Soil Erosion and Carbon Dynamics. 2005. Eric J. Roose, Rattan Lal, Christian Feller, Bernard Barthes and Bobby A. Stewart (eds.). CRC Press, Boca Raton, FL. ISBN: 1566706882. $129.95. 376 pp.

Readers of Soil Science will find this book very useful. It presents new and useful information on soil erosion and the impact it has on carbon dynamics. The book is balanced on the global scale of erosion and how it is related to carbon dynamics (fluxes). It provides what is needed in erosion studies and does not just look at the amount of soil lost but what happens to it after it has been eroded.

This book addresses a very important issue that is or has not been very well understood. Many people consider that all carbon that moves by erosion to be lost and to emit CO$_2$ upon oxidation, but this view does not consider deposition of carbon in lower areas of fields, in sediments in water bodies, and so on. All soil loss is considered to be removal by many models, but this book takes a much more realistic look at the fate of soil erosion and how carbon dynamics are affected.

The process of erosion has not been considered in depth in the past; erosion is a measure for a given slope length and percent slope, and this figure is the end answer, but this is not really the case. Even the extent and magnitude are not clear as to from point to point. Many times, the lower part of the fields becomes more fertile as the upper part of the slopes erodes. The process is not just erosion but also deposition. It is true in a way that the magnitude and severity of erosion are well documented but not with respect to deposition. The models look at all soil as being lost, and this is not the case. Even the case of loss of nutrients; many times, the nutrients are just moved from one area to another, so down slope areas may have a gain in productivity.

The bottom-line is that soil organic carbon moved by erosional process is not always lost as CO$_2$. This book looks at all the various factors that affect the fluxes. This book goes beyond the normal erosion predictions and looks into the process changes that come from erosional processes.

Many works have looked at management practice (no-till, mulch till, deep tillage, conventional tillage) on the rate and magnitude of erosion, but the process that they affect have not really been understood; only sediment movement was considered. This book goes beyond this and starts to put a handle on the fluxes of carbon that are affected by different managements and processes. Erosion has always been measured in the amount of sediment moved, not in what happens to the material being moved. Farm practices are governed by amounts, not the fate, of moved soil. The simple bottom-line is if we managed soils to maintain or increase soil carbon, erosion would be stopped and the overall environment would improve; agriculture would be more sustainable and in a more environment-friendly manner.

This book has three major objectives that go beyond the normal measures of erosion; the purpose was to look at fluxes of carbon that are changed by erosion. The authors studied what happens to soil and carbon after it has been moved by erosion. The authors wanted to look at the fate of eroded carbon. This is needed, and this is why the book will help advance the understanding of the many processes influence the overall carbon cycle.

The book has three major sections, and there is a good global overview of the relationship of climate change and carbon cycle and how soil erosion influences the overall carbon cycle in the world. One drawback of the specific plot studies is that they focused only on the tropics. Erosion is a major problem in the tropics, but a couple of chapters on the more temperate, nontropical environment would have given readers a more balanced view. This would also have allowed readers to understand what is going on in other areas. In a way, the title is a bit misleading because it does not say that most of the book is focused on tropical areas. Even the section on carbon in rivers is focused on tropical rivers. Most of the soils in these areas are low-activity clays and highly depleted of organic carbon; it is hard to know if
similar fluxes would be found in 2:1 clays in many of the large-grain-producing regions of the world (Ukraine, Argentina, China, and the central United States).

Even in the first chapter, the point is made that 50% of the carbon has been lost in the cultivated soils of the United States, but it does not clearly say if this was a result of erosion or simple oxidation due to the tillage. This is in a way a minor point, but if the book is about erosion, some estimation of the loss by erosion is needed. In the chapter by Dr Lal, the emissions of carbon by erosion are given and hot spots are pointed out; however, although the chart shows that 10% to 15% of the emissions come from North America, no hot spots are shown for that area.

Overall, the point is made that carbon management is needed to reduce erosion and that there are many benefits that will result from carbon management. The book is very useful because it greatly increases the understanding of soil carbon fluxes and how erosion has an effect on said fluxes. It shows what is known at the present time and points out where there are gaps in the knowledge base related to erosion and carbon dynamics. It will be a very useful reference for its readers. It is hoped that future symposia would focus on temperate regions and that sections on what is needed in future research would be more clearly defined. Also, even if most scientists do not want to get involved in the policy arena, some policy options should be pointed out; if science is to have an impact, input to policy development is needed.

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**Erratum**

In the article “Soil Organic Matter Changes in a Spruce Chronosequence on Swedish Former Agricultural Soil. I: Carbon and Lignin Dynamics,” by Chiara Cerli, Luisella Celi, Maj-Britt Johansson, Ingrid Kögel-Knabner, Lars Rosenqvist, and Ermanno Zanini, in the November 2006 issue of the journal, Table 3 and Figure 4 appear incorrectly. We regret the error. (Fig. 4) (Table 3)

| Age | Horizon/layer | Depth (cm) | C (g kg\(^{-1}\)) | N (g kg\(^{-1}\)) | C (Mg ha\(^{-1}\)) | N (Mg ha\(^{-1}\)) | C (Mg ha\(^{-1}\) yr\(^{-1}\)) | N (kg ha\(^{-1}\) yr\(^{-1}\)) | C/N ratio |
|-----|---------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------------------|---------------------------------|-----------|
| 18  | Oi            | 0.5        | 320               | 9.11              | 0.62              | 0.018             | 0.035                         | 0.99                            | 35.2      |
|     | Oe            | 1.0        | 342               | 11.6              | 1.37              | 0.046             | 0.076                         | 2.38                            | 29.4      |
|     | Oa            | 2.5        | 146               | 5.40              | 1.42              | 0.053             | 0.079                         | 2.92                            | 27.0      |
|     | Average FF*   | 4.0        | 217               | 7.44              | 3.41              | 0.12              | 0.19                          | 6.49                            | 29.2      |
|     | 0–5 cm        | 5.0        | 66.1              | 3.32              | 13.5              | 0.68              | 0.75                          | 37.9                            | 19.9      |
|     | 5–15 cm       | 10.0       | 66.9              | 3.07              | 45.5              | 2.09              | 2.53                          | 116                             | 21.8      |
|     | 15–30 cm      | 15.0       | 32.3              | 2.18              | 36.5              | 2.46              | 2.03                          | 137                             | 14.8      |
| 29  | Oi            | 1.0        | 419               | 10.9              | 2.64              | 0.068             | 0.091                         | 2.36                            | 38.6      |
|     | Oe            | 1.0        | 206               | 7.62              | 1.30              | 0.048             | 0.045                         | 1.66                            | 27.0      |
|     | Oa            | 1.5        | 210               | 8.36              | 1.99              | 0.079             | 0.068                         | 2.72                            | 25.1      |
|     | Average FF*   | 3.5        | 268               | 8.86              | 5.92              | 0.20              | 0.20                          | 6.74                            | 30.3      |
|     | 0–5 cm        | 5.0        | 47.0              | 2.45              | 15.3              | 0.80              | 0.53                          | 27.5                            | 19.2      |
|     | 5–15 cm       | 10.0       | 41.7              | 2.22              | 33.3              | 1.78              | 1.15                          | 61.2                            | 18.8      |
|     | 15–30 cm      | 15.0       | 26.3              | 1.64              | 31.6              | 1.97              | 1.09                          | 67.9                            | 16.1      |
| 64  | Oi            | 2.0        | 464               | 12.6              | 12.2              | 0.33              | 0.19                          | 5.18                            | 36.9      |
|     | Oe            | 3.0        | 453               | 13.1              | 17.9              | 0.52              | 0.28                          | 8.06                            | 34.7      |
|     | Oa            | 3.5        | 332               | 8.97              | 15.3              | 0.41              | 0.24                          | 6.46                            | 37.0      |
|     | Average FF*   | 8.5        | 406               | 11.3              | 45.4              | 1.26              | 0.71                          | 19.7                            | 36.0      |
|     | 0–5 cm        | 5.0        | 61.3              | 2.59              | 22.7              | 0.96              | 0.35                          | 15.0                            | 23.6      |
|     | 5–15 cm       | 10.0       | 61.5              | 2.70              | 62.1              | 2.73              | 0.97                          | 42.6                            | 22.8      |
|     | 15–30 cm      | 15.0       | 39.2              | 2.40              | 38.3              | 2.34              | 0.60                          | 36.6                            | 16.3      |
| 73  | Oi            | 2.0        | 451               | 9.3              | 9.93              | 0.25              | 0.14                          | 3.39                            | 40.1      |
|     | Oe            | 2.5        | 463               | 13.8              | 12.7              | 0.38              | 0.17                          | 5.22                            | 33.4      |
|     | Oa            | 4.0        | 366               | 10.9              | 16.1              | 0.48              | 0.22                          | 6.58                            | 33.5      |
|     | Average FF*   | 8.5        | 414               | 11.9              | 38.7              | 1.11              | 0.53                          | 15.2                            | 34.9      |
|     | 0–5 cm        | 5.0        | 77.3              | 2.87              | 20.1              | 0.75              | 0.28                          | 10.2                            | 26.9      |
|     | 5–15 cm       | 10.0       | 71.5              | 2.75              | 47.2              | 1.82              | 0.65                          | 24.9                            | 26.0      |
|     | 15–30 cm      | 15.0       | 41.2              | 2.04              | 39.0              | 1.94              | 0.53                          | 26.5                            | 20.2      |
| 91  | Oi            | 2.0        | 391               | 10.5              | 15.0              | 0.40              | 0.17                          | 4.44                            | 37.2      |
|     | Oe            | 3.0        | 452               | 12.4              | 26.0              | 0.72              | 0.29                          | 7.86                            | 36.4      |
|     | Oa            | 4.0        | 286               | 8.18              | 21.9              | 0.63              | 0.24                          | 6.90                            | 34.9      |
|     | Average FF*   | 9.0        | 364               | 10.1              | 63.0              | 1.75              | 0.69                          | 19.2                            | 36.0      |
|     | 0–5 cm        | 5.0        | 95.0              | 3.84              | 22.8              | 0.92              | 0.25                          | 10.1                            | 24.7      |
|     | 5–15 cm       | 10.0       | 69.7              | 2.82              | 44.6              | 1.81              | 0.49                          | 19.9                            | 24.7      |
|     | 15–30 cm      | 15.0       | 50.9              | 2.46              | 61.1              | 2.95              | 0.67                          | 32.4                            | 20.7      |

*Average FF = average value of the three litter layers.
Fig. 4. Syringyl/vanillyl (S/V) and cinnamyl/vanillyl (C/V) phenols ratio and acid/aldehyde ratio of the vanillyl (Ac/Al)$_V$ and syringyl (Ac/Al)$_S$ CuO oxidation products in the different organic horizons and mineral layers of the five stands.