Geophysical Research Abstracts
Vol. 13, EGU2011-1507, 2011
EGU General Assembly 2011

Carbon stock evaluation in different forest stands in North-East Italy

Claudio Bini and Valentina Faggian
University of Venice, Environmental Sciences, Venice, Italy (bini@unive.it, +39 412348584)

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Bini C*., Faggian V., Zilioli D.M.
Dept.of Environmental Sciences, University of Venice. Dorsoduro,2137 - 30123 Venezia, Italy.

Abstract
Gas emissions from anthropic activities contribute strongly to global warming, and determine important consequences to the whole planet. Mitigation actions, therefore, are needed in order to reduce and absorb glasshouse gasses (particularly CO2), as stated in the Kyoto protocol. Soil is the major carbon sink in the earth, being global soil carbon sequestration over 2Gt /y.
In the present work, the objectives were: i) to evaluate the potential carbon stock of different forest stands in NE Italy, and ii) to outline the relationships among litter typology, soil organic matter dynamics and actual carbon stock under different vegetation coverage.
Five forest stands (spruce, scots pine, larch, swiss stone pine, hemloch) were selected in the Dolomites area (NE Italy). The humus forms were examined in the field and samples were carried to the lab for further analyses. Soil organic carbon (SOC) was determined, and humification parameters were calculated. Finally, the carbon stock for each soil was calculated from the balance equation:

The less developed humus forms, as the Dysmull at site H1 and the Hemimoder at site H3, presented the highest carbon storage capacity (168 t/y and 129 t/y, respectively), followed by Lithoamphimus at site H2 (123 t/y) and Eu-amphimus at site H5 (96 t/y), and by Oligomull at site H4 (86 t/y).
Organic horizons proved to recover 36% of the total carbon stocked along the soil profile, and this points to humus layers as a fundamental source in carbon stock evaluation. Positive correlation between elevation, humus type and carbon stock values was found. The increased humus mineralization rate, however, would transform the carbon sinks (forest stands) in carbon sources, therefore enhancing the global change.
Current uncertainty about key processes requires further investigations about this scenery.

Key words: SOC, forest stands, humus forms, carbon stock, global change.
* presenting author, 2137 Dorsoduro, Venice, 30123 – Italy. +39412348918; bini@unive.it