rents occur less frequent.

In the analysis of the data we need to get an idea of the general shape of the bed thickness. In determining if datasets are well characterized by a log-normal distribution, we plot the cumulative distribution of the data, log (number thicker) as a function of bed thickness. This plot has a linear shape if the data is well characterized by a log-normal distribution (Carlson, 1998). The power-law distribution has a linear shape on a logarithmic plot of the cumulative distribution (number of beds thicker) as a function of the logarithm of bed thickness. It is not clear to identify observed distribution only by visual trend. The goodness-of-fit data to some statistical distribution are expressed through RSquare value obtained using statistical method known as least-squares regression. In other words, we compare predicted distribution with observed distribution.

Studied sedimentary sections consist of predominantly thick-bedded turbidites characterized by log-normal distributions. Goodness-of-fit data to log-normal distribution is expressed by R Square values higher than 0.9 (Fig. 1a, b, c), which means that more than 90% of data match to log-normal distribution. Curved shapes of distributions observed on logarithmic plots (Fig. 1c, d, e) best correlate with more proximal sedimentation where processes such as erosion and bed amalgamation are significant and were also identified in the field during sedimentological research (Potfaj, 2002, Staňová and Soták, 2002, Starek and Pivko, 2001). Carlson (1998) observed several datasets fit well the log-normal distribution, too. These datasets also commonly involved thick bedded facies, consistent with high-density turbidites. There is well-marked step on the shape of distribution observed from locality Veľké Rovné (Fig. 1f). This could be related to occurence of thick-bedded as well as thin-bedded sequences intepreted previously as fan-lobe (alternatively channel) deposits alternating with interchannel deposits (Starek and Pivko, 2001). This could correlate to previously observed “segmented” power-law distributions (Rothman and Grotzinger, 1995, Malinverno, 1997) reffered by Talling (2001) as sumation of a mixture of thin-bedded and thick-bedded turbidites. This produces a step in the trend of the probability plot for entire bed population.

Conclusions

This paper presented how current understanding on turbidite-bed thickness distributions could be useful in intepretations of submarine-fan environments. Observed shapes of turbidite bed thickness distributions together with classical interpretations for studied sequences match to previously interpreted mid-fan depositional subenvironments. It is certain that providing an universal statements for bed thickness distributions corresponding to depositional subenvironments could be therefore able to become an attractive instrument describing a submarine-fan environment in more detail fashion. However, there is still a lot of uncertainities and lack of more general applicable assumptions and more detail research is need to define any specific conditions.

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Pore Space Geometry of the Rock under Investigation by Ultrasonic Pulse Transmission

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The confining pressure-driven closing of the pores in the rock sample results in changes of the effective physical properties of the rock. In order to characterize spatial distribution of pores, the ultrasonic pulse-transmission based method is applied as a tool for the investigation of pore space geometry. With the use of apparatus developed by Z. Pros in Geophysical Institute (e.g. Pros et al., 1998) the measurements of P-wave velocities and amplitudes (V_P and A_P) in 132 independent directions on spherical rock samples are carried out at several steps of confining pressure within pressure-increasing and pressure-decreasing paths (0.1–400, 400–0.1 MPa). Then the data are subtracted so that the change between the pressure-steps and the hysteresis at particular pressure can be visualised in differential stereographic diagrams.

Using the V_P and A_P values measured at the highest confining pressure or computed with averaging method (taking into account the elastic parameters of constituent mineral phases, their volume fractions and lattice orientation distribution) we are able to distinguish the influence the deformation-induced lattice re-orientations from the pore-related properties.

The typical observed trends for crack-related V_P are:

a/ highest V_P values parallel to mineral lineation, lowest values normal to metamorphic foliation

b/ largest increase in V_P with increasing confining pressure normal to metamorphic foliation, lowest increase parallel to mineral lineation

c/ hysteresis (the difference between the values measured at particular pressure within pressure-increasing vs. pressure-decreasing path) is the same as in b/ and is usually non-zero at least up to 200 MPa.

For A_P the typical features are:

a/ highest A_P values parallel to mineral lineation, lowest values normal to metamorphic foliation

b/ largest increase of A_P with increasing confining pressure parallel to metamorphic foliation

c/ lowest hysteresis parallel to lineation (the directions of highest values of hysteresis can lie inside or outside the metamorphic foliation).

Although for A_P the patterns of the non-processed data are similar to V_P, the differential patterns are often opposite. The behaviour of V_P can be interpreted as a result of the closest arrangement of minerals parallel to mineral lineation and the loosest normal to metamorphic foliation. For the observed A_P changes other explanation has to be found, which would take into account the relations between the spacing of pores (e.g. cleavages, microcracks) and amplitude/frequency of the transmitted signal.

The anisotropic patterns of V_P and A_P changes due to the closing of oriented pores and other voids highly correlate with the macroscopic structural features of the rock (preferred grain-shape orientation, fracture cleavage, lineations) and are sensitive to them. In such cases where the structural features associated with porosity can not be observed directly, the above outlined relations between elastic properties of the rock and structural features seems to be applicable as a tool for the examination of the spatial distribution and orientation of pores in rocks. It can contribute to numerous domains of geoscience such as the investigation of crustal seismic anisotropy in seismological survey or the assessment of possible ways of contaminant transport through the low-porosity rocks in nuclear waste reservoir sites.

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Deep Structure, Seismicity Pattern and Subduction Generated Concentration of Metals in Continental Wedges Overlying Convergent Plate Margins

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Detailed studies of the seismicity pattern of convergent plate margins, based on the data of International Seismological Centre (ISC) and their relocations (Engdahl et al., 1998) have made possible to differentiate the earthquake foci in the subducted oceanic plate from those occurring in the overlying continental wedge. The analyses of the geometry of distribution of the latter earthquake foci have shown that they are not distributed randomly, but are arranged into fracture zones (Hanuš and Vaněk, 1979, Hanuš et al., 1996). These seismically active fracture zones generally correlate spatially with some geologically defined faults.

The comparison of the distribution of the seismically active fracture zones with the distribution of large mineral deposits and important mining districts has revealed that the majority of largest accumulations of ores occurring in active convergent plate margins are situated in the outcrops of these fracture zones. We verified this statement on the example of the central part of the Andean South America (Hanuš et al., 2000, Hanuš et al., 2001a) (Fig. 1) and of the western part of the Indonesian island arc (Hanuš et al., 2001b). The validity of this correlation is being investigated in the regions of central and southern Mexico and Middle America. The main results of the finding of spatial relationship between the distribution of hypogene mineral deposits and deep rooted seismically active fracture zones, representing the paths for a long-term transportation of hydrothermal solutions from the subducting lithosphere to the Earth's surface could be applicable in interpreting the development of a fossil plate boundary, e.g. the Carpathian arc.

The establishment of the spatial correlation of the occurrences of large accumulations of metals with the distribution and orientation of the outcrops of seismically active fracture zones could help to solve some important problems of the following branches of Earth sciences:

1) **Seismology**: The occurrences of hypogene ore deposits of different age (covering a period of several tens of MA), witness to long-lasting existence and activity of pertinent fracture zones. The occurrence of dated poly-stage hydrothermal mineralization points to the probability that these zones were active before any following stage of mineralization and that the activity of fracture zones was responsible for preparing open