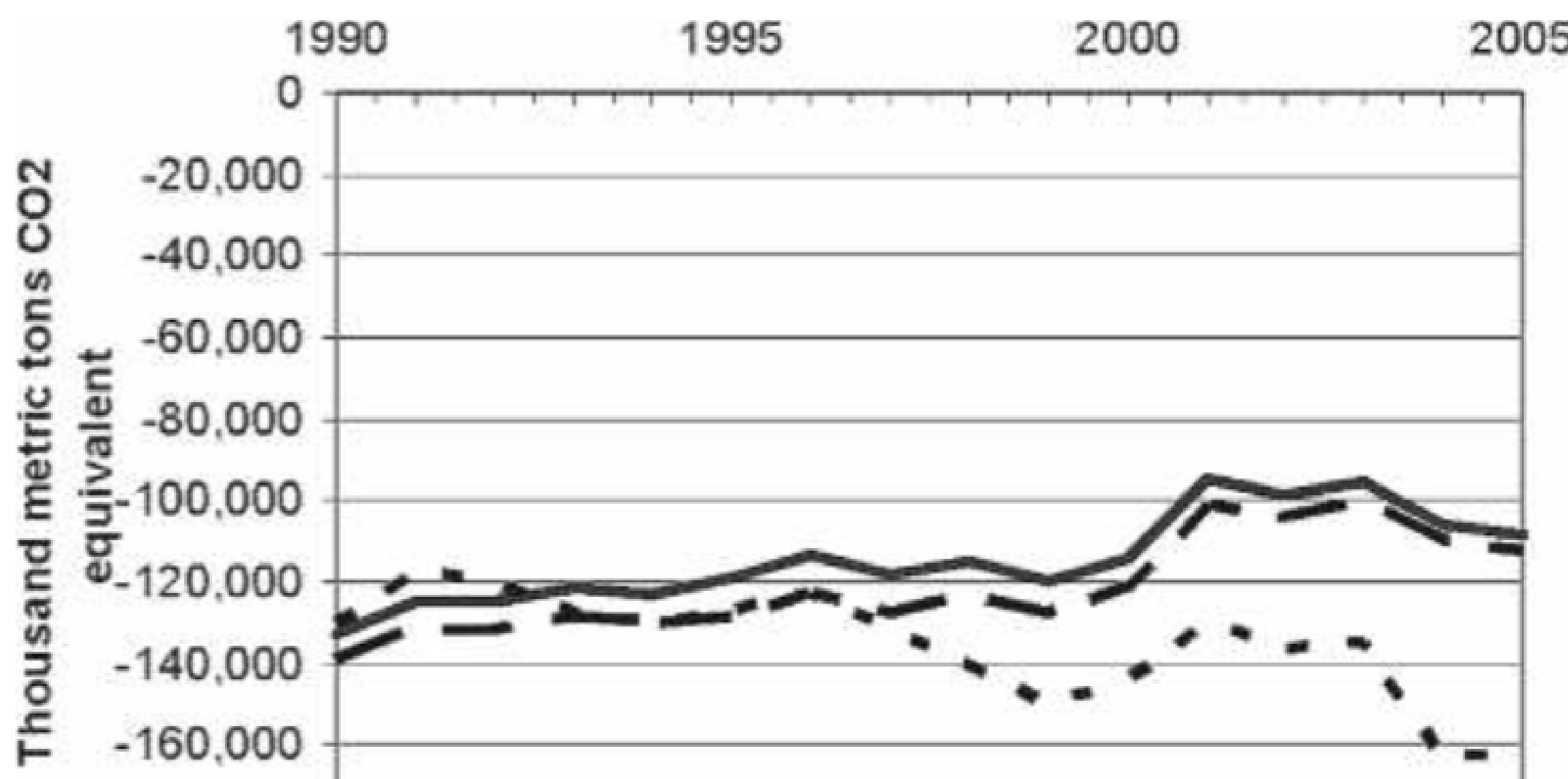
- Online link: WOODCARB3R package
- Instant access:



Sensitivity Plot



Sensitivity of Input



Sensitivity Table

Time Plot with Envelope

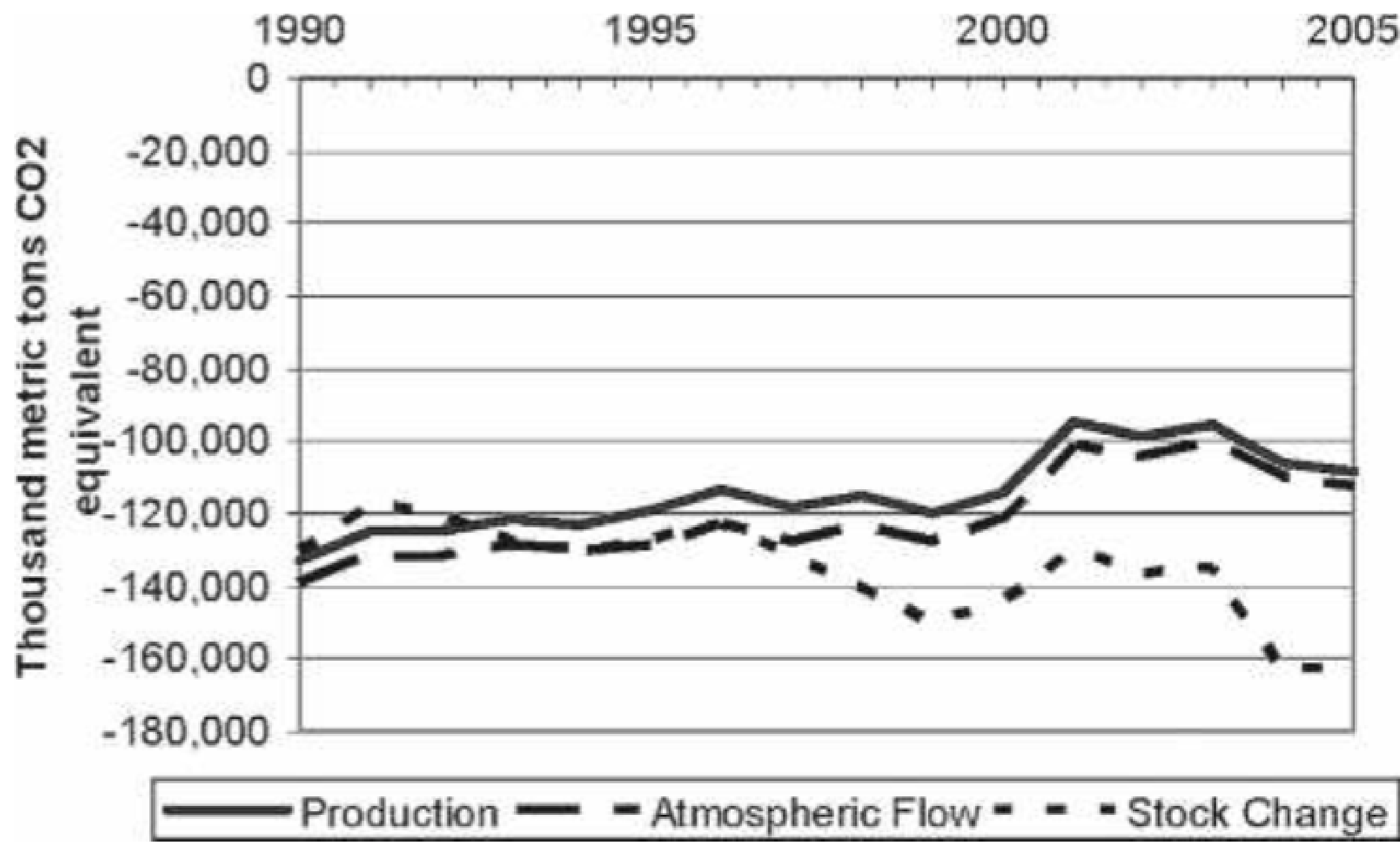


Figure: Figure caption