



**REPORT ON THE COURSES  
" FUNDAMENTALS OF SOIL SCIENCE"  
AND  
"THE STUDY OF PALEOSOLS AND THEIR USE IN GEOLOGY PRACTICE"  
DEVELOPED BY ISPRA IN COLLABORATION WITH OGL**

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**ABSTRACT:** A short report on two training courses on Soil Science and Paleosols is here presented. They were designed by Italian Institute for Environmental Protection and Research (ISPRA) in collaboration with the Order of Geologists of Latium (OGL). The courses were developed through a blended learning program. A one-day field training in the Roman countryside comprised the analysis of two soil profiles specially excavated.

**Keywords:** soils, paleosols, training courses, ISPRA

According to one of the most accepted definitions, paleosols are soils that have evolved in environments different from the current one (see Ferrari & Magaldi, 1983, among others:). The systematic study of these geological layers offers a great potential in paleoclimatic, paleoenvironmental and stratigraphic reconstructions of the Quaternary continental record. Even the North American Stratigraphic Code (NACSN, 1983) recognised their undoubted value by introducing specific formal stratigraphic units named pedostratigraphic units or geosols. In addition, the common use of unconformity-bounded stratigraphic units (UBSU, Salvador, 1994) for the stratigraphic classification of the Quaternary continental and volcanic deposits, also adopted in the Geological Map of Italy at 1: 50,000 scale (CNR, 1992), has often led to use both relict and buried paleosols (Fig. 1) as a guide to recognise and track the unconformity surfaces (e.g. Coltorti & Pieruccini, 2006; Giannandrea et al. 2006).

As a result, the paleopedological analysis has become a rewarding interpretive tool in the practice of the field geologists and scientists dealing with the study of past environments. However, these studies need a multidisciplinary approach integrating geologic-stratigraphic and soil sciences, the latter usually treated in agricultural or agronomic context. This integrated approach is only sporadically available in the training programs of the Italian university.

Therefore the Italian Institute for Environmental Protection and Research (ISPRA) has developed two training courses ("Fundamentals of Soil Science" and "The study of paleosols and their use in geology practice ") in collaboration with the Order of Geologists of Latium (OGL) and with the support of AIQUA, the Italian Geological Society (SGI), the Italian Association of Physical Geography and Geomorphology (AIGeo) and the Italian Association of Pedologists (AIP). The educational activities were held from September 18<sup>th</sup> to Octo-

ber 31<sup>th</sup> through a blended learning program including: i) digital self-training courses on the ISPRA web platform, ii) two days of face-to-face lessons at ISPRA headquarters in Rome and iii) a one-day field training course in the Roman countryside (Agro Romano) which comprised the analysis of two soil profiles specially excavated.

The two courses have been designed as an integrated approach, starting from the common basic concepts of pedogenesis and soil classification, then deepening in specific topics relating to soils and paleosols respectively. The general part was organized by ISPRA Geologists M. Di Leginio and F. Fumanti, with the help of the other ISPRA experts for specific subjects covered by the Institute. Authors of this note took care of the course on paleosols. Visiting professors, some of the leading experts for the subject, have been involved: the lectures on paleosols were given by L. Trombino (Professor of Geopedology at the State University of Milan) and F. Scarciglia (Professor of Geopedology at the University of Calabria). M. Paolanti (self-employed agronomist), and R. Napoli [researcher at the Council for Research and Experimentation in Agriculture (CRA)] provided the lessons on soils. The field activity (Fig. 2a) made use of the experience of F. Terribile (Professor of Soil Sciences at the University of Naples "Federico II"), flanked by R. Napoli and M. Paolanti.

The general part, which was common to both courses, provided participants with an overview of soil properties and functions, classifications and surveying and analysis techniques. Applications on soil databases and mapping, including GIS techniques, were also outlined. In addition the main factors of land degradation and related monitoring activities were treated, with mentions to soil remediation, restoration and recovery methods. A part of the lessons was devoted to the discussion of the current European, national and regional legislation and to the possible future developments in the Italian

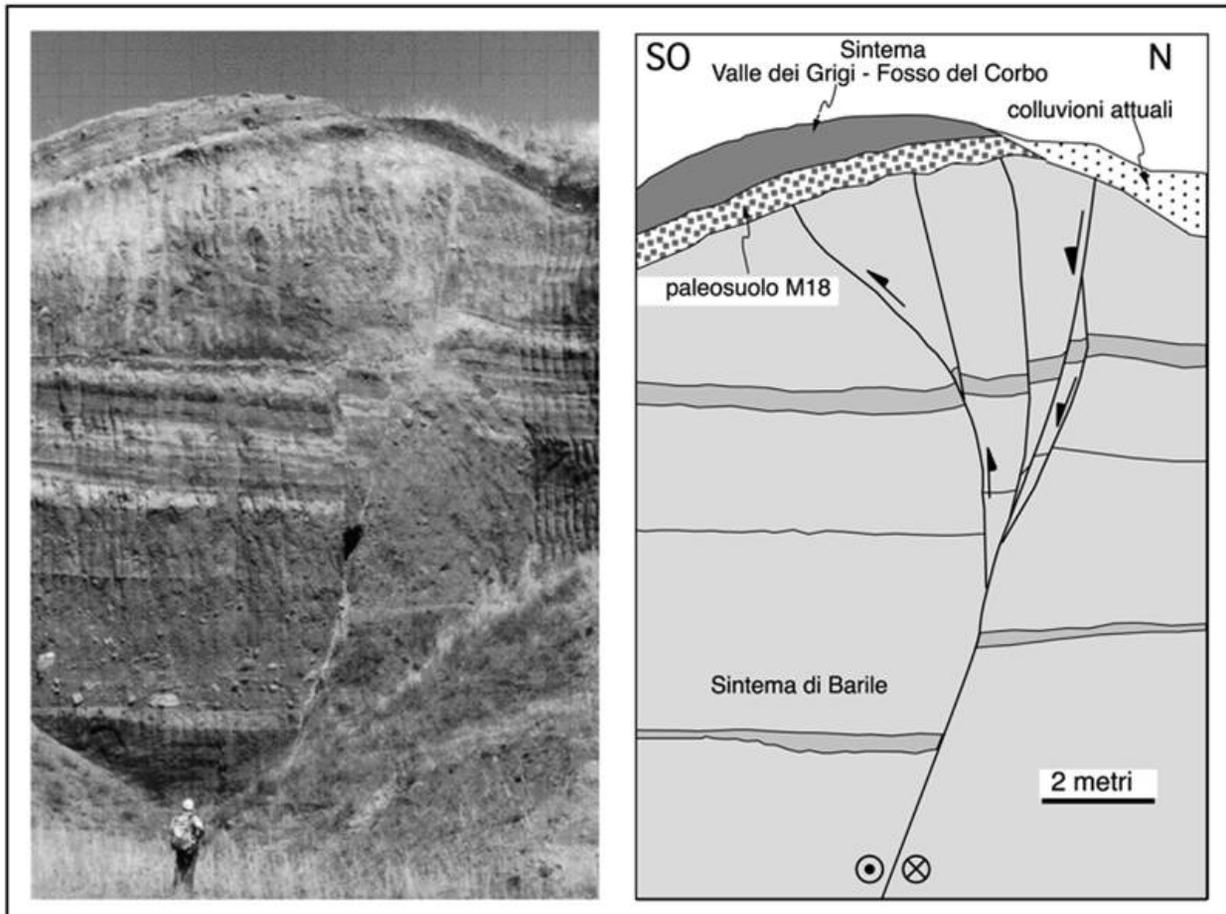


Fig. 1 - In the volcanic area of the Vulture (Italy) the paleosol M18 was used as a marker that divides two supersynthem: it marks the base of the Valle dei Grigi - Fosso del Corbo synthem, fossilising a transpressive "flower" structure in the underlying Barile synthem. (From Schiattarella et al., 2005).

Parliament.

The specialized part on present soils are dealt with matters relating to land evaluation and land use planning; notions of hydrology, chemistry and ecology of soils were also provided.

As regard to paleosols, basic elements for their definition, recognition, characterization and analysis were illustrated, as well as their use as pedostratigraphic units in geological and paleoenvironmental studies. The significance of the time factor, chronosequences and chronofunctions was widely discussed. Several examples of applications of paleopedology to the stratigraphic, paleoenvironmental, paleoclimatic and archaeological reconstruction, in different climatic and geological environments, were presented. The dating methods and their reliability were also mentioned. Finally, the micromorphological analysis of soils and the wealth of information that can be drawn were discussed in detail.

The field activity took place at Casale della Perna, near Tenuta di Decima (Rome). At first M. Fabbri (Vice-President of the Order of Geologists of Latium) outlined the geological-stratigraphic framework of the area. The practical lesson was then focused on the observation of

two soil profiles sited in different geomorphological context: one on the summit plateau and one in the valley area. A geopedological surveying form was given out to participants, then filled in with the help of the experts according to specific guidelines (Costantini, 2007). Finally participants, on the basis of data detected (Fig. 2b), were guided to the classification and interpretation of soils cropping out in the two profiles and to the recognition of an important paleosol, which represent a relevant stratigraphic marker for the Roman area.

The two courses have received a good acceptance among a number of about 60 researchers and technologists, self-employed, public and private officials, academics, having a cultural background mainly related to Earth sciences and in minor part, to environmental, agricultural and biological sciences.

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Fig. 2 - Field trip in Agro Romano (Rome, Italy): a) Fabio Terribile and Rosario Napoli explain how to study a soil profile to course participants; b) participants practice the soil description.

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