



COST Action 639



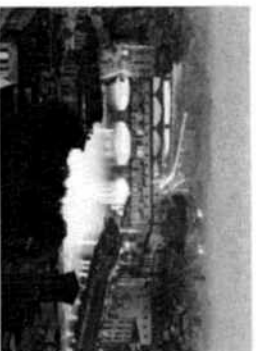
FONDAZIONE EDMUND MACH

"Greenhouse-gas budget of soils under changing climate and land use"

Thematic workshop: "Soil carbon in Mediterranean Ecosystems"

Florence, 2-3 March 2009

(Facoltà di Agraria, Aula Magna; Piazzale delle Cascine, 18 - Firenze)



Program

Monday, 2

09:00 Welcome (Robert Jandl - Stefano Carnicelli)

09:20 Introduction (Mirco Rodeghiero - Ingrid Koegel-Knabel)

Section 1: Main features of Mediterranean soils

10:00 **Theodore Karyotis** (Greece): "Properties, characteristics and soil nutrients in Southern European countries".

10:20 *Coffee break*

10:50 **Simona Castaldi** (Italy): "Pedological and landscape characteristics influencing C distribution in soils of Southern Italian environments".

11:10 Discussion of session 1

Section 2: Monitoring soil carbon and soil carbon stocks

11:30 **Mirco Rodeghiero** (Italy): "The Italian National Forest Inventory as a tool to monitor Mediterranean ecosystems soil C".

11:50 **Rossano Ciampalini** (Italy): "Development of a pedotransfer function (PTF) for estimating bulk density in Mediterranean forest soils".

12:10 Discussion of session 2

12:30 *Lunch break*

Bulk density estimation through PTFs for Mediterranean forest soils

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Bulk density (BD) is a key property for quantitative understanding of soil status, and is then necessary for modeling environmental dynamics. From this point of view, it is important to have an alternative evaluation option, through non-destructive, indirect procedures such as the utilization of pedo-transfer functions (PTFs). Such functions may also allow to utilize pre-existing datasets; for forest soils, these were often built without any direct measurement of BD, but generally include a set of basic soil characterization data. Finally, PTFs allow estimation of bulk density for soil layers in which direct measurement is practically very difficult; high coarse fragment content, for example, is a very common problem hindering BD measurement in forest soils.

A wide collection of PTFs, relating BD to soil organic carbon, organic matter, texture, and depth, are found in literature (e.g. De Vos et al., 2005; Kaur et al., 2002); few of them, however, targeted forest soils, and none is specifically calibrates for the Mediterranean environment.

In this study, we inquired relations of bulk density with some basic properties of a forest soil layer, such as organic carbon content and coarse fragment volume, in the Mediterranean context.

In the ICP-Forests Level I and some Level II plots, located in Central and Southern Italy, BD was determined for about 300 soil core samples, collected with a fixed-volume steel ring sampler at fixed soil depth intervals. Coarse fragments weight and volume were measured, after dry sieving, with an oil immersion method; organic carbon content was measured by elemental analysis.

We found that a strong relation exists between soil organic carbon and bulk density; this relation is well described by exponential decay-type functions, which achieve correlation coefficients in excess of 0.7. The evaluation of the predictive errors (RMSPe) shows a significant improvement with respect to published PT functions.

Estimation of bulk density by PTF on the basis of organic carbon content appears to be a reasonable target in Mediterranean forest soils.