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RECENT STATE OF KNOWLEDGE OF THE DEEP STRUCTURE OF THE EASTERN ALPS: A REVIEW

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The eastern Alps are traditionally thought to be a elongated belt of mountains between the Rhine valley in the W and the Vienna Forest in the E situated North of the Insubric line. All this area in Austria, Switzerland, Germany and Italy is covered by high quality potential field maps.

The gravity map shows the East Alpine gravity minimum. This gravity low is divided into three parts. The W part between the Rhine and the Brenner fault is the most pronounced gravity low in the Alps at all. The second part of minimum accompanies the Tauern window and is of different character than the W anomaly. An important, circa 40 mGal part of the minimum is characterized by a relatively low wavenumber, its source must be present in the upper 10 km of the crust. The third part E of the Tauern window is lower in amplitude. The amplitude decreases eastwards and is becoming very small in the Semmering area. This decreasing amplitude is accompanied by the narrowing of the Alpine foredeep. From the point of view of the diminishing minimum and narrow foredeep, the Alps E of the Bohemian Massif promontory around St. Pölten posses already the Carpathian deep characteristics.

The aeromagnetic map of the Eastern Alps is characterized by a very pronounced Berchtesgaden anomaly that continues to the East, beneath the Carpathians we are able to trace it until the Cracow area in Poland. The anomaly undoubtedly mirrors the basement rocks of the Bohemian Massif s.l. Refraction seismic experiments in the seventies of the last century revealed basic characteristics of the plunging Moho boundary beneath the Eastern Alps. Depths more than 50 km were discovered beneath the central parts of the Alps between the Rhine valley and the Tauern window. Farther to the east the Moho is shallower and reaches the depth of some 28 km beneath the Pannonian basin at the eastern boundary of the Alps.

Reflection seismics has been done along the Transalp line five and four years ago. The main results were presented several times and lastly in Trieste during the final Transalp Conference in February 2003. Excellent results were achieved and will be presented also during this conference. Receiver function studies and refraction experiment helped to the success of the Transalp project. New refraction studies were done during the projects of CELEBRATION 2000 and ALP 2002. Also these results will be presented during the MinPet 2003 conference.

All data confirm the model where the Eastern Alps were built during the final Late Oligocene and Early Miocene continental subduction that stopped during the Ottnangian (18 Ma ago) and following continental collision, which continues until recent. The Alpine crust is deepest in the W and subsequently is becoming thinner towards the E. The easternmost portion of the Eastern Alps posses already Carpathian characteristics, not only expressed by geophysical data but also by the type of Miocene volcanism in Styria.