Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10699, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10699
EGU General Assembly 2008

Laser scanner-based discrimination between marls and limestones in a stratigraphic section

M. Franceschi (1), G. Teza (1), N. Preto (2), A. Pesci (3), A. Galgaro (1)

(1) Dipartimento di Geoscienze, Università di Padova, via Giotto, 1, I-35137, Padova, Italy, (2) Istituto di Geoscienze e Georisorse, CNR, corso Garibaldi, 37, I-35137, Padova, Italy, (3) Istituto Nazionale di Geofisica e Vulcanologia, via Creti, 12, I-40128, Bologna, Italy (marco.franceschi@unipd.it / Phone: +39-049-827-2077)

Terrestrial laser scanner (TLS) is commonly used in geological survey since it allows a detailed geometrical characterization of an observed surface. Besides geometrical data, TLS also provides the intensity of reflected beam. If the instrument operates in the infrared band, intensity is related, among other parameters, to IR reflectance of the observed material and therefore could be useful to discriminate different lithologies, without any direct contact with the investigated surface.

This study focuses on the discrimination of lithologies in sedimentary successions constituted by limestones and marls. Experiments were carried out to verify the feasibility of this application of TLS, and to solve problems arising when a reflectance analysis is performed, related to data acquisition and processing. Environmental factors as, e.g., water content or surface temperature must be accounted for. Moreover, the intensity data must be corrected for the position of TLS with respect to the observed surface (i.e. distance and angle of view).

Results point out that IR reflectance discrimination provides reliable data and that a detailed model of a stratigraphic sequence, including information about lithology, can be therefore obtained. Moreover, intensity seems to be influenced by $CaCO_3$ content. The possibility to link intensity values with a sedimentological parameter such $CaCO_3$ concentration opens new interesting perspectives of application in stratigraphy, in particular in cyclostratigraphic studies.