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THE UPPER CRUST STUCTURE OF THE SOUTHERN ALPS ALONG THE TRANSALP SEISMIC LINE

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The eastern Southern Alps, located to the east of the N Giudicarie Line, has been originated by polyphase compressional evolution of Tertiary age.

The oldest structural system corresponds to the Mesoalpine (Eocene) and early Neoalpine (Oligo-Miocene) compressional events, which originated the Dinaric structural system (NW-SE trending), recognised in the NE side of the Southern Alps.

The subsequent tectonic belt is the Valsugana Structural system, ENE-WSW trending, Serravallian – Tortonian in age. The intense activity of this compressional event is documented both by stratigraphic- structural data and by fission track studies which indicate uplifting of some 4 km in the hanging wall of the Valsugana overthrust between 12 and 8 Ma B.P.

The most external structures NE-SW trending are located in the Montello-Friuli zone which were generated by the Messinian-Pleistocene compressions (whose principal stress axis is NW striking).

The Transalp seismic line (350 km from Munich to Treviso) in the Eastern Alps has been acquired during 1998–199. A combined survey with vibrator-explosive source provide a good resolution in the upper crust and a deep lithospheric penetration.

The results of the vibroseis profile in the Italian sector of the line are in substantial agreement with previous structural interpretation for the upper crust.

The profile shows along the foothill of the southern border of the orogenic chain, the Venetian foreland is thrusted by a large south-verging structure (S. Maria di Feletto-Montello Anticline, BVM thrust system in Fig. 1), involving both the syntectonic Paleogene-Pleistocene clastics and the underlying Mesozoic carbonatic units.

To the north, in the adjacent structural belt of the Southern Alps the Mesozoic carbonatic units are thrusted along three main south-verging overthrusts (S. Boldo, Belluno and Valsugana lines). These thrusts involve the underlying crystalline rocks of the metamorphic basement, largely outcropping in the Gosaldo-Agordo nucleus (Valsugana structural system, VV in fig. 1). These main trusts are decakilometrically spaced with about 10 km in shortening and 5 km in vertical displacement component, each one.

In the northern part of the Southern Alps (Dolomites) the seismic profile shows the outcropping Triassic units affected by south- and north-verging thrusts whose surfaces involve the Variscan basement.

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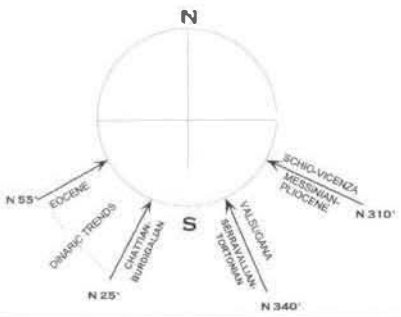

L.: tectonic line, lineament, overthrusting, transfer faults; S.: local structural system; B.: structural belt; Palmanova L. (PL); Udine L. (UD); Bernadia L. (BE); Sacile L. (SC); Bassano-Valdobbiadene-Montello L. (BVM); Caneva L. (CA); Pinedo Avasinis L. (PAV); Barcis-Tarcento L. (BT); Alto Tagliamento L. (ATF); Sauris L. (SA); Val Pesarina-Lozzo L. (VPL); Pontebba-Tarvisio L. (PT); Paludnig L. (PG); M. Zermula-M. Cavallo L. (ZC); Forni Avoltri-Ravascletto L. (FR); Croce di Comelico-Val Visdende L. (CCV); S. Candido-S. Stefano di Cadore L. (SCST); Val Bordaglia L. (VB); Dolomiti di Sesto S. (DS); Funes L. (FU); Falzarego L. (FZ); M. Pare'-Col Becchei-Lunes S. (PB); Stava-Collaccio L. (ST); Marmolada-Antelao L. (MA); "Grunzione Cadorina" (CA); Valsugana S. (VV); Val di Sella L. (VS); Colombarone klippe (C); Belluno L. (BL); Civetta L. (CI); Duron-Fedaia L. (VDF); Folgaria-Mezzocorona S. (FMZ); Trento-Cles L. (TC); Calisio L. (CAL); Val d'Astico L. (VAS); Schio-Vicenza L. (SCHV); Castel Madera klippe (MA); Rocchetta-Riva Arco transfer zone (R); Recoaro zone (RE); Cima Marana L. (CM); "Flessura Pedemontana" (FP); M. Pastello-Ala L. (PAL); Volta Mantovana L. (VM); Dosso del Vento L. (DV); Tremosine-Tignale-Costa L. (TT); Gardicarie S. L. (GS); Val Trompia L. (VTP); Brenta Group S. (BR); Ballino L. (B); M. Baldo-M. Stivo-M. Bondone L. (MB); Sarca-Paganella L. (SI); Molveno L. (MO); Pre Adamello B. (PA); Gallinera L. (GA).

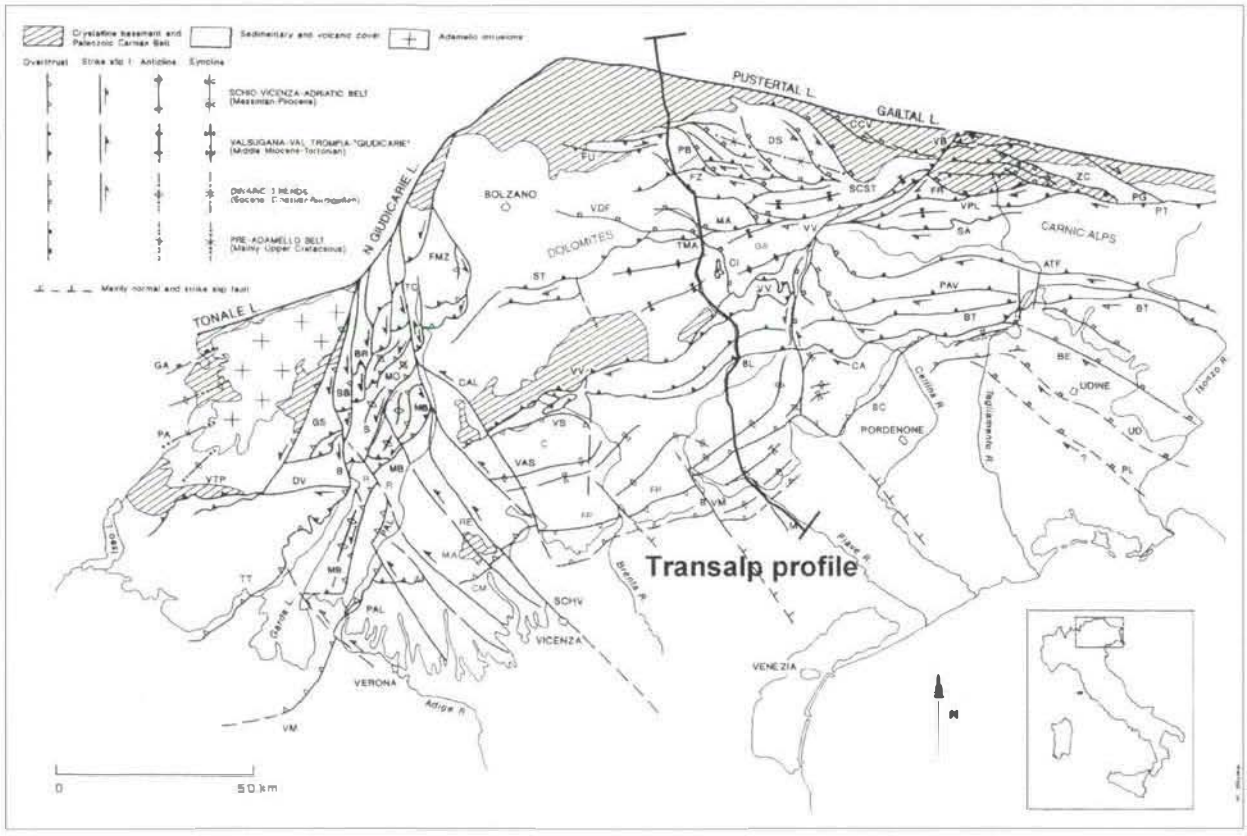

Fig. 1: Syntetic structural map of the eastern Southern Alps