Insoluble dispersive organics characteristics of various facies in the Lviv Foredeep

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Facial-palynological research Lviv paleozoic foredeep Carboniferous deposits points at complicated and natural character of complex distribution of microphytoorganics both in lateral and vertical sections. This phenomenon resulted from paleogeographic, paleotectonic, paleoclimatic and biological factors of environment. Intricate process of palynooryctocenoses formation in sedimentary rocks has 4 periods: preparing of the out coming material, its transference, burying and fossilization. During each period, vegetable organics is influenced by certain factors which save dispersive remnants and either let them continue transfering or destroy them.

Palynooryctocenoses forming under different facial conditions has its particulars. In the continental deposits microfossil composition is determined by processes of outcoming material mobilization and its character of burying and fossilization. Continental facies are greatly saturated with dispersive organics, among which the elements of humus group prevail – large fragments of inertinite and vitrinite. Snatches of cuticles, tracheids, megaspores are constantly present, sometimes in great amounts. Miospores are of satisfactory preservation, frequently containing chemical biotical damages, coloured according to L.V. Rovnina (1984) scale with the index of 3,4,5. In the continental deposits the amount and variety of palynoorictocenoses are the highest. However, their distribution in some facies is not regular. The facies of clayey and aleurite sediments of swamped low-lying near-sea lands are the strongest organics concentrate. One half of continental palynoorictocenoses is gathered here. The subtype with a small number of spores (M1) is the most widespread (it makes 35% of palynoorictocynoses of this facies). Sporic palynoorictocynoses are of approximately equal quantity. The smallest amount of dispersive organics is characteristic of sandy and aleurite sediments of river mouthes and lower reaches facies. Palynoorictocynoses distribution is the following: a type of low organics concentration – 34%, the subtype with a small number of spores (M1) – 51%, a mixed type – 15%.

Under the continental conditions microphytoorganics distribution is controlled by climatic and biological factors. For this reason, continental palynoorictocynoses more realistically reflect the composition and correlation of parent vegetable groups. Outcoming organic material may undergo significant changes at stage diagenetic sediment transference. Under continental conditions chemical-biological decomposition of the vegetable material is likely to be more active then in other facies. Low miosporic apportionment, chemical-biotic demage dominance and darker color of palynomorphes prove this.

Another major microphytoorganics concentration maximum was marked in the facies of clayey, aleurite sediments of the near-sea lakes, freshened lagoons and gulfs (transitional from continental to marine sediments facies group). Miosporic content increases, concentration and size of carbonaceous remnants and fragments of vegetable fabrics decreases. Futheron humus substance type prevails. However, other correlations components with miosporic predominace or equal humus liptonite group elements' content are also found. Palynocomplexes are multicomponental (~60 taxons). Miospores are of satisfactory preservation. Mechanical damages and ruptures with traces of pyritisation among damages prevail. Casings' colour is 3, 4. Often small numbers of acrytarchs are present. Palynoorictocynoses are various, represented by all types. Densosporic type prevails significantly – 50 %. Others: lycosporic and mixed (subtype 2) – at 20 %, a type with a small number of spores (subtype 2) – at 10 %.

When microorganic complexes are formed, under the transitional from contental to marine conditions, mechanical differentiation occupies the first place. It considerably distorts initial data of the plant organics composition and leads to palynoorictocynoses enrichment with lighter elements under physical factors: among carbonaceous remains – with inertinit, and among miospores – spores of lycopodium and ferns. Transport conditions influence the particles' size, and the bigger turns the quantity of mechanical deformations. Palynoorictocynoses do not reflect the composition of ground vegetation and provide only vague ideas. Palynocomplexes of transitional facies should be viewed as a changed and integrated, during transportation and fossilization, reflection of the vegetation of the paleobotanic region. Significant concentration and taxonomic variability of miospores, high content of palynoorictocynoses are connected with this.

Concentration of dispersive organics in marine facies decreases. Often mechanically damaged lightcoloured (index 2, 3) miospores, domineering over other components, create sapropel-liptinite type of organic material. Carbonaceous remnants (inertinit) are present in the form of tiny fragments. Sometimes hightened content comparison with transitional facies of acrytarchs is marked (up to 30 %). Palynoorictocynoses include three types: lycospores (subtype 3), the type with a small number spores (subtype 2), and a type with low organics concentration which quantity is approximately equal.

Decrease in concentration of dispersive organics in marine facies is explaned by the distance increase in demolition region and shortage of outcoming vegetable material, as well as by hydrodynamic basin regime of sedimentation. Subtype 3 is unique among sporive palynoorictocynoses presents in marine deposits, saturated with tiny floating miospores, with structural elements such as round or triangular body shape, availability of perispore, sculpture of egsine, characterized by small thorns and small hills and grains, etc. which facilitates distant transportation.

Research proves that there is close genetic connection between palynoorictocynoses components, as well as between organics complexes and containing rocks. This connection reflects interaction and time variation of the environmental processes. Indices of palynoorictocynoses show the activity of the factors of environment and can be used to detect paleosedimentation, to study cyclic recurrence, to reconstruct vegetation, and to carry out different biostratigrafic surveys.

Tectonosedimentary formations of the Pieniny Klippen Belt (Orava, Slovakia): structural styles of melanges and olistostromes

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The term olistostroma and melange has been used to designate the chaotic units with block-in-matrix fabric. The chaotic units originate in responce of synsedimentary deformation (olistostromes) and tectonic deformation (melanges), or in influence of both processes (tektonosomes). Recognition of olistostromes from melanges is based on structures induced tectonically. In the Western Carpathians, the chaotic units occur mostly in the Pieniny Klippen Belt, which was designated as a melange already by Andrusov (1938). Lithosome- and melange-like units of the Pieniny Klippen Belt are well exposed in outcrops near Záskalie and Krivá, where they have been studied from structural point of view.

In the Klippen belt near Záskalie the Upper Cretaceous sediments of the Kysuca Serie are exposed. They consist of breccias (so-called Záskalie Breccias) belonging to the Gbelany Formation. Záskalie breccias are composed of sharply angular blocks of marly limestones, which are embeded in shaly matrix with oriented fabric. The blocks are separated to form a boudinages, which are flatened and prolongated in matrix flow direction. Boudinage is developed through necking and swelling of beds (pinch-and swell structures), which reflects a strain efficiency and shear movement in inhomogenous units. Shear concentration in the ductile claystones was compensated by fracturation and strike-parallel extension of rigid blocks along the Riedl (R_1) shears, observed as a domino-like structures. Systems of Riedl (R_1) fractures are filled up by calcite. Orientation of prolongated blocks and Riedl (R_1) elements indicates top to the SSW shear movement. Original S_0 bedding is identifiable in pressure shadows along the necked parts of blocks. Mudstone matrix shows a secondary schistosity, developed as S_1 and S_2 foliations. Their combination originates an expressive S/C fabric. S_1 and S_2 planes bear a slickenslides, offsets and stretching lineations. This planes are marked by paralell sets of fibrous calcite veins, which were formed through detachement and buckling of dilatation fissures under shear deformation and fluid overpressure (Capuano 1994, Stoneley 1983). Secondary schistosity S_2 is observed as a planes with sigmoidal deflection corresponding with shear sense. Observed S/C structures indicate the simple shear with top-to-the SSW translation. Sequence in the middle part of profile is deformed into tight and isoclinal subhorizontal folds with SSW vergency. Mudstones from around the folds are intensively sheared, exhibiting the S/C fabric and boudinage of marly limestones. Záskalie Breccias are superimposed by the Gbelany Fm., which provides a less intensity of tectonic deformation. Sequence of the Gbelany Fm. is overturned in position, which is documented by the appearance of hieroglyphs on the upper bed surfaces. Tectonic slices with overturned position occur together with those in the normal position (Jablonský 1994). Schistosity in claystones is developed non-systematicaly. The sandstones are synsedimentary folded, while the surroundings of folds lacks the tectonic deformation. Overlain beds fill a bulk deficit after the generation of folds, and that without tectonic deformation of footwall beds. The structures described above from the Záskalie Breccias are indicative of tectonic melange.

Chaotic formations of different type are exposed in the Klippen belt near Krivá. They belong to Nižná Succesion of Upper Cretaceous sediments, which occur in normal position (hieroglyphs on the lower bed surfaces). The cross section is oriented in the SW – NE direction. The formation consists of various sediments of submarine fans, like turbidite and conglomeratic deposits and bock accummulations. Turbidite sequences are deformed via sliding in form a large-scale drag folds with axes 234/9° Drag folds occur within the gravitational slumps, where the sandstones show a pinch-and-swell structures and pass progressively to broken formations. The contact with underlying undeformed beds is overprinted by bedding parallel slip, as is indicated by smooth surfaces and