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IMAGING THE DEPOSITS THAT FILL VALTELLINA (NW ITALY) BY SEISMIC REFLECTION INVESTIGATION

Giancarlo Biella, Roberto de Franco, Grazia Caielli, Pietro Vignola, Alfredo Lozej, Alfredo Bini, Mauro Guglielmin, Stefano Carbonara & Michele Terenzoni

In the frame of a contract with regione Lombardia, in November 2000 and April 2001 the National Research Council (CNR) shot three seismic reflection profiles across the Valtellina valley in order to identify the sediment layering and the rock basement depth. The acquisition parameters were as follows: group interval 5 m; shot interval 10 m; CDP fold 12; number of groups 48; geophone frequency 30 Hz; sample rate 1 ms; record length 1024 ms, energy source dynamite, acquisition geometry off end.

The Valgella profiles were also acquired simultaneously with a 24 channels instrument and a 25 m group interval, reaching a maximum offset of 850m. All reflection shots were acquired from the refraction cable in order to better control the velocity of the upper part of the valley with refraction first arrivals and to have wide offset reflection phases In this way we were able to record clear deep reflections, where the bedrock shows the maximum depth. For this line the reflection and refraction data were merged in the reflection data processing.

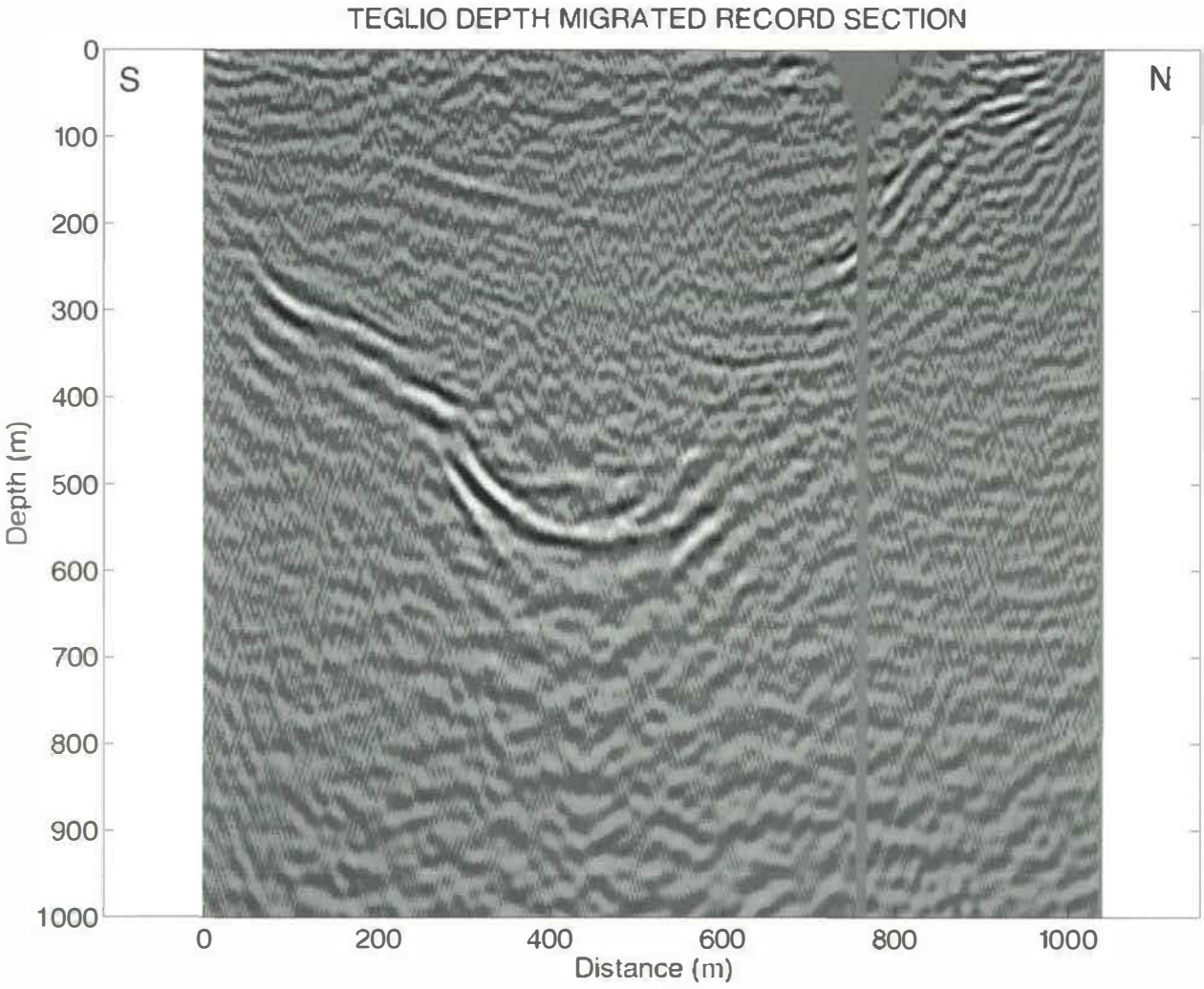
Bormio profiles were shot by using as energy source both dynamite and hydropulse, in order to compare their efficiency and resolution.

The data were processed by a standard procedure using PROMAX and SUNT5 processing codes.

The statics were calculated starting from the refracted first arrivals using a two layer inversion based on least square optimisation. Single CDP was filtered, after a spectral analysis, with a band pass working between 20 hz and 210 hz with 100% band pass between 30 hz and 200 hz. We attenuated the air blast pulses and ground roll using the FK filter defining for each CDP a mute function in the FK domain. The manual mute of refracted arrivals and an AGC with 50 ms window length were applied. A time variant spectral whitening was also applied to balance the spectra of the reflected signals. The sorted CDP were corrected of Normal Move Out (NMO) using the velocity profile obtained in the velocity analysis step. In order to enhance the lateral correlation a DIP scan filter was applied to the shot point panel corrected of NMO. The time migration was obtained using a finite difference algorithm using the interval velocity obtained from RMS velocity deduced from the previous velocity analysis; a reduction of 30% and 40% of the original velocity values was applied. In order to choose the better migration a test of migration with constant velocity was performed. The migrated section were calculated using a step of 250 m/s, from 1500 m/s to 3000 m/s, and obtaining the best result for a mean velocity of 2000 m/s.

The depth migrated record section of the profile shot in Valgella is shown in Figure (datum 300 m, mean surface elevation 363 m).

The bedrock features are clearly identified, with a maximum depth of about 550 m, which means about 180 m below the sea level. The sediments that fills the valley are characterised by a well defined layering, with a clear reflection, below about 150 m depth. These deposits are interpreted as lacustrine deposits (BINI et al.,



this issue) and they have been confirmed by the visual observation of the cores collected in a bore-hole drilled at 300 m distance (Figure). In this core have been observed for the depth ranging between 192 and 209 m lacustrine deposits overlaid by a succession of till until the depth of 40 m when starts a fluvial sequence.

Along both the buried slopes the basement, seems to suffer some deformations related to a deep-seated gravitational slope deformation (DGSD) as more described in detail in BINI et al. (this issue).

Authors' addresses:
Giancarlo Biella, Roberto de Franco, Grazia Caielli, Pietro Vignola, IDPA-CNR, Via Mangiagalli 34, 20133 Milano, Italy; Alfredo Lozej, Alfredo Bini, DIST, University of Milano, Via Mangiagalli 34, 20133 Milano, Italy; Mauro Guglielmin, ARPA Lombardia, V.le Restelli 1/A, 20124 Milano, Italy; Stefano Carbonara, Michele Terenzoni, SIAG S.P.A., Via XXIV Maggio 6, 20021 Bollate (MI), Italy