Structural interpretation of seismic data in Polish Outer Carpathians southwest and southeast of Krakow

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The deep structure of the Polish Outer Carpathians and its basement, that is southern prolongation of the North European Platform, has been recognized by deep boreholes as well as by deep seismic sounding profiles. The Polish Outer Carpathians are built up from the flysch deposited during Late Jurassic-Neogene times. They form nappes thrust over the southern part of the North European platform covered by the autochthonous Miocene deposits. Relationship between basement and flysch nappes in the Outer Carpathians is based on interpretation of seismic and magnetotelluric survey. The Precambrian basement beneath the Outer West Carpathians is divided into two basement blocks: the Upper Silesia Block on the west and the Małopolska Block on the east. The Krakow-Smilno Fault system marks the boundary between two different tectonic realms within the North European Plate.

In the area southwest of Krakow, the Precambrian basement is covered discordantly by Devonian and Upper Paleozoic formations. The Mesozoic sequences are known only from the eastern part of the investigated area, their thickness significantly increasing eastwards. The Miocene deposits lay discordantly on the various Paleozoic, Mesozoic and Paleogene rocks. The series of mainly normal faults reach top of Paleozoic, sometimes Miocene rocks. The biggest strike-slip faults cuts also allochthonous flysch sequences. In the area southeast of Kraków, the oldest rocks are represented by Precambrian phyllites covered by Paleozoic, Triassic, Jurassic, Upper Cretaceous and Miocene deposits. The investigated top of Jurassic horizon is cut by series of faults, dividing the Mesozoic basement into separate blocks. The large thrust Łąkta faults are cutting through Paleozoic, Mesozoic, Miocene and allochthonous flysch sequences. The southwestern fault systems developed under mainly extensional regime with strong strike-slip component, while southeastern systems developed under mainly compressional regime.

Olistostromes and olistoliths: a historical review and modern perspectives

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The terms olistostrome and olistolith have been introduced by G. Flores (4th World Petroleum Congress, Rome, 1955) to indicate either mass-transported bodies with a chaotic block-in-matrix fabric, or single slide blocks, intercalated between layered sequences in the Tertiary succession of Sicily. Both terms soon became extensively used by the international geological community world-wide. With the extended usage, they evolved to generally indicate stratally disrupted to chaotic complexes and "exotic" bed packages, which originated by mass-transport events, mainly recycling extrabasinal rocks. In this extended meaning, the concept of olistostrome played a significant role in other, important scientific debates, such as the origin of mélanges, being paradigmatically assumed as indicative of sedimentary processes (olistostromal mélanges).

We will briefly discuss what happened to the terms during the 50 years of their history and how this lead to the following points:

1) Are the terms olistostrome and olistolith still to be used, and, if yes, with what meaning?

2) Olistostromes have been considered markers of either phases of basin instability and regional-scale tectonic events, or of peculiar geodynamical or tectonic stages. Are these assumptions true, or are olistostromes merely related to a specific condition of slope instability?

3) Olistostromes have been only seldomly studied from sedimentological point of view. Therefore, their translational and depositional mechanics, as well as the internal processes of stratal disruption and dispersion leading to their breccia-like, block-in-matrix fabric, are still poorly known.

4) The two previous points concern the genetical and regional relationships between the bodies defined as olistostromes and the more general category of mass-transport complexes (MTC), with a particular emphasis on the basin-wide ones.

In the sedimentary record of collisional chains, the majority of fossil MTC, including olistostromes, originated during the stages of intracontinental deformation, having been deposited in foreland and wedge-top basins. In some cases, collisional orogeny has allowed MTC related to extensional tectonics and passive margin to become exposed.

This contrasts with the observed abundance of present-day MTC, which prevail in passive and divergent margins and along the flanks of volcanic islands atop the oceanic crust. The present-day submerged contractional margins, however, do not show a significantly high concentration of MTC, apart from the erosional margins off the coasts of Peru. Moreover, basin-wide MTC are only present when catastrophic events occur, as in the case of the subduction of seamounts and volcanoes.

Some, possibly concomitant, solutions to these discrepancies will be discussed in this communication, with a special emphasis on the origin of mélanges in the accretionary wedges and relations between mass-transport processes, slope tectonics, contractional tectonics and mud diapirism.

Deterioration Processes of Travertine Monumental and Contemporary Stonestructures

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Architectural decorative elements as well as monumental stone structures made of travertine are subject to complex deterioration processes, which cause morphoses and strength reduction depending on climatic conditions.

Deterioration susceptibility was compared for travertine from boundaries of Mediterranean area (Hierapolis, Turkey) and from Lowland Polish area (Raciszyn, Poland). The comparison outcome is the observation that wall surface colours turn gradually to grey, become rough, and weather-exposed structure fragments crack irregularly and fall off.

For both travertine varieties, macroscopic analysis, microscopic analysis, scanning (SEM) analysis, and strength and strain tests indicated that younger Hierapolis travertine were more porous and lighter than Raciszyn travertine. Besides, Hierapolis travertine featured a lower strength as a result of a significantly stronger leaching out of organic debris, and of a lower crystallization extent level for the carbonate skeleton structure.

Comparative porosity tests made for new Hierapolis travertine (HO) and for ancient quarry Hierapolis travertine (HA) provided with a conclusion that since the ancient time until presently, the material porosity increased by range of 60%, while the strength decreased by