

Questionnaire

Summary of the main activities of a scientific Organisation of the Slovak Academy of Sciences

Period: January 1, 2003 - December 31, 2006

I. Formal information on the assessed Organisation:

1. Legal name and address

Geological Institute Slovak Academy of Sciences
Dúbravská cesta 9, P.O.Box 106, 840 05 Bratislava

2. Executive body of the Organisation and its composition

Directoriat	name	age	years in the position
director	RNDr. Jaroslav LEXA, CSc.	63	2006 -
deputy director	RNDr. Igor BROSKA, CSc.	52	2006 -
scientific secretary	RNDr. Igor PETRÍK, CSc.	55	2006 -

3. Head of the Scientific Board

RNDr. Ján SOTÁK, CSc.

4. Basic information about the research personnel

- i. **Number of employees with a university degree (PhD students excluded) engaged in research and development and their full time equivalent work capacity (FTE) in 2003, 2004, 2005, 2006 and average number during the assessment period**

ii. Organisation units/departments and their FTE employees with the university degree engaged in research and development

Research staff	2003		2004		2005		2006		average	
	No.	FTE	No.	FTE	No.	FTE	No.	FTE	No.	FTE
organisation in whole	25	18,768	25	19,299	26	20,819	25	23,15	25,25	20,509
unit Bratislava	12	9,522	12	9,522	12	9,942	13	12,6	12,25	10,397
unit Banská Bystrica	13	9,246	13	9,777	14	10,877	12	10,55	13	10,113

5. Basic information on the funding

i. Total salary budget¹ of the Organisation allocated from the institutional resources of the Slovak Academy of Sciences (SAS) in 2003, 2004, 2005, 2006, and average amount for the assessment period

Salary budget	2003	2004	2005	2006	average
total salary budget (millions of SKK)	9,900	9,181	9,624	10,341	9,762

6. URL of the Organisation's web site

<http://www.geol.sav.sk/>

II. General information on the research and development activity of the Organisation:

1. Mission Statement of the Organisation as presented in its Foundation Charter

The Geological Institute is oriented to the complex research of geological structure, rock and mineral compositions, and geodynamic evolution of the Western Carpathians area including the interpretation of deep structures. The institute develops the basic research in scientific branches of geology, stratigraphy, palaeontology, sedimentology, tectonics; mineralogy, petrology, geochemistry; ore and environmental geology, on the basis of information obtained by the regional study of the Slovak territory, its regions and other areas with comparable geological structure.

2. Summary of R&D activity pursued by the Organisation during the assessed period, from both national and international aspects and its incorporation in the European Research Area (max. 10 pages)

¹ Sum of the brutto salaries without the fund contributions.

Framed mostly by running projects, the research activities of the scientific staff of the Geological Institute have been aimed mainly to the fields of (1) petrology and mineralogy of the basement rocks, (2) sedimentology and palaeontology, (3) metallogeny and environmental geochemistry. Most of the activities have international dimension as they have been carried out in cooperation with our colleagues abroad (within the European research area, USA, Russia and China).

(1) Petrology and mineralogy

Granitic rocks of the Western Carpathians, the traditional subjects of our investigation, were studied from various aspects of their age, mineralogy, tectonism and metamorphism. Thanks to the collaboration with the Salzburg University (F. Finger), Mainz University (U. Poller, W. Todt), and introduction of the monazite microprobe dating method at the Slovak Geological Survey (Konečný et al., 2005) extensive dating of granitoid massifs has been accomplished (Finger et al., 2003, Gaab et al. 2005, Petrik et al. 2006). *The dating method enabled us to distinguish three successive granite emplacement events.* The first one represented by generation of S-type granites in association with crustal thickening occurred at the interval 360 – 340 Ma. and It was followed by I-type granitoids during the interval 340 – 320 Ma. . Emplacement of a separate group of A-type and Sn-specialized granites took place during the interval 260 – 280 Ma during the Permian extension.

Although the most important Western Carpathian granitic magmatism and metamorphism are Variscan *an older protolith was definitely identified among basement rocks of the Tatric and Veporic units.* New data obtained from Muráň felsic gneisses (U-Pb zircon evaporation, Gaab et al. 2005) revealed their Ordovician age (464 ± 35 Ma) and a significant Alpine overprint. The Nízke Tatry orthogneiss monazites (Petrik et al. 2006) show mostly ages around 350 Ma indicating the strong Variscan reworking but they also contain old Ordovician cores (ca 480 Ma). Together with other existing data these data suggest incorporation of a significant Ordovician component derived from an active Gondwana margin into the Variscan basement (Gaab et al. 2005).

Containing characteristic rare mineral assemblages, the specialised Permian granites of the Gemeric unit were a subject of intensive research focused mainly to *the role of (1) volatiles, B and F and (2) P and phosphate minerals – apatite, xenotime and monazite.* The first aspect was studied by Kubiš and Broska (2005) on the Hnilec granite. They described various fates of F- and B-minerals and presented a new magma evolution model. The model includes an overpressure build-up, rupture of overlying solidified granite, escape of fluids and related breccia and vein formation. The mineralogical insight into phosphate minerals shows that the bulk chemistry controls whether apatite forms or P enters feldspars instead (Broska et al. 2005). In the polymetamorphic West Carpathian basement the phosphate minerals were shown to be unstable. Primary monazite commonly breaks down to the assemblage apatite – allanite – huttonite(?), whereas xenotime breaks down to Y-rich apatite and Y-rich epidote (Broska et al. 2005).

A special case of *granite undergoing a total tectonic-induced remelting* has been studied in detail in the Vysoké Tatry mountain range. Here, a seismic-induced extreme shearing associated with frictional heating caused instantaneous melting and formation of pseudotachylyte veins (Petrik et al. 2003). This special rock thus both marks and dates initial stages of the main sub-Tatra detachment fault formation. The detailed petrology revealed that these short living (10 – 90 s) melts formed at high temperature (>1000 °C) and in highly oxidized environment by disequilibrium melting. Interpretation of the hematite crystal-size distributions indicates that these frictional melts crystallized mostly as open systems.

The high-pressure metamorphism was another topic of concentrated effort during the last four years following the first evidence for the high-pressure and even ultrahigh-pressure metamorphism in the Western Carpathians and Eastern Alps. For the first time eclogites were discovered in the crystalline basement of the Western Carpathians, in the

northern parts of the Veporic unit (Janák et al., 2003). These rocks contain a peak metamorphic assemblage omphacite – garnet – phengite – rutile – zoisite – quartz – amphibole. Geothermobarometry allowed to constrain the maximum pressure and temperature conditions to 2.5 GPa and 700 °C, implying initial subduction during the Early Variscan time to the depth of around 80 km. *The ultrahigh-pressure metamorphism (>3GPa)* is related to subduction of the earth crust to the depth over 100 km. Such UHP rocks are known only from several places in the world. Discovery of the UHP rocks in the Pohorje mountain range (Slovenia) in the realm of the Eastern Alps (Janák et al. 2004) is a very important contribution not only to the understanding of the evolution of the Alps but orogens in general. The extremely high-pressure conditions have been documented in the eclogites (Janák et al., 2004) and garnet peridotites (Janák et al., 2006). We have proposed that these rocks were incorporated into the subducting continental crust and subsequently exhumed due to the extraction of the overlying lithosphere that enables a rapid uplift without a necessity of erosion (Janák et al., 2004, 2006). This is a new model for exhumation of UHP rocks in general.

The ultrahigh-pressure metamorphism (>3GPa) is related to the subduction of the earth crust to the depth over 100 km. As the mechanism of their return to the surface is rather complex the UHP rocks are known only from several places in the world. Thus, their discovery by Janák et al. (2004) in the Pohorje mountain range (Slovenia) in the realm of Eastern Alps represents a very important contribution to the evolution of the Alpine orogene as well as orogens in general. *The extremely high-pressure conditions have been documented in both the mafic (eclogites, Janák et al., 2004) and ultramafic rocks – garnet peridotites (Janák et al., 2006).* These rocks were incorporated into subducting continental crust and subsequently exhumed thanks to the extraction of the overlying lithosphere that enabled a rapid uplift without a extensive erosion (a new exhumation model advocated by the authors).

Two of our projects involving cooperation with Polish colleagues have been devoted to the investigation of *diagenesis and very low-grade metamorphism of sedimentary rocks* in selected geological units of the Central Western Carpathians. Two principal progressive mineral transformations, involving a sequence of dioctahedral (smectite → mixed-layer illite-smectite → illite → muscovite) and a sequence of trioctahedral (saponite → corrensite → chlorite) clays have been used along with fluid inclusion data, stable isotope data and radiometric dating to restore burial and thermal history of Tertiary accretion prism (flysch belt) and forearc basin of the Carpathian arc. *Formation PT conditions, depths of burial and geothermal gradients have been precisely determined and zones of methane, oil-condensate, and carbon dioxide stability have been identified.* Reconstruction of thermal history and depth of burial is of crucial importance for forecasting and identification of the oil- and gas-productive strata. Investigation of the hydrotectonic regime at soles of overthrust sheets points to high fluid overpressures associated with hydraulic fracturing and dissolution phenomena (Milovský and Hurai, 2003; Milovský et al., 2003).

Some attention has been paid also to petrological and geochemical studies of of the *Late-Palaeozoic and Mesozoic volcanism* in the Carpathian realm – a new view has been reached concerning the *geotectonic position of the meliata unit* (Faryad et al., 2005) and *sources of Cr-spinels in flysch deposits* (Mikuš et al., 2005, 2006; Mikuš and Spišiak, 2006).

(2) Sedimentology and palaeontology

Our Institute performs sedimentological and paleontological research focused on the sequence stratigraphic and paleoclimatic analyses of Mesozoic and Paleogene sedimentary formations in West Carpathians and the paleoecologica and morphological analyses of marine and terrestrial invertebrates in general (Michalík, 2004; Michalík et al., 2005). Our scientists participated in several international projects oriented on biodiversity changes, paleoecosystems, paleoclimatic regimes and oceanographic systems in the

geological past, funded by the UNESCO (IGCP projects No. 458 - Triassic/Jurassic Boundary Changes (Michalík et al., 2007) and No. 463 – Cretaceous Oceanic Red Beds), EC, Visegrad Fund and other organizations (Hu et al., 2005).

The sequence stratigraphic and paleoclimatic analyses were focused on sequences of (1) the Carnian, (2) Triassic/Jurassic boundary, (3) Cretaceous, and (4) Paleocene-Eocene. They record regional-to-global events that were coupled with substantial environmental and evolutionary perturbations.

(1) The Carnian event represents a two million-years-long humid anomaly that replaced a generally hot and arid Triassic climate, and was characterized by enormous monsoon-like precipitations. Sedimentology, rhythmostratigraphy, and C-isotope stratigraphy have been studied at termination of this event, when the climate gradually changed to the seasonal and finally into the arid type again (Michalík and Szulcz, in print; Soták and Sýkora, in preparation).

(2) New data were obtained in the frame of the IGCP Project 458 oriented on Triassic/Jurassic (T/J) Boundary Changes (Michalík ed., 2003; Michalík et al., 2007). Sedimentary, biotic, impactoclastic and isotope records of drastic boundary changes at the T/J boundary have been found in the sequences studied. The T/J Boundary events recorded by the Fatra Formation in the Zliechov Basin comprise traces of several environmental perturbations that probably contributed to a global mass extinction. *An abrupt change indicating cessation of Triassic climatic regime, about 200 Ma ago, caused a destruction of carbonate platforms that flourished for more than 30 Ma, and led to massive influx of mud and sand from the continent (probably caused by renewal of monsoonal rains and fluvial systems)*. The diversity of benthic fauna decreases at the base of the "Transition Beds", which is the uppermost member of the Fatra Formation. Marine invertebrates that are abundant in the Fatra Formation went globally extinct at the T/J boundary. Terrigenous-rich beds record the first important fresh water input in uppermost parts of the Fatra Formation. O and C isotope anomalies in one of the topmost cycles in the Fatra Formation correspond to significant lithological changes. The C and O isotope excursion is followed by thin spherulæ beds with peculiar lithological composition. Calcified spherulæ might have originated either during strong volcanic explosions, or by impacts of large cosmic objects on the Earth surface. This spherulæ bed is traceable for tens of kilometres across the Zliechov basin (Michalík et al. 2007, Soták, 2003).

(3) Another global event 93 Ma ago has been detected in the Upper Cretaceous sequence in northern Slovakia and Ukrainian Carpathians (e.g. Hu et al. 2005, Soták 2004, Soták et al. 2005a, Salaj 2006; Wagreich and Michalík, in print). An abrupt colour change of deep sea deposits from black to red one indicates that environmental cooling led to an increase in intensity of vertical currents bringing oxygen into deeper oceanic water layer evoked by cool water influx from higher latitudes. The currents renewed a nutrient support and caused a rapid evolution of marine plankton. Positive excursions of carbon isotope curve indicating excessive warming of the Earth atmosphere due to rising concentration of greenhouse gasses were recorded in Lower Cretaceous (early Aptian) formations of Western Carpathians. Mid-Cretaceous formations of the Pieniny Klippen Belt provide an evidence of the black-shale deposition (Koňhora Mb.). The Rochovica section in the Kysuca Gate studied by Michalík and Soták is now an internationally accepted type section corresponding to Selli event (Michalík et al., Cretaceous Research, in print). Investigation of Senonian formations resulted in identification of a change in deep oceanic water conditions terminating the stagnant salinary regime, influx of cold polar waters 90 Ma ago and a renewed circulation of water masses. The oxygen influx in oceanic depths is indicated by the occurrence of red Púchov marls (Soták & Michalík, 2004, Soták et al. 2005b).

(4) The first records of the Late Paleocene thermal maximum indicated by tropical foraminiferal plankton were ascertained in the Western Carpathians (Soták 2006). Another important climatic change was accompanied by cooling 34 Ma ago that resulted

in a climatic turn from a climatic optimum to ice-house conditions (especially in the Antarctic region, which has been glaciated since that time). In Western Carpathians this event is indicated by the extinction of carbonate platforms, mass productivity of marine plankton, decrease of isotopic temperatures, influx of fresh river waters, nutrification and/or by mass-circulation of oceanic waters resulting from the formation of upwelling currents (Soták et al. 2003, 2004, 2006).

Geological Institute participated also in the project of the European Scientific Fund (ESF) oriented on the processes of forming the present appearance of Europe and present climatic systems (EEDEN). Top results in paleoenvironmental and paleoclimatic research enabled incorporation of the Geological Institute team into the European FP6 (the PROPER project – „Proxies in Paleoclimatology: Education and Research“). Jozef Michalík and Ján Soták acted as organizers and teachers of this educational course that was attended by students from Europe, southern Asia, the Middle East and Southern America.

A considerable effort has been devoted to the sedimentary analysis and evolution of the Paleogene basins in the Western Carpathians. Their evolution was caused by a regional tectonic subsidence. Deltaic, slope and basinal fans produced by a rapid deposition formed close to strong sediment supply areas (Starek, 2001, 2005; Starek et al., 2004, 2005, in press). They represent a substantial part of the basin fill. Definition of basic trends and cycles, transport factors and factors controlling depositional processes contributed to interpretation of sedimentary environments. They changed at space and time during reflecting eustatic sea-level changes, tectonic events and climate changes.

Adam Tomašových with colleagues from the Würzburg University, the University of Chicago, the Texas A&M University (College Station), Institute of Geology, Academy of Sciences (Czech Republic), University of Ottawa, and the Comenius University (Bratislava) performed paleoecological and morphological studies of benthic communities with brachiopods and bivalves. These studies funded by the German Science Foundation, the Systematic Association, the Paleontological Society, and Friday Harbor Laboratories (University of Washington) have been carried out on datasets from the Eastern Alps, West Carpathians, the Middle and Central High Atlas of Morocco, Cantabria (Spain), southern Germany, and the Swiss Jura (Switzerland). Present-day brachiopods were sampled in the eastern Pacific (Washington State, USA). *Ecological analyses of brachiopod and bivalve distribution* enlighten the role of abiotic vs. biotic factors, and the role of background vs. episodic events in structuring their ecologic and evolutionary history (Tomašových, 2006a). *The main cause for the brachiopod decline during the Mesozoic and Cenozoic might be a loss of their preferred, nutrient-poor carbonate environments that took place after the Jurassic, rather than a gradual displacement caused by increasing competition and consumer pressure.*

The role of large-scale physical perturbations in mediating biotic replacements is highlighted by Tomašových and Siblík (2007). This study shows that an *environmental disturbance at the Triassic/Jurassic (T/J) boundary correlates with abrupt and substantial changes in the composition of brachiopod communities*. The disturbance at the T/J boundary changed the phylogenetic structure of Early Jurassic brachiopod communities owing to a removal of higher taxa that were abundant in the Late Triassic. *Analyses of shell bed origin and preservation* show that organic-rich and organic-poor species are characterized by differential post-mortem durability in siliciclastic environments, which can have substantial effects on fidelity of their abundances (Tomašových, 2004, Tomašových and Rothfus, 2005). Contrasting predictions from shell bed modeling provide a theoretical basis for distinguishing whether high shell density in shell beds reflects passive shell accumulation due to the lack of dilution or whether it reflects high population density of a life assemblage (Tomašových et al., 2006). *A new approach for estimation of compositional fidelity of fossil assemblages, based on multivariate comparisons of shell beds differing in the preservation, was applied for the Upper Triassic shell beds affected by storm reworking* (Tomašových 2006).

An internationally recognized work has been carried out also on the group of *Miocene to Recent non-marine Ostracoda*. A research was focused on the taxonomy and paleobiogeography of the ostracods of isolated freshwater Turiec Basin (Pipík 2002, 2004, 2005; Pipík and Bodergat 2003a, b, 2004a, b, 2005a, 2006, in press a, b) and brackish-freshwater Lake Pannon (Pipík in press, Pipík et al. 2004). Special attention was aimed to morphological radiation of the genus *Cyprideis* and evolution of its paleoenvironment in that lake. *The studies show how a primary morphological species variability leads to the evolution of a new species at the environmentally stable conditions, how new species are dispersed inside the lake and how they spread and adapt outside of the area of origin.* On the other hand, stasis or small microevolutionary changes in morphology characterize the species living in unpredicted environment (Pipík and Bodergat 2005b, Minati et al. in press). All these studies contribute to the ostracod taxonomy and to the concept of evolution in addressing the problem of the appearance of a new species and the rate of their evolutionary changes. Results of our research at this field enable the use of Ostracoda for stratigraphic correlation of fresh-water basins and palaeoecological studies.

Dr. Vršanský has led a wide international team involved in *evolutionary studies of Mesozoic insects at the world scale* and a Baikal seal team – a research which resulted in publication in the National Geographic (Russia) (Vršanský 2006). The study was devoted to recognition of *evolutionary patterns and global environmental changes as indicated by cockroaches, mantises and termites*, but resulting also in a discovery of a different structure of predatory control of extinct ecosystems, the first record of animal mass mutations (Vršanský 2005), *discovery of most primitive social insects – termites and their stem group* (Vršanský 2002, 2003), and also pterosaur parasites. The stem group for praying mantises was identified (Vršanský 2002), and about 50 new cockroach species were described. *Ancestors of synanthropic cockroaches and unique extinct beetle-like group have been discovered* (Vršanský 2003a). In the course of the study, the most significant localities in Mongolia, Brazil, USA., Kazakhstan, Kirgizia, China and Russia were investigated (Vršanský 2003, 2004). In the territory of our country, the research resulted in description of the first fossil insect, which is the sole record of insect living in the tertiary mangroves on a world scale (Sukatheva et al. 2006).

(3) Metallogeny and environmental geochemistry

A complex mineralogical-geochemical research of hydrothermal deposits of gold, silver and polymetallic ores in the famous Banská Štiavnica – Hodruša ore district has been concluded by fluid inclusion and stable isotope studies (Kovalenker et al., 2002, 2006). Melt inclusions point to the change of magmatic composition from the intermediate one during the early stage to silicic one during the late stage of hydrothermal processes. A corresponding change in magmatic fluid composition has been demonstrated. *Mineralization itself has taken place in a relatively shallow environment 200 – 1 000 m due to boiling of fluids, decreasing temperature and/or mixing with fluids of meteoric origin.* Results represent a valuable contribution to the theory of magmato-hydrothermal systems and to the strategies of exploration.

Studies of *Sb-Au mineralizations of Western Carpathians* continued in cooperation with the Faculty of Natural Sciences, Comenius University at the localities of the Gemer tectonic unit. A Europe-wide comparison of Pb isotopes in stibnites of Sb-mineralizations has been carried out in cooperation with universities in Bratislava, Vienna, Leoben, Prague, Coimbra and Lisbon. The study has demonstrated a variable role of mantle, lower crust and upper crust lead sources in individual mineralizations (Andráš and Chovan, 2006; Mateus et al., 2006). Crustal Pb dominates in the orogene-hosted mineralizations.

The environmental research in the field of mineralogy and geochemistry was aimed at study of mining dumps and associated mining waters, commonly occurring around old mining works in Slovakia. It included studies of the bacterial degradation of ore minerals

in deposit surroundings, mining landscape remediation and possibilities of acid mining waters elimination. In a degradation study realised along with the Faculty of Natural Sciences, Comenius University at the Pezinok Sb deposit, the activity of *Acidithiobacillus ferrooxidans* bacteria was studied in acid and alkaline mine drainage waters (Andráš et al. 2006; Andráš 2006). *The bacteria are much more active in biochemical catalysis in the acid type water.* Sb-As minerals löllingite, arsenopyrite, stibnite, gudmundite and berthierite are more sensitive to bacterial decomposition than sulphides pyrite and chalcopyrite. *Weathering processes of minerals in acid conditions caused a mobilization of heavy metals and toxic elements.* Data on contamination of sediments, underground water, surface water, on the migration and bioavailability of heavy metal and toxic element pollutants are necessary to suggest an effective remediation.

The contamination of the landscape in the surrounding of the dump field near old copper mines Ľubietová studied in surface and underground waters, sediments, soils and plants revealed that all are contaminated by heavy metals Cu, Pb, Zn, Mn, Fe, Cd and toxic elements As and Sb (Andráš et al., 2006). The acid percolating waters at Šobov dump field next to Banská Štiavnica (pyrite-rich rocks of a high-sulphidation system) damage strongly and destroy all biotops. Concentrated sulphuric acid and metabolism of the species *Bacillus* release Si, Al, Cr, Au and Ag to solutions (Križáni and Andráš, 2006). *On the base of chemical, mineralogical and microbiological study the Šobov dump was described as a spontaneous "geobioreactor",* in which rainfall water is transformed to acid (pH 2 ± 0.3). Even old dumps after several hundred years still represent an active microbiological environment. Products of the biological oxidation are extracted by rain water to surroundings. The field investigation of selected mining waste and base metal metallurgy showed that dump material is not stable and after some period biogenic degradation takes place, accelerating the weathering processes. Small mammals that represent a proper group for monitoring the contamination of environment were studied for contents of heavy metals in internal organs. A positive correlation has been found between heavy metal contents in plants from surface levels of dumps and internal organs of little mammals (Križáni et al. 2006). It appears necessary to verify these data on the larger set of samples.

(4) Other R&D activities

Geological institute has been a coordinating institute for Slovak Republic of international projects „*The Central European Lithospheric Experiment Based on Refraction*” (CELEBRATION 2000 and SUDETES 2004). The seismic experiment has mapped the Earth Crust and Uppermost mantle in the Central European area. *The obtained picture of the actual Crust/Mantle structure implies three major geotectonic processes leading to its origin – a north-vergent subduction during the Late Jurassic – Early Cretaceous time, a continental collision with the Crust/Mantle delamination during the Late Cretaceous time and a general thinning of lithosphere during the Tertiary back-arc extension* (Bielik et al., 2006; Grad et al., 2006; Šroda et al., 2005, 2006). Results advance significantly our understanding of deep structure and evolution of the Carpathian orogene. We have participated also in the international project *Tectonostratigraphic terranes and paleoenvironment maps of the Circum-Pannonian region (TERRANES)*. Maps and explanatory notes that bring along a new insight into the evolution of the Carpathian-Balkan region are by now almost complete.

3. Concept of R&D activity of the Organisation for the next four years (max. 5 pages)

Considering tradition of the last years, running projects and scientific orientation of the staff research activities of the institute during the next five years will be focused on two principal fields: (A) *Complex analysis of structure and evolution of the Alpine-*

Carpathian orogen; (B) Dynamics of sedimentary basins and fossil ecosystems. In addition, we shall be active in the field of applied science – *(C) Environmental mineralogy and geochemistry of past mining activities.* There is a little overlap between these fields of research so they will be treated separately throughout the following text.

i. Present state of knowledge and status of ongoing research related to the subject of the Concept, from both international and national perspective

(A) A complex analysis of structure and evolution of the Alpine-Carpathian orogen

Orogeny is a fundamental process shaping the Earth crust. Continental crust underwent at least one orogenic cycle, as orogenies are responsible for the tectonometamorphic transformation of former sedimentary and magmatic rocks into the orogenic belts. Despite the fact that understanding of orogens during the last years has made a great progress, there are still problems to be solved. The Alpine-Carpathian orogen is one of the best studied orogens of the world, which offers a possibility to contribute to the understanding of orogenic evolution in general besides upgrading our knowledge of the orogen itself.

The Alpine-Carpathian orogenic belt underwent at least two major orogenic cycles-Variscan and Alpine. Its present form is a result of the neo-Alpine orogenic processes during the Tertiary time. While the Tertiary foredeep molasse deposits and flysch belt accretion prism represent outer units of the orogen, internal units involve the Variscan basement and Late Paleozoic to Early Cretaceous sedimentary formations. Internal units have been formed mainly during the eo-Alpine continental collision in the Cretaceous time.

The Variscan orogeny resulted from accretion and amalgamation of crustal blocks in the mobile zone between Gondwana and Baltica-Laurasia. In the Western Carpathians, at least two metamorphic events (HP/HT, LP/HT) and several stages of granitoid magmatism (S, I and A-type) have been recognized. While general aspects have been already established, details on protolith, structure, P/T paths, timing, fluid regime and granite origin remain to be solved. Pre-Variscan evolution is only poorly understood, however, there is increasing evidence on granitoid magmatism that occurred during the Cambro-Ordovician time.

Alpine orogeny during the Mesozoic time resulted from a subduction-collisional events between the European and Apulian continental domains involving two major orogenic sutures – Meliatic in the south and Penninic in the north. High-pressure blueschist facies metamorphism resulted from the closure of the Meliatic Ocean in the Late Jurassic time. Late Cretaceous, eo-Alpine metamorphism caused by continental collision reached the highest intensity in the Veporic Unit and along the Veporic/Gemic boundary. The Alpine metamorphic overprint in the Veporic Unit reached anchi and epizone in the Mesozoic cover and amphibolite facies in the basement. In the Gemic unit, the eo-Alpine metamorphism occurred earlier, in the Early Cretaceous. It was accompanied by expulsion of basinal brines and formation of economically important siderite mineralization. Metamorphic conditions of Alpine metamorphism in the Gemic unit reached mostly the greenschist facies, study of fluid inclusions suggests relatively high pressure conditions of siderite formation during the Alpine orogeny. There is a new information about the tectono-metamorphic evolution of superficial units. Burial and thermal history of the Tertiary accretion prism (flysch belt) and forearc basins of the Carpathian arc has been restored. Mesozoic basins and the internal Carpathian nappe stack need to be investigated as well. Initial study of the hydrotectonic regime at soles of the overthrust sheets suggest that fluid overpressure can facilitate the movement and thrusting of the nappes.

In the Eastern Alps the metamorphic grade of eo-Alpine metamorphism reached ultrahigh-pressure facies in the south-easternmost parts, in the Pohorje Mountains of

Slovenia. This UHP metamorphism of ca. 3-4 GPa and 800-900°C P-T conditions was recognized in kyanite eclogites and garnet peridotites suggesting that continental crust was buried to depths of at least 100 km. The finding of UHP metamorphism in Pohorje has profound consequences for the tectonic structure and metamorphic evolution of the Alps. An intracontinental subduction zone in the NW foreland of the Meliata suture has to be assumed during Early Cretaceous. As units of the Eastern Alps continue into the area of internal Carpathians the discovery of UHP metamorphism has far reaching consequences also for the Western Carpathians. Following our participation in *The Central European Lithospheric Experiment Based on Refraction* (CELEBRATION 2000) project we have in hands relevant data on the deep structure of the orogenic belt.

(B) Dynamics of sedimentary basins and fossil ecosystems

Due to tectonometamorphic transformation of older sedimentary rock complexes, detailed history and dynamics of Permian, Mesozoic and Cenozoic sedimentary basins could have been studied in the Western Carpathians. Sedimentary rocks sequences infilling these former basins contain not only detailed record of ancient paleogeographic, paleoceanographic and paleoclimatic changes, but they also have yield rich archive of the fossil life evolution. Their systematic study is a natural part of regional geology and reconstruction of the Alpine evolution. However, they provide an opportunity to contribute to the solution of global problems, too.

Geological record of the development of life and terrestrial environments during Phanerozoic contains several sections, indicating sudden turnovers, acceleration of changes, extinction of older specialised forms and rapid development of new organisms. These events were evoked by complex sequence of causes and consequences. Some of them can be interpreted as revolutionary, apparent catastrophic consequences in the Earth evolution proper (including surface systems), the others were probably caused by different extraterrestrial agents. A definitive interpretation of the majority of these changes remains uncertain goal of activity for teams composed of different specialists, associated around IGCP UNESCO Projects (458, 463), ESF (IMPACT) or EU (Global Change) projects.

West Carpathian sedimentary sequences contain several breaks in geological record that do not allow study of all popular „events“ in our territory. We do not know consistent rock record of Permian/Triassic and Cretaceous/Tertiary transitions. On the other hand, available sections in our territory enable study of hitherto incompletely known sequences on the Triassic/Jurassic transition or other stages.

Mesozoic and Cenozoic formations of the Western Carpathians and adjacent areas have been studied by methods of microbiostratigraphy and environmental micropaleontology. Ongoing research tends to apply sophisticated methods that contribute to updating of the Geological Time Scale (Gradstien et al. 2004).

Moreover, these questions are not of pure academician character – they are connected with the understanding of global changes affecting the whole globe. Research of this type can provide data for solving of such important problems as gaining water sources for world human population, prevention of risks connected with climate changes, or threatening of life on the Earth by extraterrestrial factors.

The study of fossil brachiopods, bivalve molluscs, ostracods and insects is bringing new data concerning the role of paleoenvironment in the evolution of fossil ecosystems, replacements of fossil faunas evoked by controlling factors of their distribution, postmortem changes of fossil record vs. population dynamics of original settlements, etc. Evolutionary history of ancient cockroaches leading to the origin of social forms (termites), mantises, or pterosaur parasites have been studied.

Compilation of universally applicable scale is a need of the modern interregional stratigraphic correlation for calibration of parabiostatigraphical scales and elimination of paleobiogeographic distribution factors of the index organisms. Several key importance West Carpathian section are in preparation to serve as the base of regional calibration

sections system, available for any specialists working in broader area of the Western Carpathians.

(C) Environmental mineralogy and geochemistry of past mining activities

Environmental impact and mediation of past mining activities are a world-wide problem. While there are available geoenvironmental models for deposit types and results of monitoring at different sites, relevant processes and methods of remediation are less understood. After the Pan-European decay of mining activities during the second half of the last century liquidation and remediation of mining sites started. Most of these works was carried out using leveling of dumps, remediation of dumps using mould cover (e. g. sludges from water cleaning plants) and/or by grass seeding or planting of trees. Special choice of the suitable trees and seed that could tolerate stress conditions at dump stands (salting by water-soluble acid or alkaline secondary minerals, lack of mould and unsuitable water regime etc.) was carried out only rarely. This type of remediation in no case can markedly reduce biological-chemical and geochemical processes in disintegrated mining and metallurgical waste substrate. The mould layer is usually rapidly washed away because the artificial vegetation cover is subject to degradation and stable greenery does not form. Scientifically designed procedures are mostly missing. The work carried out during last years in the Banská Štavnica and Pezinok areas demonstrated that application of scientific approach might be successful.

One of the most important problems of the present environmental remediation activities is the effort how to find effective possibility of waste processing and utilization to eliminate the source of the contamination. It is possible to mention at least the following two convenient possibilities: the low temperature polymerisation of fine grained mineral wastes or the production of pigments from metalosulphate waters.

ii. Organisation's role or significance in the overall research effort within the field of the Concept on both the national and international scales

(A) A complex analysis of structure and evolution of the Alpine-Carpathian orogen

As documented by the results and publications presented above, the team of the Geological Institute plays a leading role in the analysis of the Alpine-Carpathian orogen. The research team is traditionally strong and experienced especially in metamorphic and igneous petrology, mineralogy and geochemistry. Our laboratory for Ar/Ar dating enables us to solve the geochronological aspects, especially the timing of tectonometamorphic and magmatic processes. We shall focus also on the emplacement mechanism of the superficial units and the role of fluids in orogenic processes. International scope of our work is documented by extensive cooperation with foreign partners and increasing number of publications and citations in the high-rank journals. The ongoing APVV project on Alpine orogeny devoted to the UHP metamorphism in the Eastern Alps has interregional aspects involving foreign co-workers (Austria, Germany, Norway, Slovenia, Sweden). One of them Prof. Nikolaus Froitzheim (Univ. Bonn) spent 4 months in our Institute during his sabbatical leave. Mirijam Vrabc (Univ. Ljubljana) is working with dr. Janák for several years, including her MSc. and PhD studies. Dr. Petrík was co-editor of a special issue devoted to the Variscan orogeny published in the international journal *Lithos* (2005). Dr. Vozár was one of the coordinators within the international geophysical project CELEBRATION 2000.

(B) Dynamics of sedimentary basins and fossil ecosystems)

The Institute traditionally keeps the role of research center in stratigraphy and sedimentology of Central Carpathian Mesozoic and Paleogene deposits. Important results obtained by scientists of the SAS Geological Institute in last years in this field resulted in the fact that both national coordinators of the IGCP Projects 458 and 463

(Michalik, Sotak) are researchers of our institute. In 2003 we organized successful workshop of the TRIBE (Triassic-Jurassic Boundary Events) project in High Tatra Mts. The scientific results concerning the problem of Triassic/Jurassic boundary have been presented in several conferences (Tata 2005, Paris 2005, Neuchâtel 2005, Cracovia 2006). The results obtained in the frame of the IGCP 463 Project "Cretaceous Oceanic Red Beds" (CORB, active during 2002 – 2006) were presented in international workshops in Barten, Turkey 2003, in the frame of the 32nd International Geological Congress in Florence, Italy, 2004, or in the International Cretaceous Symposium in Neuchâtel, 2005. International dimension of paleoenvironmental and paleoclimatic research in the Geological Institute enabled our participation in the 6th RP project of the Marie Currie action – *PROPER : Proxies in Paleoclimatology: education and research*.

(C) Environmental mineralogy and geochemistry of past mining activities

Team of the Geological institute is well established in this field of applied research. It has already carried out research activities in the field of the remediation of old mining activities (Pezinok, Banská Štiavnica, Ľubietová, Banská Belá). The strength of the team is in mineralogical, geochemical and bacterial research of underground waters, AMD (acid mine drainage) waters, soils, sediments as well as in the research of contamination of landscape components (abiotic and biotic) by heavy metals and toxic elements. A close cooperation with biologists, botanists and environmentalist enables to elaborate various natural and technical treatments for remediation processes, both passive and active.

(D) Other activities

At last but not least is necessary to underlain that the Geological institute SAS is the leader in the Slovak agenda for the International Year of Planet Earth (IYPE) within the whole triennium 2007-2009.

iii. Objectives of the Concept

(A) A complex analysis of structure and evolution of the Alpine-Carpathian orogen

Our main objective is to understand the evolution of the Alpine-Carpathian orogen and to contribute to the knowledge of the orogenic processes in general. Naturally, we cannot cover all the aspects of the orogenic evolution. We shall focus on the following problems: (1) pre-Variscan protolith and its geotectonic interpretation; (2) Variscan structure, metamorphic processes and magmatism and their correlation with Variscides; (3) Alpine structure and metamorphic processes, especially the Ultrahigh-pressure metamorphism and processes of deep subduction and exhumation of crust from the mantle depths; (4) reconstruction of paleotemperature and subsidence of sedimentary basins and tectonometamorphic processes in the low-temperature metamorphic terranes; (5) analysis of the deep structure of the orogen in conjunction with lower crustal processes; (6) the role of fluids in magmatic, metamorphic, tectonic and metallogenetic processes.

(B) Dynamics of sedimentary basins and fossil ecosystems

The main objective in this field is to upgrade our knowledge of sedimentary formations in the Western Carpathians and to identify global events that are represented in biostratigraphic record. Our effort will be focused on: (1) elaboration of the Slovak stratigraphic code; (2) stratigraphic data useable for interregional correlation in the frame of international stratigraphic standards GSSP (Global Stratigraphic Sections and Points); (3) global events that might be identified by biochronology, astrochronology, seasonality and cyclostratigraphy, climatostratigraphy, isotopic stratigraphy, classification of global anoxic events (like Selli, Paquier, Breistroffer, Bonarelli horizons in the Cretaceous formations), chemostratigraphy, clay mineral composition, tephrostratigraphy, etc.; (4)

national reference sections with well-marked global events in the Mesozoic and Cenozoic formations of the Western Carpathians (5) fossil fauna and flora and their changes to enable stratigraphic correlation, reconstruction of past environments, interpret climatic changes, understand evolution of species etc.; (6) evolution of sedimentary basins in conjunction with evolution of the Alpine-Carpathian orogen.

(C) Environmental mineralogy and geochemistry of past mining activities

Our research in this field will be focused on the following aspects: (1) mineralogical, pedological and geochemical monitoring aimed at identification of toxic element contamination, source of contamination and toxic element migration; (2) environmental load at selected parts of the environment, especially fauna and flora; (3) role of bacteria in oxidation and/or reduction of minerals; (4) capacity of natural toxic element sorbents (clay minerals, limonite, zeolites, etc.); (5) testing modification of mining water pH; (6) testing efficiency of artificial geochemical barriers (iron barriers, mixed zeolite – organic compounds barriers, etc.); (7) waste processing and utilization to eliminate the source of the contamination.

iv. Proposed strategies and methods to be applied, and time schedule

(A) A complex analysis of structure and evolution of the Alpine-Carpathian orogene

Major goals of our Institute's research program in this field there are: (1) Pre-Variscan protolith of magmatic and metamorphic rocks in the crystalline basement of the Western Carpathians will be investigated by means of mineralogical, petrological, geochronological and geochemical methods. Dating of zircon and monazite will be performed in order to constrain the timing of protolith formation. Geochemical study will be focused on the pre-metamorphic setting of metagranitoids (orthogneisses), paragneisses and amphibolites. (2) Variscan metamorphism, mainly the P-T conditions, timing and tectonic setting will be investigated in the crystalline basement of the Western Carpathians. Especially, we shall focus on high-pressure, eclogite facies metamorphism in the metabasites and other potential high-pressure rocks (metaultramafics, metagranitoids, metasediments). (3) Permian events related to continental rifting will be studied with special emphasis to low-pressure metamorphism and granitoid magmatism. We shall focus on elucidation of Permian events obscured by Alpine metamorphism in the Gemeric and Veporic units. (4) Alpine tectonometamorphic processes will be investigated in the Western Carpathians and Eastern Alps. Metamorphic P-T conditions, timing, fluid regime and deformation related to the eo-Alpine metamorphism will be investigated in the Veporic and Gemeric units as well as in the superficial tectonic units. In the Eastern Alps, eo-Alpine metamorphism will be investigated in the Austroalpine units of Pohorje and adjacent areas. This will enable to correlate the eo-Alpine tectonometamorphic events in the Alpine-Carpathian orogen. Special emphasis will be paid to ultrahigh-pressure metamorphism, the mode of burial, exhumation and P-T-t paths followed by UHP rocks. We shall focus on special mineralogical and petrological aspects like determination of UHP phases, their composition and transformation during the course of exhumation. The timing of metamorphism and rate of exhumation will be investigated by several geochronological methods. The fluid regime will be characterized during prograde and retrograde stages of metamorphism, and a role of the metamorphic fluids in mineralization will be evaluated.

A complex field and laboratory research involving modern methods will be employed. Mineralogical and petrologic research will include microprobe analyses, X-ray diffraction, Raman, infrared and Mossbauer spectroscopy. Geochemical research will use the major, trace and REE elements, isotopes, and maturity of organic matter. Fluid inclusion studies will be used along with other methods to study the role of fluids in the relevant processes and estimate P/T conditions. Geochronological dating employing the Ar/Ar will be

performed in our laboratory (CEAL), while other methods – U-Pb, Sm-Nd, Lu-Hf, Re-Os will be carried out in collaboration with foreign partners. To reach the above mentioned goals we shall use our own laboratory equipment (Ar/Ar dating, X-ray diffraction, optical mineralogy/petrography, separation of minerals) as well as facilities of cooperating institutions in Slovakia (electron microprobe, fluid inclusion studies) and abroad (Bonn, Salzburg, Wien, Leoben, Ljubljana, Stockholm, Uppsala, Potsdam, Praha, Kraków, Strassbourg, Oxford, Tromsø) for isotopes, radiometric dating, Raman, IR spectroscopy and other sophisticated methods. Our research will be performed and supported within the several ongoing and planned projects (APVV, VEGA, informal collaboration) during the next four years. These guarantee that major goals of the Institute's research program will be achieved. The outcome of our research will be the publications in the international journals and presentations at important conferences and meetings.

(B) Dynamics of sedimentary basins and fossil ecosystems

Successful solving of complicated task would be not possible without a complex approach to the problems. Modern paleontological and sedimentological analyses will be complemented by paleomagnetic dating, isotope analyses and geochemical studies to define details of sections and corresponding environmental changes. It is inevitable to rely on wide collaboration of geoscientists of different disciplines, institutions and countries. New objectives in the research of the sedimentary formations will concentrate on the identification of global events by methods of biochronology, astrochronology, seasonality and cyclostratigraphy, climatostratigraphy, isotopic stratigraphy, classification of global anoxic events, chemostratigraphy, clay mineral composition, tephrostratigraphy, etc. As a subject of prime interest, there will be the microorganisms having a potential to the high-resolution stratigraphy (HIREs), biostratigraphic zonation, adaptive morphogenesis, radiative and innovative bioevents, stable isotope records and paleothermometry, etc. In the environmental micropaleontology, the research will be oriented to planktonic bioproductivity, taphonomy of meiobenthic organisms, biotopes exhibiting a critical-life conditions (oxygen deficiency, eutrophication, nutrient resources, etc.), limnic ecosystems, biostatistic analysis of fossil assemblages, etc.

Micropaleontological stratigraphic studies will be carried out mostly on the Upper Cretaceous formations (revision of international neostatotype of the Puchov Marls, HIREs study of the APVV core section – Hradište 1), Paleogene formations (Eocene pelagic sequence in the Kršteňany-1 core, Podhorskovia section), Oligomiocene formations (transitional beds of the Podtatranská skupina Group and the Prešov Fm. at the Dúbrava section), Neogene limnic deposits of the Lake Pannon (Central Europe), Lake Sinj (Croatia), and other isolated lakes inside Carpathian-Balkan area.

(C) Environmental mineralogy and geochemistry of past mining activities

Our work will be focused on the interdisciplinary study of the country components contamination (rocks, soils, water, vegetation and fauna). A special attention will be paid to the processes of alteration of primary minerals in zones of oxidation and cementation, forming of secondary products, study of their water solubility in various conditions (e. g. in dependability on pH) and of their biological accessibility. The role of bacteria in processes of oxidation will be established. Experimental research of heavy and toxic metals mobility, of their mobilization to the country components and of their retardation processes e. g. by using of geochemical barriers (pH changes, Fe-barriers, carbonate barriers, wetland systems...) and natural sorbents (vegetation, clay sorbents, zeolites, dead biological mass...) will be carried out with respect to the possibilities of utilization of accumulated elements (mineral pigments, fire-proof coatings, bacterial leaching and metal precipitation...). Results will be a proposal of methods how to provide for balanced sanitation of the county with respect to the preservation of the typical features of the mining country. The remediation will regard the mining-historical, environmental and economic aspects.

III. Partial indicators of the main activities:

1. Research output

i. List of the selected publications documenting the most important results of basic research. Total number of publications in the whole assessed period should not exceed the average number of the research employees

- [1] BROSKA I. - WILLIAMS C. T. - UHER P. - KONEČNÝ P. - LEICHMANN J.: The geochemistry of phosphorus in different granite suites of the Western Carpathians, Slovakia: the role of apatite and P-bearing feldspar. In *Chemical Geology*. ISSN 0009-2541. Vol. 205 (2004), p. 1-15. (2.330 – IF2003).
- [2] BROSKA I. - WILLIAMS C. T. - JANÁK M. - NAGY G.: Alteration and breakdown of xenotime-(Y) and monazite-(Ce) in granitic rocks of the Western Carpathians, Slovakia. In *Lithos*. ISSN 0024-4937. Vol. 82 (2005), p. 71-83. (2.567 - IF2004).
- [3] FARYAD Sh. W. - SPIŠIAK J. - HORVÁTH P. - HOVORKA D. - DIANIŠKA I. - JÓZSA S.: Petrological and geochemical features of the Meliata mafic rocks from the sutured Triassic Oceanic Basin, Western Carpathians. In *Ofioliti*. ISSN 0391-2612. Vol. 30, no.1 (2005), p. 27-35. (1.125 - IF2004).
- [4] FINGER F. - BROSKA I. - HAUNSCHMID B. - HRAŠKO Ľ. - KOHÚT M. - KRENN E. - PETRÍK I. - RIEGLER G. - UHER P.: Electron-microprobe dating of monazites from Western Carpathian basement granitoids: plutonic evidence for an important Permian rifting event subsequent to Variscan crustal anatexis. In *International Journal of Earth Sciences*. ISSN 1437-3254. Vol. 92 (2003), p. 86-98. (1.538 – IF2002).
- [5] GAAB A.S. - JANÁK M. - POLLER U. - TODT W.: Alpine reworking of Ordovician protoliths in the western Carpathians: geochronological and geochemical data on the Muráň Gneiss Complex, Slovakia. In *Lithos*. ISSN 0024-4937. Vol. 87, no. 3-4 (2006), p. 261-275. (2.243 - IF2005).
- [6] GRAD M. - GUTERCH A. - KELLER G.R. - JANIK T. - HEGEDÜS E. - VOZÁR J. - SLACZKA A. - TIIRA T. - YLINIEMI J.: Lithospheric structure beneath trans-Carpathian transect from Precambrian platform to Pannonian basin: CELEBRATION 2000 seismic profile CEL05. In *Journal of Geophysical Research—Solid Earth*. ISSN 0148-0227. Vol. 111 (2006), B03301. (2.784 - IF2005).
- [7] HU X.H. - JANSÁ L. - WANG CH. - SARTI M. - BAK K. – WAGREICH M. - MICHALÍK J. - SOTÁK J. 2005: Upper Cretaceous oceanic red beds (CORBs) in the Tethys: occurrences, lithofacies, age, and environments. *Cretaceous Research* 26, Elsevier, p. 3-20 (0.588 – IF2004).
- [8] JANÁK M. - FROITZHEIM N. - LUPTÁK B. - VRABEC M. - RAVNA E.J. Krogh: First evidence for ultrahigh-pressure metamorphism of eclogites in Pohorje, Slovenia: Tracing deep continental subduction in the Eastern Alps. In *Tectonics*. ISSN 0278-7407. Vol. 23, no. 5 (2004), TC5014, doi:10.1029/2004TC001641. (2.308 – IF2003)
- [9] JANÁK M. - FROITZHEIM N. - VRABEC M. - RAVNA E. J. Krogh - DE HOOG J.C.M.: Ultrahigh-pressure metamorphism and exhumation of garnet peridotite in Pohorje, Eastern Alps. In *Journal of Metamorphic Geology*. ISSN 0263-4929. Vol. 24, no. 1 (2006), p. 19-31. (3.083 - IF2005).
- [10] KUBIŠ M. - BROSKA I.: The role of boron and fluorine in evolved granitic rock systems (on the example of Hnilec area, Western Carpathians) *Geologica carpathica* Vol 56, no 3 (2005), p. 193-204.(1,45 – IF2005)

- [11] LUPTAK B. - JANAK M. - PLAŠIENKA D. - SCHMIDT S.T. Alpine low-grade metamorphism of the Permian-Triassic sedimentary rocks from the Veporic superunit, Western Carpathians: Phyllosilicate composition and "crystallinity" data. *Geologica carpathica* Vol. 54, no. 6 (2003), p. 367-375 (0,45 – IF2005).
- [12] MIKUŠ T. - CHOVAN, M.: Hydrothermal Sb-Au mineralization in the Strážovské vrchy Mountains (Malá Magura, Western Carpathians). *Geologica carpathica* Vol. 54, no 4 (2003), p. 207-216 (0,45 – IF2005)
- [13] MIKUŠ T. - SPIŠIAK J. - SÝKORA M. - DEMKO R.: Chemical composition of spinels from Mesozoic alkali basalts of the Western Carpathians: implications for sources of detrital spinels in flysch sediments. *Geologica carpathica* Vol. 57, no 6 (2006), p. 447-460. (1,45 – IF2005)
- [14] MILOVSKÝ R. - HURAI V. - PLAŠIENKA D. - BIROŇ A.: Hydrotectonic regime at soles of overthrust sheets: textural and fluid inclusion evidence from basal cataclasites of the Muráň nappe (Western Carpathians, Slovakia). In *Geodinamica Acta*. Vol. 16, no. 1 (2003), p. 1-20. (0.978 – IF2002).
- [15] PIPIK R. - BODERGAT A.M., 2006: Groupe de Candona clivosa, nouveau groupe de Candoninae (Crustacea, Ostracoda) et diversification dans le Basin de Turiec (Slovaquie) au Miocene supérieur. In: *Geobios*, ISSN 0016-6995. Vol. 39, no 3, p. 394-414 (0,817 – IF2005).
- [16] PETRÍK I. - NABELEK P. - JANÁK M. - PLAŠIENKA D.: Conditions of formation and crystallization kinetics of highly oxidized pseudotachylytes from the High Tatras (Slovakia). In *Journal of Petrology*. ISSN 0022-3530. Vol. 44, no. 5 (2003), p. 901-927. (2.903 – IF2002).
- [17] PETRÍK I. - KONEČNÝ P. - KOVÁČIK M. – HOLICKÝ I.: Electron microprobe dating of monazite from the Nizke Tatry Mountains orthogneisses (Western Carpathians, Slovakia) *Geologica carpathica* Vol 57, no. 4 (2006), p. 227-242. (1,45 – IF2005)
- [18] ŠRODOŇ J. - KOTARBA M. - BIROŇ A. - SUCH P. - CLAUER N. - WÓJTOWICZ A.: Diagenetic history of the Podhale-Orava Basin and the underlying Tatra sedimentary structural units (Western Carpathians): evidence from XRD and K-Ar of illite-smectite. In *Clay Minerals*. ISSN 0009-8558. Vol. 41, no. 3 (2006), p. 751-774. (1.184 - IF2005).
- [19] TOMAŠOVÝCH A.: A new early Jurassic Rhynchonellid brachiopod from the western Tethys and implications for systematics of Rhynchonellids from the Triassic-Jurassic boundary. In *Journal of Paleontology*. ISSN 0022-3360. Vol. 80, no. 2 (2006), p. 212-228. (0.960 - IF2005).
- [20] TOMAŠOVÝCH A.: Brachiopod and bivalve ecology in the late Triassic (Alps, Austria): Onshore-offshore replacements caused by variations in sediment and nutrient supply. In *Palaios*. ISSN 0883-1351. Vol. 21, no. 4 (2006), p. 344-368. (1.551 - IF2005).
- [21] TOMAŠOVÝCH A.: Linking taphonomy to community-level abundance: Insights into compositional fidelity of the Upper Triassic shell concentrations (Eastern Alps). In *Palaeogeography, Palaeoclimatology, Palaeoecology*. ISSN 0031-0182. Vol. 235, no. 4 (2006), p. 355-381. (1.899 - IF2005).
- [22] VOZÁROVÁ A. - FRANK W. - KRÁL' J. - VOZÁR J.: $^{40}\text{Ar}/^{39}\text{Ar}$ dating of detrital mica from the Upper Paleozoic sandstones in the Western Carpathians (Slovakia) *Geologica carpathica* Vol. 56, no 6 (2005), p 463-472. (1,45 – IF2005)
- [23] VRŠANSKÝ P.: Mass mutations of insects at the Jurassic/Cretaceous boundary? *Geologica carpathica* Volume 56, number 6/2005, pages 473-481. (1,45 – IF2005)

ii. List of monographs/books published abroad

- [1] EBNER F. - PAMIČ J. - KOVÁCS S. - SZEDERKÉNYI T. - VAI G.-B. - VENTURINI C. - KRÄUTNER H.-G. - KARAMATA S. - KRSTIČ B. - SUDAR M. - VOZÁR J. - VOZÁROVÁ A. - MIOČ P.: *Variscan Preflysch (Devonian-Early Carboniferous) environments 1:2 500 000: Tectonostratigraphic terrane and paleoenvironment maps of the Circum-Pannonian region*. Budapest: Geological Institute of Hungary, 2004. ISBN 963 671 244 1 CM.
- [2] LESS G. (scien.edit.) - MELLO J. (scien.edit.) - ELEČKO M. (zost.) - KOVÁCS S. (zost.) - PELIKÁN P. (zost.) - PENTELÉNYI L. (zost.) - PEREGI Z. (zost.) - PRISTAŠ J. (zost.) - RADÓCZ G. (zost.) - SZENTPÉTERY Ildikó (zost.) - VASS D. (zost.) - VOZÁR J. (zost.) - VOZÁROVÁ A. (zost.): *Geological map of the Gemer-Bükk Area 1:100 000*. Budapest: MÁFI, ŠGÚDŠ, 2004.
- [3] VOZÁROVÁ A. - VOZÁR J. - EBNER F. - PAMIČ J. - KOVÁCS S. - SZEDERKÉNYI T. - VAI G. B. - VENTURINI C. - KRÄUTNER H. G. - KARAMATA S. - KRSTIČ B. - SUDAR M. - MIOČ P.: *Late Variscan (Latest Carboniferous to Early Permian) environments 1:2 500 000 : Tectonostratigraphic terrane and paleoenvironment maps of the Circum-Pannonian region*. Budapest: Geological Institute of Hungary, 2004. ISBN 963 671 245 X CM.

iii. List of monographs/books published in Slovakia

- [1] BAKOS F. - CHOVAN M. - BAČO P. - BAHNA B. - FERENC Š. - HVOŽDARA P. - JELEŇ S. - KAMHALOVÁ M. - KAŇA R. - KNÉSL J. - KRASNEC Ľ. - KRIŽÁNI I. - MAŤO Ľ. - MIKUŠ T. - PAUDITŠ P. - SOMBATHY L. - ŠÁLY J.: *Zlato na Slovensku: sprievodca zlatou históriou, ťažbou a náleziskami na našom území*. Bratislava: Slovenský skauting, 2004. 298 s. ISBN 80-89136-21-4.
- [2] BEZÁK V. - BROSKA I. - ELEČKO M. - HAVRILA M. - IVANIČKA J. - JANOČKO J. - KALIČIAK M. - KONEČNÝ V. - LEXA J. - MELLO J. - PLAŠIENKA D. - POLÁK M. - POTFAJ M. - VASS D.: *Vysvetlivky k tektonickej mape Slovenskej republiky: 1:500 000*. Bratislava: ŠGÚDŠ, 2004. 71 s. ISBN 80-88974-65-8.
- [3] ILLÁŠOVÁ Ľ. - SPIŠIAK J. - TORONAYIOVÁ M. - TURNOVEC I.: *Obsidián: prírodná zaujímavosť z Viničiek pri Trebišove*. GIÚ SAV Bratislava. Banská Bystrica: Merkantil, 2004. 51 s. ISBN 80-8050-694-9
- [4] KONEČNÝ V. - LEXA J. - KONEČNÝ P. - BALOGH K. - ELEČKO M. - HURAI V. - HURAI V. - PRISTAŠ J. - SABOL M. - VASS D.: *Guidebook to the Southern Slovakia alkali basalt volcanic field*. Bratislava: ŠGÚDŠ, 2004. 143 s. ISBN 80-88974-58-5
- [5] POLÁK M. - BEZÁK V. - FILO I. - HAVRILA M. - KOHÚT M. - KOVÁČ P. - MELO J. - MAGLAY J. - ELEČKO M. - OLŠAVSKÝ M. - VOZÁR J. - SIMAN P. - BUČEK S. - HÓK J. - RAKÚS M. - LEXA J. - ŠIMON L.: *Geologická mapa Starohorských vrchov, Čierťaže a severnej časti Zvolenskej kotliny 1:50 000*. Bratislava: ŠGÚDŠ - Nakladateľstvo D. Štúra, 2003.
- [6] POLÁK M. - BEZÁK V. - FILO I. - HAVRILA M. - KOHÚT M. - KOVÁČ P. - MELO J. - MAGLAY J. - ELEČKO M. - OLŠAVSKÝ M. - VOZÁR J. - SIMAN P. - BUČEK S. - HÓK J. - RAKÚS M. - LEXA J. - ŠIMON L.: *Vysvetlivky ku Geologickej mape Starohorských vrchov, Čierťaže a severnej časti Zvolenskej kotliny 1:50 000*. Bratislava: ŠGÚDŠ - Nakladateľstvo D. Štúra, 2003. 227 s.
- [7] MICHALIK J. (ed. 2003): Triassic/Jurassic Boundary Events. Special Volume to the 3th Annual Workshop of the 458 (TRIBE) IGCP UNESCO Project, Stará Lesná, October 2003. VEDA Bratislava, 89p.

iv. List of other scientific outputs specifically important for the Organisation

- [1] **GEOLOGICA CARPATHICA** - ISSN 1335-0552, Indexed/Abstracted in: Current Contents, BIOSIS, Chemical Abstracts, Elsevier/GeoAbstracts, Geocache, GeoRef, Mineralogical Abstracts, NISC GeoSEARCH, Ulrich's International Periodicals

v. Table of research outputs

Table **Research outputs** shows research outputs in number of specified entries; these entries are then divided by FTE employees with a university degree (from Tab. Research staff) for all Organisation at the respective year; finally these entries are divided by the total salary budget (from Tab. Salary budget).

Research outputs	2003			2004			2005			2006			total			
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	averaged number per year	av. No. / FTE	av. No. / salary budget
chapters in monographs, books published abroad	1	0,05	0,10	2	0,10	0,22	0	0,00	0,00	0	0,00	0,00	3	0,8	0,04	0,08
chapters in monographs, books published in Slovakia	0	0,00	0,00	3	0,16	0,33	1	0,05	0,10	4	0,17	0,39	8	2,0	0,10	0,20
CC publications	10	0,53	1,01	5	0,26	0,54	10	0,48	1,04	23	0,99	2,22	48	12,0	0,59	1,23
scientific publications indexed by other databases (* Scopus, GEOBASE, GeoRef, Chemical Abstracts, BIOSIS Previews, Zoological Record)	31	1,65	3,13	36	1,87	3,92	24	1,15	2,49	13	0,56	1,26	104	26,0	1,27	2,66
scientific publications in other journals	6	0,32	0,61	7	0,36	0,76	5	0,24	0,52	13	0,56	1,26	31	7,8	0,38	0,79
publications in proc. of international scientific conferences	53	2,82	5,35	36	1,87	3,92	42	2,02	4,36	50	2,16	4,84	181	45,3	2,21	4,64
publications in proc. of nat. scientific conferences	19	1,01	1,92	28	1,45	3,05	22	1,06	2,29	36	1,56	3,48	105	26,3	1,28	2,69
active participations at international conferences	53	2,82	5,35	83	4,30	9,04	67	3,22	6,96	74	3,20	7,16	277	69,3	3,38	7,09
active participations at national conferences	39	2,08	3,94	31	1,61	3,38	69	3,31	7,17	57	2,46	5,51	196	49,0	2,39	5,02

vi. Renormalized publications²

Renormalized publications = number of CC publications in the given year times authorship's portion of the Organisation times the journal impact factor in 2005 divided by the median impact factor in the research field

Renormalised publications	2003			2004			2005			2006		
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget
Renormalized publications	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00

vii. Standard manuscript page count³

Standard manuscript page count	2003			2004			2005			2006		
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget
page count	0	0,0	0,0	0	0,0	0,0	0	0,0	0,0	0	0,0	0,0

viii. List of patents and patent applications

[1]

ix. Supplementary information and/or comments on the scientific output of the Organisation

The major publication effort of scientific workers in our Institute during the last years has been aimed to publications in ISI registered journals (CC). This may seem facilitated by the fact that Institute's *Geologica carpathica* is a CC journal. Although we consider our journal (which together with 2 Polish and 1 Austrian journal are only CC journals in Central Europe) a major editorial and managing achievement, our scientists successfully place their papers also to foreign CC journals. As can be seen in the above lists, those in foreign journals make up ca. 75 % of the selected most important CC papers. The increasing efficiency of publishing is also seen in the rising the *per capita* publication

² This information is required only from the Organisations of the Section 2 of the Slovak Academy of Sciences.

³ This information is required only from the Organisations of the Section 3 of the Slovak Academy of Sciences.

which approached 1 in the last year. We are nevertheless aware that the number of papers varies considerably from year to year.

Papers published in journals indexed in other databases decrease antithetically to those in CC journals. They comprise partly papers in English placed in other Slovak or foreign journals, and partly in Slovak language aimed to local audience which is also considered important in view of publishing new results from regional research.

In addition to CC publications, 3 monographs and 8 chapters in monographs co-authored by our scientists were published in last 4 years. The most important appears a comprehensive guide to the history of gold mining in Slovakia contributed by three Institute's authors.

2. Responses to the scientific output

Table **Citations** shows specified responses to the scientific outputs; these entries are then divided by the FTE employees with a university degree (from Tab. Research staff) for all Organisation at the respective year; finally these entries are divided by the total salary budget (from Tab. Salary budget).

Citations	2002			2003			2004			2005			total			
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	averaged number per year	av. No. / FTE	av. No. / salary budget
Web of Science	126	6,7	12,7	93	4,8	10,1	137	6,6	14,2	113	4,9	10,9	469	117,3	5,7	12,0
(SCOPUS)	8	0,4	0,8	60	3,1	6,5	24	1,2	2,5	73	3,2	7,1	165	41,3	2,0	4,2
(GeoRef)	198	10,5	20,0	78	4,0	8,5	140	6,7	14,5	205	8,9	19,8	621	155,3	7,6	15,9
in monographs, conf. proceedings and other publications abroad	60	3,2	6,1	26	1,3	2,8	29	1,4	3,0	10	0,4	1,0	125	31,3	1,5	3,2
in monographs, conf. proceedings and other publications in Slovakia	58	3,1	5,9	106	5,5	11,5	105	5,0	10,9	26	1,1	2,5	295	73,8	3,6	7,6

i. List of 10 top-cited publications and number of their citations in the assessment period

- [1] PLAŠIENKA D. – GRECULA P. – PUTIŠ M. – KOVÁČ M. – HOVORKA D.: Evolution and structure of the Western Carpathians: an overview. In Grecula P., Hovorka D. & Putiš M. (eds): In *Geological evolution of the Western Carpathians. Mineralia Slovaca Monograph, Bratislava.* (1997), p. 1-24. ISBN 80-967018-7-8.
Number of citations: 40
- [2] BROSKA I. - PETRIK I. – WILLIAMS C.T.: Coexisting monazite and allanite in peraluminous granitoids of the Tribec Mountains, Western Carpathians In *American mineralogist* Vol. 85, no. 1, (2000), p. 22-32.
Number of citations: 14
- [3] SOTÁK J. – RUDINEC R. – SPIŠIAK J.: The Penninic "pull-apart" dome in the pre-Neogene basement of the Transcarpathian Depression (Eastern Slovakia). In *Geologica Carpathica.* Vol. 44, no. 1, (1993) p. 11-16.
Number of citations: 12
- [4] JANÁK M. - PLAŠIENKA D. - FREY M. - COSCA M. - SCHMIDT S. T. - LUPTÁK B. - MĚRES Š. Cretaceous evolution of a metamorphic core complex, the Veporic unit, Western Carpathians (Slovakia): P-T conditions and in situ $^{40}\text{Ar}/^{39}\text{Ar}$ UV laser probe dating of metapelites. In *Journal of Metamorphic Geology.* Vol. 19, no. 2, (2001), p. 197-216.
Number of citations: 12
- [5] POLLER U. – JANÁK M. – KOHÚT M. – TODT W.: Early Variscan granitoid magmatism in the Western Carpathians: U-Pb zircon data from granitoids and orthogneisses of the Tatra Mountains (Slovakia). In *International Journal of Earth Sciences.* Vol. 89, (2000), p. 336-349.
Number of citations: 12
- [6] FINGER F. – BROSKA I. The Gemeric S-type granites in southeastern Slovakia: Late Palaeozoic or Alpine intrusions? Evidence from electron-microprobe dating of monazite. In *Schweizerische Mineralogische und Petrographische Mitteilungen.* Vol. 79, no.3, (1999), p. 439-443.
Number of citations: 11
- [7] SOTÁK J. – SPIŠIAK J. – BIRONĚ A.: Metamorphic sequences with „Bündnerschiefer“ lithology in the Pre-Neogene basement of the East Slovakian Basin. In *Mitt. Österr. Geol. Ges.* Vol. 86, (1994), p. 111-120.
Number of citations: 11
- [8] SOTÁK J. – PERESZLÉNYI M. – MARSCHALKO R. – MILIČKA J. – STAREK D.: Sedimentology and hydrocarbon habitat of the submarine-fan deposits of the Central Carpathian Paleogene Basin (NE Slovakia). In *Marine and Petroleum Geology, Elsevier.* Vol. 18, 2001, p. 87-114.
Number of citations: 11
- [9] PETRÍK I. – NABELEK P. – JANÁK M. – PLAŠIENKA D.: Conditions of formation and crystallization kinetics of highly oxidized pseudotachylytes from the High Tatras (Slovakia). In. *Journal of Petrology.* Vol. 44, no. 5, (2003), p.901-927. . Number of citations: 11
- [10] PLAŠIENKA D. – JANÁK M. – LUPTÁK B. – MILOVSKÝ R. – FREY M.: Kinematics and metamorphism of a Cretaceous core complex: the Veporic Unit of the Western Carpathians. In *Physics and Chemistry of the Earth.* Vol. 24, 1999, p. 651-658.
Number of citations: 10

ii. List of top-cited authors from the Organisation (at most 10 % of the research employees) and their number of citations in the assessment period

- [1] MICHALÍK J. – Number of citation: 200
 [2] SOTÁK J. – Number of citation: 196
 [3] BROSKA I. – Number of citation 162

iii. Supplementary information and/or comments on responses to the scientific output of the Organisation

Responses to the publication activities reflect the structure of our papers: all of the top cited papers were published in CC journals with a notable exception of the comprehensive review *Geological evolution of the Western Carpathians*, which is long lasting reference book for all type of readers. The number of WOS citations varies between 100 and 140, on average approaching 6 citations per year, *per capita*. This is considered satisfying although we realize the actual number of cited authors (8) is quite low: less than half of the total number. We hope however, that publications of younger authors will contribute more significantly to overall response in next years.

3. Research status of the Organisation in the international and national context

• International/European position of the Organisation

i. List of the most important research activities documenting international importance of the research performed by the Organisation, incl. major projects (details of projects should be supplied under Indicator 4). Collective membership in the international research organisations, in particular within the European Research Area

- [1] Project UNESCO/IGCP 458 - Triassic/Jurassic Boundary Events (TRIBE) - UNESCO responsible investigator: MICHALÍK J. (2001-2006)
 [2] APVV-51-046105 Ultrahigh-pressure metamorphism in Pohorje and correlation of the eo-Alpine tectonometamorphic evolution of the Eastern Alps and Western Carpathians - JANÁK M. (03/2006 – 02/09)
 [3] Thermal evolution and provenance of granitoid pebbles from Cretaceous flysch conglomerates of the Pieniny Klippen Belt (Western Carpathians) Project DAAD-PPS (2003-2004) leaders: D. Plašienka, I. Broska, participant: D. Kissova. Financial support: 4050 EUR
 [4] DFG Fu 131/26 - The role of brachiopods in Mesozoic benthic communities, project manager – Tomášových A. (02/2003 – 09/2006) - Deutsche Forschungsgemeinschaft cca 15.000 EUR
 [5] Project UNESCO/IGCP 463 - Upper Cretaceous Oceanic Red Beds: Response to Oceanic/Climatic Global Change (CORB), responsible investigator: SOTÁK J. – MICHALÍK J. (2002-2006)
 [6] 6th Framework Programme of the MOBILITY-1 Geologic evidence of Future anomalous climatic trends (HRM activity – Marie Curie Actions) responsible investigator: J. Michalík (2004-2007)

- [7] 6th Framework Programme of the EU - (Marie Curie Actions – Research training Networks) – Proxies in paleoclimatology: Education and Research – MICHALÍK J. – SOTÁK J.,
- [8] Project CELEBRATION 2000 a SUDETES 2004. coordinator – VOZÁR J. (2003-2007)
- [9] Aktion Österreich – Slowakei (2004-2005): Project 45s6: Monazite dating of the oldest Slovak rocks and correlation with Austrian orthogneisses. Participants: I. Petřík, I. Broska F. Finger (Salzburg University) 2020 EUR

ii. List of international conferences (co-) organised by the Organisation

- [1] International joint conference of Czech and Slovak geological societies: „Geology without frontiers“, Blansko 29. 5. – 1. 6. 2003 Czech republic
- [2] International workshop „Triassic/Jurassic Boundary Events“–project UNESCO/IGCP 458 TRIBE, Stará Lesná 11. – 15. 10. 2003
- [3] International conference „Natural glasses and silicic materials“, Nitra 7. – 9. 9. 2004
- [4] Proper Course 4: Proxies in Paleoclimatology Education and Research Bratislava, 7. – 14. 10. 2005, Education course of 6th framework programme – Marie Curie training network
- [5] Workshop Circum Pannonian Terrane MPS – part ALPACA, Smolenice 4.-6.11.2005
- [6] Czech- Slovak- and Polish paleontological conference, Olomouc, 14. – 15. 9. 2005, Olomouc, Czech republic
- [7] 1st Central European Mineralogical Conference, Vyšná Boca 12.-15.9.2006
- [8] Tectonostratigraphic terranes and paleoenvironment maps of the Circum-Pannonian region (TERRANES) – project workshop, Smolenice 31.3.-2.4.2006
- [9] Special open workshop on the Circum Pannonian Terranes, programme of 18th CBGA congress, Belgrade, 6. 9. 2006
- [10] Meeting of the potential field group of the international project CELEBRATION 2000 a workshop projektu APVT-51-002804 Development, Improvement and Application of Progressive Methods of 2D and 3D Gravity Field Interpretation in Geophysics and Geology, Bratislava 26.-27.10.2006
- [11] 7th International Congress on the Jurassic System, Kraków 11.-16.9.2006
- [12] International Conference of Graduate Students and Young Scientists, Modra-Harmónia, 4.-6.5.2006
- [13] International conference Earth in a trap?, Polianka-Krpáčovo 26.-28.4.2006

iii. List of international journals edited/published by the Organisation

- [1] Geologica Carpathica
 - 2006 - Vol. 56, no 1-6, IF=0.449
 - 2005 - Vol. 55, no 1-6, IF=0.494
 - 2004 - Vol. 54, no 1-6, IF=0.397
 - 2003 - Vol. 53, no 1-6, IF=0.147

iv. List of edited proceedings from international scientific conferences and other proceedings

- [1] CHOVAN M. - JELEŇ S. - MAŤO L. - ROJKOVIČ I. - UHER P.: Mineralogy of the Western Carpathians and Bohemian Massif 2004- excursion guide, 2004. 50pp.
- [2] KOTKOVÁ J. (Eds.) - PETRÍK I. (Eds.) - SCHALTEGGER U. (Eds.). Lithos : Magmatic and Metamorphic Evolution of the Variscan Orogenic Crust, Blansko Českovice, Czech Republic, 29 May-01 June 2003, Vol. 82, no. 1-2 (2005), 248 p. (2.567 - IF2004).
- [3] MICHALÍK J. (zost.). Triassic/Jurassic boundary events : third field workshop of the 458 (TRIBE) IGCP UNESCO Project, Stará Lesná, Slovakia. Bratislava: Geological Institute Slovak Academy of Sciences, 2003. 89 p.

- **National position of the Organisation**

- i. **List of selected most important national projects (Centres of Excellence, National Reference Laboratories, Agency for the Promotion of Research and Development (APVV/APVT), National Research Programmes, Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA), and others)**

Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA)

- [1] GA-2/1137/21 **Tectonic evolution of the Mesozoic suture zones in the Western Carpathians** – PLAŠIENKA D. (01.2001 - 12.2003)
- [2] GA-2/1138/21 **(Pb Isotope study of Sb-mineralizations from Western Carpathians)** – ANDRÁŠ P. (1.2001-12.2003)
- [3] GA-2/1139/21 **Environmental risc of the mining-processing dumps and possibilities of the sanation of historical mining areas of Middle Slovakia** – KRIŽÁNI I. (01.2001 - 12.2003)
- [4] GA-2/1143/21 **Rare element (REE, Nb, Ta) mineralizations in the magmatic and metamorphic systems** – BROSKA I. (01.2001 - 12.2003)
- [5] GA-1/8318 **Origin of hydrothermal sulphidic (W, Fe, Ni, As, Au, Sb, Cu, Pb, Zn, Bi, Ag) and carbonatic (Fe, Mg, Ba) mineralizations (Tatrikum, Západné Karpaty)** - ANDRÁŠ P.(1.2001-12.2003)
- [6] GA-1/8204/21 **Clay minerals during diagenesis** - BIROŇ A.(1.2001-12.2003)
- [7] GA-2/2062/24 **Toxification of environment due to weathering of minerals on Sb-Au deposit Pezinok - Kolársky Vrch and proposal of its remediation** - MILOVSKÁ S. (01.2002 - 12.2004)
- [8] GA-1/2074/24 **Factors and indicators of palaeoclimatic changes in Mesozoic and Cenozoic environments** - MICHALÍK J.(1.2002-12.2004)
- [9] GA-2/3135/25 **Triassic-Jurassic boundary events: correlation with other events in Phanerozoic Earth evolution** - MICHALÍK J.(01.2003 - 12.2005)
- [10] GA-2/3167/25 **Reconstruction of the polymetamorphic evolution of the crystalline complexes in the Western Carpathians** - JANÁK M.(01.2003 - 12.2005)

- [11] GA–2/3168/24 **The synthesis of the metallogeny of the Banská Štiavnica stratovolcano** - JELEŇ S.(1.2003 - 12.2005)
- [12] GA–2/3178/24 **Paleogeographic changes of the Carpathian basins during the transformation of the Thetys to Parathetys: sedimentary, climatic and tectogenic records** - SOTÁK J.(01.2003 - 12.2005)
- [13] GA–2/3179/24 **Permian riftogenesis in the evolution of the Western Carpathians – significance, petrology and geotectonic aspects** - SPIŠIAK J.(01.2003 - 12.2005)
- [14] GA–1/0080/24 **Biodiversity and biotopes of the Upper Cainozoic of the West Carpathians as a reflection of paleogeographic and climatic change** - PIPÍK R. (1.2003-12.2005)
- [15] GA-1/0203/24 **Natural glasses – obsidian and siliceous masses of neovolcanics in Slovakia. The historical significance and perspectives of practical usage** - SPIŠIAK J.(2003-2005)
- [16] GA–2/4094/26 **Comparison of selected European Sb-mineralizations – Pb isotope study** - ANDRÁŠ P.(01.2004 - 12.2006)
- [17] GA–2/4096/26 **Dating of monazite by chemical method: a significant contribution to geochronology of the basement of the Western Carpathians** - PETRÍK I. (01.2004 - 12.2006)
- [18] GA–2/4097/26 **Geochemical and mineralogical characterization of the Fe-Ti oxide paragenesis in the magmatic and hydrothermal systems of the Western Carpathians** - BROSKA I.(01.2004 - 12.2006)
- [19] GA–2/5024/26 **Paleotectonic evolution and internal structure of fold and thrust systems of Križna Unit.** - KOVÁČ P.(01.2005 - 12.2007* z dôvodu ukončenia HPP projekt v roku 2006 ukončený)
- [20] GA-1/1022/04 **Tectonothermal reactivation of the continental crust in the alpine collision-subduction zones of the eastalpine-westcarpathian orogen - the reconstruction and mathematical modelling of the thermodynamic and mechanical parameters** - HRDLÍČKA M.(2004-2006)
- [21] GA-1/1026/04 **Ore mineralization in sediments as an indicator of paleogeographic conditions** - SOTÁK J.(2004-2006)
- [22] GA–1/1027/04 **Origin of the hydrothermal antimony-gold mineralization of Gemeric Unit in Western Carpathians** - ANDRÁŠ P. (01. 2004 – 12. 2006)
- [23] GA–2/4095/4 **Geological structure and tectonic evolution of the Pieniny Klippen Belt.**, (PriF UK) – KOVÁČ P. (01.2004 - 12.2006)
- [24] GA–1/2035/05 **Facies analysis of Mesozoic and Tertiary sedimentary sequences – a key to understanding of development of Recent environments** - MICHALÍK J. (1.2002-12.2006)
- [25] GA–2/6026/ **National and regional boundary stratotypes of Mesozoic stages in Western Carpathians – a contribution to the IUGS Programme „Global stratotype sections and points** - MICHALÍK J. (01.2006-12.2008)
- [26] GA–2/6092/26 **Relics of eclogite facies metamorphism in the basement of the Western Carpathians** – JANÁK M. (01.2006 - 12.2008)
- [27] GA–2/6093/26 **Integrated stratigraphy and global sedimentary records in Upper Cretaceous and Paleogene formations of the Western Carpathians: regional stratotypes and interregional stratigraphic correlations** - SOTÁK J. (1.2006-12.2008)
- [28] GA–2/6094/26 **Mineral assemblages of the oxidation zone from Banská Štiavnica – Hodruša ore district** - JELEŇ S. (01.2006 - 12.2008)

- [29] GA–2/6002/26 **Evolution of Mesozoic cockroaches in respect to global changes and origin of social termites, and predatory mantids** - VRŠANSKÝ P. (1.2006-12.2008)
- [30] GA–1/3053/06 **Biodiversity on the territory of the Western Carpathians as a reflection of climatic change in the Late Pleistocene and at beginning of the Holocene** - PIPÍK R. (1.2006-12.2008)

Agency for the Promotion of Research and development (APVT/APVV)

- [31] APVT-20-020002 **Geochemistry of the Early-Palaeozoic volcano-sedimentary complexes of the Central Western Carpathians: protolith, source area and tectonic significance** - (PriF UK); deputy investigator - JANÁK M.(1.8.2002 - 31.12.2004)
- [32] APVT-51-045202 **Rise and fall of genus Cyprideis (Jones) (Ostracoda, Crustacea) in relation with primary production of water environment in Upper Miocene of Central Paratethys** – PIPÍK R. (1.2004 – 12.2006)
- [33] APVT-51-013604 **Lithium in granites of the Western Carpathians: occurrences and perspectives** - PETRÍK I. (1.2005 – 12.2007)
- [34] APVT-51-012504 **The evolution of Volcanism in Space and Time in the Late-Variscan and Early-Alpine Stages of the Western Carpathians** - SPIŠIAK J. (1.1.2005 – 31.12.2007)
- [35] APVT-51-002804 **Development, improvement and applications of progressive methods 2D and 3D gravity field interpretations in geophysics and geology.** (Geophysical Institute of SAS), deputy investigator - VOZÁR J. (1.1.2005 – 31.12.2007)
- [36] APVV-51-011305 **Biochronology of the Mesozoic and Cenozoic formations of the Western Carpathians: plankton evolutionary events and their stratigraphic calibration** - SOTÁK J. (03/2006 – 02/09)
- [37] APVV-51-046105 **Ultrahigh-pressure metamorphism in Pohorje and correlation of the eo-Alpine tectonometamorphic evolution of the Eastern Alps and Western Carpathians** - JANÁK M. (03/2006 – 02/09)
- [38] APVV-51-008305 **Evolution of phyllosilicates during low-temperature alteration of rocks** - BIRONĚ A. (01.2006 – 12.2009)
- [39] APVV-51-015605 **Possibilities of minig landscape remediation in surrounding of Ľubietová based on the study of heavy metal and toxic element distribution in the country** - ANDRÁŠ P. (2006 –2009)
- [40] APVV-LPP-0362-06 **Educational guide round the geological geographical localities in the Central Slovakia** - JELEŇ S. (10.2006 - 9.2009)
- [41] APVT-20-016104 **Origin and tectono-metamorphic evolution of some Western Carpathians Paleozoic crustal complexes, (PriF UK),** - HRDLIČKA M., SPIŠIAK J.(01.1.2005 – 31.12.2007)
- [42] APVV-20-019905 **Possibilities of acid mining drainage waters elimination at mining dumps, (TU Zvolen),** - ANDRÁŠ P. (10.2006 - 9.2009)

National Research Programmes (ŠPVV)

- [43] 51-51-9010-00/2002 **Revaluation of geological structure of magnezite Podrečany – Točnica deposit** - SPIŠIAK J. (8.2002 - 4.2003)
- [44] 51-51-9011-00/2002 **Potential feldspar raw materials in the Slovenské Rudohorie, Strážovské vrchy and Branisko Mts. and their biological and chemical enrichment** - BROSKA I. (8.2002-4.2003)

ii. List of national scientific conferences (co)-organised by the Organisation

- [1] "Petrology and its application present and perspectives" – PriF UK, members of organising committee (Petrík, Spišiak)
- [2] "Petrology and Geodynamics" – 26.5.2005, PriF UK, preparatory committee (Zahradník), scientific board (Petrík)
- [3] "6th Banská Štiavnica days" – excursion guide, organising committee (Križáni)
- [4] Congress of Slovak Geological Society Medvedia hora – Michalovce 20.-30.6.2005
- [5] "Geochemistry 2006" – conference 23.11.2006 Bratislava, member organising committee (Broska)
- [6] organising of ESSE-WEGA 2006 conference 2006 with programme preparing, presentations and financial support

iii. List of national journals published by the Organisation

- [1]

iv. List of edited proceedings of national scientific conferences/events

- [1] ILLÁŠOVÁ L. - SPIŠIAK J. - TIRPÁK J.: Natural glasses and silicic material: *excursion guide*. Nitra: UKF, 2004. 19 s.
- [2] ILLÁŠOVÁ L. (zost.) - SANDANUSOVÁ A. (zost.) - SPIŠIAK J. (Eds.): Natural glasses and silicic material, *Prírodovedec č. 207*, FPV UKF v Nitre, Geological Institute SAS Bratislava, 2006. 62 s. ISBN 80-8050-926-3.

• International/European position of the individual researchers

i. List of invited/keynote presentations at international conferences, documented by an invitation letter or programme

- [1] BROSKA I. - KUBIŠ M. - SIMAN P. - LIPKA J.: Characterization of accessory titanite from granites of the Western Carpathians. Convention of Polish mineralogical society, Szscawnicza, 30.9.2005
- [2] VRŠANSKÝ P. - ANSORGE J.: Lower Toarcian cockroaches from Germany and England. Palaeontomological conference, Petersmarisbourg, South Africa, (Abstrakty – PC, Petersmarisbourg, South africa)
- [3] SOTÁK J. - MICHALÍK J. - SMREČKOVÁ M.: *High-resolution analysis of red-beds from the Western Carpathians: microfauna, isotopes a environments. CORB Workshop – Introductory keynotes, IGCP 463 Workshop, Neuchatel, 1. 9. 2005.*
- [4] SOTÁK J.: *Phylogenetic inovations of planktic foraminiferal species during the Oligocene: a case study from the Carpathian microfauna. 4th ISPF - International school on planktonic foraminifera, Perugia, 14. 2. 2005.*
- [5] SOTÁK J.: *Taxonomy of nonspinose morphogroups of foraminiferal plankton related to the genus Tenuitella and Paragloborotalia. 4th ISPF - International school on planktonic foraminifera, Perugia, 16. 2. 2005.*
- [6] SOTÁK J.: *Eocene/Oligocene boundary - faunal turnover related to cooling event. PROPER 2005 Course, Teaching in Paleo-climate, Bratislava, 12. 10. 2005.*
- [7] SOTÁK J.: *Cenomanian/Turonian boundary and global oceanic anoxia (OAE 2). PROPER 2005 Course, Teaching in Paleo-climate, Bratislava, 12. 10. 2005.*

- [8] MICHALÍK J. - REHÁKOVÁ D. - HALÁSOVÁ E. - LINTNEROVÁ O., 2006: Integrated stratigraphy across the J/K boundary strata at the Brodno section (the Kysuca Unit, Pieniny Klippen Belt, Western Carpathians). 7. česko-slovensko-poľská paleontologická konferencia Brno, Moravské Museum, 20. októbra 2006.
- [9] JANÁK M. et al. 2006: Ultrahigh-pressure metamorphism in the Austroalpine nappes, Pohorje, Slovenia. June 22, 2006, Universität Bonn, Bonn, Germany
- [10] JANÁK M. et al. 2006: Ultrahigh-pressure metamorphism in the Austroalpine nappes, Pohorje, Slovenia. December 21, 2006 Universität Salzburg, Salzburg, Austria.

ii. List of employees who served as members of the organising and/or programme committees for international conferences

- [1] PETRÍK I. – co-organizer, co-chairman of „Igneous rocks“ section – “Geology without frontiers”, Blansko, 19.5.-1.6.2003 ČR
- [2] MICHALÍK J. – Organising committee “Triassic/Jurassic Boundary Events” – UNESCO/IGCP 458 TRIBE, Stará Lesná 11.-15.10.2003
- [3] SOTÁK J. – Organising committee “Triassic/Jurassic Boundary Events” – UNESCO/IGCP 458 TRIBE, Stará Lesná 11.-15.10.2003
- [4] VRŠANSKÝ P. – Organising committee “Triassic/Jurassic Boundary Events” – UNESCO/IGCP 458 TRIBE, Stará Lesná 11.-15.10.2003
- [5] VOZÁR J. – 18th Congress Carpathian-Balkan Geological Association, Beograd, 3.-6.9.2006
- [6] MICHALÍK J. – 7th International Symposium on the Cretaceous, Neuschatel
- [7] BROSKA I. - 1st Central European Mineralogical Conference, Vyšná Boca 12.-15.9.2006 (special garant)
- [8] CHALUPOVÁ B. - International Conference of Graduate Students and Young Scientists, Modra-Harmónia, 4.-6.5.2006
- [9] VOZÁR J. - Special open workshop on the Circum Pannonian Terranes, v rámci programu 18th Congress KBGA, Beograd 6.9.2006
- [10] VOZÁR J. - Tectonostratigraphic terranes and paleoenvironment maps of the Circum-Pannonian region (TERRANES) – project workshop, Smolenice 31.3.-2.4.2006
- [11] MICHALÍK J. - 7th International Congress on the Jurassic System, Kraków 11.-16.9.2006
- [12] TOMÁŠOVÝCH A. - 7th International Congress on the Jurassic System, Kraków 11.-16.9.2006
- [13] ZAHRADNÍK L. - International Conference of Graduate Students and Young Scientists, Modra-Harmónia, 4.-6.5.2006

iii. List of employees who served as members of important international scientific bodies (e.g. boards, committees, editorial boards of scientific journals)

- [1] BIROŇ A. Clay Mineral Society -member
Slovak clay society - member until 2005
European Clay Groups Association - member
Carpathian-Balkan Geological association - member
European union of Geosciences - member
Galicia T Group – member until 2005

- [2] BROSKA I. European mineralogical union – national correspondent
National geological committee -secretary
- [3] HÁBER M. IAGOD – chairman slovak group
Mineralogická spoločnosť pri ČGS – vice-president
- [4] JANÁK M. Deutsche Mineralogische Gesellschaft – member
European union of Geosciences – member
Carpathian-Balkan Geological association – member
- [5] JELEŇ S. IAGOD – International Association of Geology of ore
Deposits – member
- [6] LEXA J. IAGOD – International Association of Geology of ore
Deposits – member
Slovak national geological committee – member
Carpathian-Balkan geological association – member
- [7] LUPTÁK B. European Mineralogical Union – repréz. for SR until 2006
- [8] MICHALÍK J. Slovak geological committee IGCO – president
Europe Paleontological Association (EPA) – member and
nat.corresp..
Stratigrafická terminologická komisia NGK - president
Voting member of stratigraph. subcommittee IUGS for trias
from2006
Member National comittee for pre UNESCO programmes
MZV SR until 2006
- [9] PETRÍK I. American Mineralogical Society - member
- [10] KYŠKA-PIPIK R. coordinator Palaelimnological group at KBGA
- [11] SOTÁK J. European Union of Geosciences - member
Carpathian-Balkan geological association – vicepresident
National stratigraph. group
International Association of Sedimentologists – nat.
corespond.
International Subcommision on Paleogene Stratigraphy –
nat. delegat
International Association of Fossil Algae – member
Slovenský národný geologický komitét - member
- [12] SPIŠIAK J. European Union of Geosciences – member
Carpathian-Balkan geological association – member
Society for Luminescence Microscopy and Spectroscopy –
member
Galicia T Group – member
IMA – International Mineralogical Association - member
- [13] TOMÁŠOVÝCH A. Society for Sedimentary Geology, – member
Paleontological Society – member
Paläontologische Gesellschaft – member
- [14] VOZÁR J. ÖGG – Geological Soc. of Austria – member
CBGA – Carpathian-Balkan geol. ass. - viceprezident
SGS – Serbian Geol. Soc. – honorary member

Editorial boards of scientific journals

- [15] ANDRÁŠ P. Carpathian Journal of Earth and environmental science,
North University, Baia Mare, Rumunsko
- [16] BROSKA I. Mineralia Polonica
- [17] LEXA J. Ore Geology Reviews, Elsevier (CC, IF 2005 = 0,98)
- [18] MICHALÍK J. Bulletin of Geosciences, vyd. Geologická služba ČR,
Praha

- [19] VOZÁR J. Geosciences, vyd. Geologická služba ČR, Praha
Annales Géologiques de la Péninsule Balkanique,
Belgrade

iv. List of international scientific awards and distinctions

- [1] Acknowledgment in occasion of 50th Anniversary of the Geological Institute SAS – Panstwowy Instytut Geologiczny, Warszawa, Poľsko (2003)
[2] Award of National Museum of Natural History, Washington, D.C. - VRŠANSKÝ P. (2005)
[3] Stipend of the Capital Normal University, Beigigng – VRŠANSKÝ P. (2005)
[4] John Sepkowski Award, udelené z Paleontological Society – TOMÁŠOVÝCH A., (2006)
[5] National Geographic Award, Washington, D.C. – VRŠANSKÝ P. (2006)

• National position of the individual researchers

i. List of invited/keynote presentations at national conferences documented by an invitation letter or programme

- [1] PUTIŠ M. - ONDREJKA M. - SIMAN P. - SPIŠIAK J. - UHER P. - LARIONOV A. - PADERIN I., 2006: Prvé údaje o veku magmaticko-metamorfných udalostí fundamentu Západných Karpát z datovania metódou SHRIMP. (First data on ages of magmatic-metamorphic events in the Western Carpathian fundament based on the SHRIMP dating) International conference GEOCHEMIA 2006, 23.11.2006, Bratislava

ii. List of employees who served as members of organising and programme committees of national conferences

- [1] PETRÍK I.- Petrology and its application present and perspectives – PriF UK
[2] SPIŠIAK J.- “Petrology and its application present and perspectives – PriF UK
[3] PETRÍK I.- “Petrology and Geodynamics – 26.5.2005, PriF UK, scientific board
[4] ZAHRADNÍK L. - “Petrology and Geodynamics – 26.5.2005, PriF UK, preparatory committee
[5] KRIŽÁNI I. - 6th Banská Štiavnica days – excursion guide, organising committee
[6] Congress of Slovak Geological Society Medvedia hora – Michalovce 20.-30.6.2005
[7] BROSKA I.- “Geochemistry 2006” – conference 23.11.2006 Bratislava, organising committee
[8] organising of ESSE-WECA conference 2006 with programme preparing, presentations and financial support.

iii. List of employees serving in important national scientific bodies (e.g. boards, committees, editorial boards of scientific journals)

- [1] ANDRÁŠ P. Slovak association of geochemists – vice president
Slovak geological society – member
Slovak association of economic geologists – vice president
[2] BIROŇ A. Slovak geological society – member
Slovak clay society – member

- [3] BROSKA I. Slovak geological society – member
Association of Slovak geochemists – secretary
Association of Slovak geologists – vice president
- [4] CHALUPOVÁ B. Slovak geological society – member
Geological club – member
- [5] JANÁK M. Slovak geological society – member
- [6] JELEŇ S. Slovak geological society – member B. Bystrici
Slovak association of economic geologists – member
Revision committee of Slovak mining society
- [7] KRIŽÁNI I. Slovak geological society – member
Slovak association of economic geologists – member
Slovak association of geochemists
Slovak mining society – committee
- [8] KYŠKA-PIPIK R. Slovak geological society, president of B. Bystrica branch
Slovak limnological society
- [9] LEXA J. Slovak geological society – member
Association of Slovak geologists
Slovak association of economic geologists – member
- [10] LUPTÁKOVÁ J. Slovak geological society – member
Slovak association of economic geologists – member
- [11] MICHALÍK J. Slovak association of economic geologists – president of paleontological group, auditor
- [12] PLAŠIENKA D. Slovak geological society – president
- [13] PETRÍK I. Slovak geological society
- [14] SIMAN P. Association of Slovak geologists – member
Mineralogical club of Bratislava – member
- [15] SOTÁK J. Slovak geological society – committee, member of Banská Bystrica committee,
Slovak committee of KBA
- [16] SPIŠIAK J. Slovak geological society – member
Slovak association of geochemists
Association of Slovak geologists – member
- [17] STAREK D. Slovak geological society – member
Geological club – member
- [18] VASS D. National geological committee
- [19] VOZÁR J. Slovak geological society – member
Slovak committee of CBGA

Membership in advisory committees of Slovak government, parliament, ministries

- [20] HÁBER M. - Advisory committee of State environment protection for anorganic nature, Banská Bystrica
- [21] JANÁK M.- Research and development support agency – member of committee for Earth and environmental sciences
- [22] JELEŇ S. - Advisory committee State environment protection for anorganic nature
- [23] MICHALÍK J. - Slovak geological board – advisory committee of Ministry of environment
- [24] MICHALÍK J. – Accreditation committee – advisory committee of Slovak Government, member of committee for Physics and Earth and Space sciences
- [25] PLAŠIENKA D. – Slovak geological board – advisory committee of Ministry of environment

iv. List of national awards and distinctions

- [1] Award for GI SAS for presentation at “KAMENAR 2003” exhibition, Trenčín
- [2] Presidium of SAS award for 2nd place in competition of young scientists (5.6.2003) – LUPTÁK B.
- [3] Gold medal of BERG faculty, Technical University Košice
- [4] Gold medal of Faculty of Natural Sciences, Comenius University Bratislava of 50th Anniversary of the Geological Institute SAS, Smolenice, 1-2.12. jún 2004
- [5] Presidium of SAS award for 3rd place in competition of young scientists until 35 years “(June 2004) – LUPTÁK B.
- [6] Presidium of SAS award for 1st place in competition of young scientists 2005 – KYŠKA-PIPIK R.
- [7] Presidium of SAS award for best publication in Geology 2001-2004 [Petrik, I., Nabelek, P.I., Janák, M., Plašienka D., 2003: Conditions of formation and crystallization kinetics of highly oxidized pseudotachylytes from the High Tatras (Slovakia)] – PETRÍK I.
- [8] Best geological mapping publication (December 2005): BEZÁK V. - BROSKA I. - IVANIČKA J. - REICHWALDER P. - VOZÁR J. - POLÁK M. - HAVRILA M. - MELLO J. - BIELY A. - PLAŠIENKA D. - KALIČIAK M. - ŽEC B. - ELEČKO M. - JANOČKO J. - PRESZLÉNYI M. - MARKO M. - MAGLAY J. - PRISTAŠ J. 2004: Tektonická mapa Slovenskej republiky (Tectonic map of Slovak republic).
- [9] An award for the GI SAS for the presentation at the Kamenár 2005 exhibition.
This exhibition is oriented to presentation of geology and stone industry. Among home and foreign companies our Institute presented two posters, along with decorative stone products in collaboration with the Limestone Industry Ružina. The SAV exposition was awarded as the most attractive presentation at the Exhibition (RUŽIČKA P.).
- [10] Memorable letter of Slovak Geological Society – MICHALÍK J.
- [11] Award for GI SAS for presentation at “KAMENAR 2006”, Trenčín - exhibition

Supplementary information and/or comments documenting international and national status of the Organisation

In the basic research, which is institute’s main domain, the results achieved within specialised areas covered by our scientific workers belong with no doubts to the top of national science. In international contexts our results are comparable to those of similar scientific institutions in Central European countries. For more detail see the Concept R & D activity and Organisation’s role in the overall research effort.

4. Project structure, research grants and other funding resources

• International projects and funding

- i. List of major projects within the European Research Area – 5th and 6th Framework Programme of the EU, European Science Foundation, NATO, COST, INTAS, CERN, etc. (here and in items below please specify: type of project, title, grant number, duration, funding, responsible person in the Organisation and his/her status in the project, e.g. coordinator, principal investigator, investigator)

- [1] 6th Framework Programme of the EU - FP6-2002-MOBILITY-1- „**GeoFact-Net**“ – **Geologic evidence of Future anomalous climatic trends – Human Resources and mobility (HRM) activity – Marie Curie Actions – Research Training Networks**, project manager Wagner T., (Univ. Bremen, Nemecko), responsible investigator: MICHALÍK J. (2004-2007)
- [2] 6th Framework Programme of the EU - (Marie Curie Actions – Research training Networks) – **Proxies in paleoclimatology: Education and Research** – MICHALÍK J. – SOTÁK J., (Project was submitted in the collaboration with Faculty of Sciences, Comenius University Bratislava and the Faculty of Earth and life sciences Free university Amsterdam. Scientific workers of Geological Institute were invited to the investigation team.)
- [3] 6th Framework Programme of the EU - (Marie Curie Actions – Research training Networks) – **Geological evidence of future anomalous trends.** (podaný v r. 2003) – MICHALÍK J. - SOTÁK J. ,
- [4] 6th Framework Programme of the EU – **THERMA** - VOZÁR J. (Podaný v spolupráci PIG Warszawa, PBG Warszawa, BRGM Paríž/Lyon, Geocomplex a.s. Bratislava, Envigeo a.s. Banská Bystrica, Geologický ústav SAV. Submitted in collaboration with OIG Warszawa, PBG Warszawa, BRGM Paris, Lyon, Geocomplex a.s., Envigeo, a.s., Geological Institute SAS. Registered as FPG-2002-TREN1, No 503199 (Brussels, 30 July 2003). The project is oriented to the geological structure and its use for new energy resources and environmental problems in the Slovak – Polish part of the Carpathians.
- [5] Projekt UNESCO/ IGCP No. 463 – **Upper Cretaceous Oceanic Red Beds: response to Ocean/Climate Global Changes.** – SOTÁK J. – MICHALÍK J., (2002-2006)
- [6] Projekt UNESCO/IGCP No. 458 – **Triassic/Jurassic Boundary Events** – MICHALÍK J: - SOTÁK J. – TOMÁŠOVÝCH A: - BIRO)N A., (2003-2005)
- [7] Projekt UNESCO/IGCP No. 443 - **Magnesite and Talc – geological and environmental correlation** (2001 – 2004) – SOTÁK J.
- [8] Projekt “European Science Foundation” – **EEDEN - Environments and Ecosystem Dynamics of the Eurasian Neogene** – (2000 – 2005) – SOTÁK J. – PIPÍK R.
- [9] Project UNESCO/IGCP 458 - **Triassic/Jurassic Boundary Events (TRIBE) - UNESCO** - project manager - Hesselbo Stephen (UK), McRoberts Chris (USA), Pálffy Jozsef (HU), responsible investigator: MICHALÍK J. (2001-2006)
- [10] Project UNESCO/IGCP 463 - **Upper Cretaceous Oceanic Red Beds: Response to Oceanic/Climatic Global Change** (CORB), project manager - Jansa L.F., Halifax (Canada), Wang Chengshan, Chengdu (Čína), Massimo Sarti, Ancona (Taliansko, Robert W. Scott, Cleveland (USA), responsible investigator: SOTÁK J. – MICHALÍK J., (2002-2006)
- [11] Project **CELEBRATION 2000 a SUDETES 2004.** coordinator – VOZÁR J. (2003-2007)
- [12] **Projekt CARTA** - The project of cross border collaboration among Slovakia, Czech Republic, Poland and Ukraine oriented to a complex geological / geophysical evaluation of the border area funded by the SR Ministry of Environment. The Responsible Coordinator is Geocomplex, a.s., Geological Institute is responsible for geological map and interpretations. Duration 2002-2004. The project ended by the Final report for Ministry of Environment submitted by Geocomplex.
- [13] Project EUROPAL (Italy) – **Current research in Planktonic Foraminifera** – SOTÁK J.

- [14] Projekt: **Global Sedimentary Geology Program** – Working group 4: Cretaceous Resources, Events and Rhythmes – MICHALÍK J. – SOTÁK J. (2003-2005)
- [15] UNESCO - **Projekt AMBA 2006**, project manager VRŠANSKÝ P. (1994 – 2005)
- [16] UNESCO - **Projekt NUUR 2006**, project manager VRŠANSKÝ P. (1999 – 2005)
- [17] DFG Fu 131/26 - **The role of brachiopods in Mesozoic benthic communities, project manager** - Prof. Franz T. Fürsich (Würzburg Universität), TOMÁŠOVÝCH A., (02/2003 – 09/2006) - financial: Deutsche Forschungsgemeinschaft Kennedyallee 40 53175 Bonn, cca 15.000 EUR (cca 600.000 Sk)
- [18] KBGA - **Tertiary to Quaternary volcanism of the Carpathian-Pannonian region**, project manager - Dr. Z. Pecskey, (Debrecen, Hungary), LEXA J. (1996 – 2008)
- [19] **“Climate & Biota of the Early Paleogene“ - CBEP (Projekt je neformálny a stratigrafiu a klimatológiu spodného a stredného triasu a sympózia sa konajú v dvojročnom cykle) , coordinator** - Schmitz B. (Nórsko), Pujalte V. (Španielsko), SOTÁK J. (2004 – 2013)
- [20] UNESCO-AMBRA **Biosphere reserve Baotianman**, Central China, project manager – VRŠANSKÝ P. (from 7/2006)

ii. List of other international projects incl. funding

- [1] **Monazite dating of the oldest Slovak rcks and correlation with Austrian orthogneisses.** (Institut für Mineralogie, Universität Salzburg) – PETRÍK I. (2004/2005), SAIA (Aktion Österreich - Slowakei) 45s6, príspevok celkove 29800 Sk, 1100 EUR
- [2] UNESCO-AMBRA - **Projekt Nerpa**, project manager – VRŠANSKÝ P. (1995 – 2006), financial: FF Bratislava 24.000 Sk, National Geographic Russia, 820 USD
- [3] **MVTS-UNESCO - Evolutionary patterns and global environmental changes as indicated by cockroaches, mantids and termites, project manager** - VRŠANSKÝ P. (9.2006-1.2009), financial: 30 000 .-Sk
- [4] **Ecology of the brachiopod Terebratalia and morphometry of its pedicle muscle scars** project manager – TOMÁŠOVÝCH A. (06/2006 – 06/2007), financial - University of Washington, Friday Harbor Laboratories, University of Washington, 620 University Road, Friday Harbor, WA 98250 USA (2.500 USD – 75.000 Sk), Paleontological Society, Department of Earth and Environment, Franklin and Marshall College, Lancaster, PA 17604-3003 (500 USD – 15.000 Sk)
- [5] **NSF-EAR 0345897 - Quantifying sedimentary capture of biological information**, project manager - Prof. Susan M. Kidwell (University of Chicago, USA), TOMÁŠOVÝCH A. (11/2006 – 11/2007), financial: National Science Foundation, National Science Foundation 4201 Wilson Blvd, Arlington, VA 22230 (cca 39.000 USD - cca 1.170.000 Sk)

iii. List of other important projects and collaborations without direct funding

- [1] Grant KBN 86510 - Poľsko: **Magneto-, bio-, sequence- and carbon isotope stratigraphy of Valanginian and Hauterivian sequence of the Fatric of the Polish part of Western Tatra Mts and Strážov Mts (Slovakia).** – projekt manager Grabowski Jacek Dr.(PIG Warszawa), responsible investigator: MICHALÍK J. (2003-2006)
- [2] **Projekt: GALICIA GROUP - working group in tectonic research.** SOTÁK J. – PLAŠIENKA D. – STAREK D. - BIRÓN A. (2003-2004)

- [3] **Project: University association of Carpathian geologists** – (Polish-Slovak project) - SOTÁK J. - BIRONĀ A. - STAREK D. (2003-2004)
- [4] **Projekt 073: Integrated stratigraphical investigation of Cretaceous beds of the Outer Carpathians and marginal units of the Central Western Carpathians.** (ČR-SR), project manager - Skupien Petr, Dr. (VŠB Ostrava), responsible solutionist – MICHALÍK J. (2004-2005)
- [5] **Projekt 529: Magneto-, bio-, and carbon isotope stratigraphy of Valanginian and Hauterivian sequence in the Fatric of the Western Tatra Mts and Strazov Mts** (PL-SR), project manager - Grabowski J. (PIG Warszawa), responsible solutionist – MICHALÍK J. (2004-2007)
- [6] **Modeling and testing the origin of fossiliferous concentrations** – TOMÁŠOVÝCH A., Prof. F.T. Fürsich, PD Dr. M. Wilmsen, Prof. T. D. Olszewski)
- [7] **The interpretation of genetic and time relations between magmatism and epithermal ore formation in volcanic structures of the Central Slovak Neovolcanic field.** project manager - Prof. I. V. Černyšev, Dr.Sc., (IGEM RAN, Moskva), LEXA J. - JELEŇ S. (2005 – 2007)

- **National projects and funding**

- i. **List of projects supported by the Agency for the Promotion of Research and Development (APVV/APVT), National Research Programmes, and their funding**

- [1] APVT-20-020002 **Geochemistry of the Early-Palaeozoic volcano-sedimentary complexes of the Central Western Carpathians: protolith, source area and tectonic significance** (PriF UK); deputy investigator JANÁK M. (1.8.2002 - 31.12.2004),
- [2] APVT-51-045202 **Rise and fall of genus Cyprideis (Jones) (Ostracoda, Crustacea) in relation with primary production of water environment in Upper Miocene of Central Paratethys** – PIPÍK R. (1.2004 – 12.2006), 506 000,-Sk
- [3] APVT-51-013604 **Lithium in granites of the Western Carpathians: occurrences and perspectives** - PETRÍK I.(1.2005 – 12.2007), 1 009 000,-Sk
- [4] APVT-51-012504 **The evolution of Volcanism in Space and Time in the Late-Variscan and Early-Alpine Stages of the Western Carpathians** - SPIŠIAK J. (1.1.2005 – 31.12.2007), 1 121 000,-Sk
- [5] APVT-51-002804 **Development, improvement and applications of progressive methods 2D and 3D gravity field interpretations in geophysics and geology.** Geophysical Institute deputy investigatr - VOZÁR J. (1.1.2005 – 31.12.2007), 3 244 000,-Sk
- [6] APVV-51-011305 **Biochronology of the Mesozoic and Cenozoic formations of the Western Carpathians: plankton evolutionary events and their stratigraphic calibration** - SOTÁK J. (03/2006 – 02/09), 7 402 000,-Sk
- [7] APVV-51-046105 **Ultrahigh-pressure metamorphism in Pohorje and correlation of the eo-Alpine tectonometamorphic evolution of the Eastern Alps and Western Carpathians** - JANÁK M. (03/2006 – 02/09), 3 439 000,-Sk
- [8] APVV-51-008305 **Evolution of phyllosilicates during low-temperature alteration of rocks** - BIRONĀ A.(01.2006 – 12.2009), 2 218 000,-Sk
- [9] APVV-51-015605 **Possibilities of minig landscape remediation in surrounding of Ľubietová based on the study of heavy metal and toxic element distribution in the country** - ANDRÁŠ P.(2006 –2009), 2 327 000,-Sk

- [10] APVV-LPP-0362-06 **Educational guide round the geological geographical localities in the Central Slovakia** - JELEŇ S. (10.2006 - 9.2009), 1 753 000,-Sk
- [11] APVT-20-016104 **Origin and tectono-metamorphic evolution of some Western Carpathians Paleozoic crustal complexes** (PriF UK), - HRDLIČKA M. - SPIŠIAK J. (01.1.2005 – 31.12.2007)
- [12] APVV-20-019905 **Possibilities of acid mining drainage waters elimination at mining dumps** (TU Zvolen), for the cooperative organization ANDRÁŠ P. (10.2006-9.2009), 62 000,-Sk

National Research Programmes (ŠPVV)

- [13] 51-51-9010-00/2002: **Revaluation of geological structure of magnezite Podrečany – Točnica deposit** - SPIŠIAK J. (8.2002 - 4.2003)
- [14] 51-51-9011-00/2002: **Potential feldspar raw materials in the Slovenské Rudohorie, Strážovské vrchy and Branisko Mts. and their biological and chemical enrichment** - BROSKA I. (8.2002-4.2003)

ii. Number of projects supported by the Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA) for each year, and their funding

VEGA	2003	2004	2005	2006
number	14	17	16	15
funding (millions of SKK)	0,770	0,785	0,720	0,860

• Summary of funding from external resources

External resources	2003	2004	2005	2006	total	average
external resources (millions of SKK)	7,800	3,150	15,590	9,400	35,940	8,985
external resources transferred to cooperating research organisations (millions of SKK)	0,000	0,000	0,000	0,999	0,999	0,250
ratio between external resources and total salary budget	0,908	0,343	1,609	0,909	-	0,942
overall expenditures from external as well as institutional resources(millions of SKK)	23,116	24,446	36,113	30,787	114,462	28,616

Supplementary information and/or comments on research projects and funding resources

Due to priorities of the European 6th FP our participation has been limited to the Marie Curie Actions and mobility programs. However, our institute has been always active in International Geological Correlation Programme (IGCP) projects of IUGS/UNESCO and CBGA projects. Important there was also our participation in the Central European seismic refraction programs CELEBRATION 2000 and SUDETES 2004. Most of the projects carried out by the institute have included informal international cooperation as documented by joint authorship of our publications.

National project funding came mainly from the Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences (VEGA). Since 2004 important funds came also from the Slovak Research and Development Agency (APVV). The APVV funding has improved significantly the research budget as it funds the accepted projects at the reasonable level, including equipment. The first small APVV project has been launched in 2004, other 3 projects in 2005 and 5 new APVV projects have been launched in 2006. Since 2006 the institute funding from the APVV resources is at the level of 5.7 mil. a year.

External financial resources as the next significant item of the institutional budget came from our participation of the State Geological Institute of D. Štúr / Ministry of the Environment SR and contracts with Regional authorities and/or commercial sphere (e.g. UNICHEMA).

The increase of external resources in the institutional budget in the year 2005 was related to the sale of one of the buildings in Banská Bystrica. These resources have been invested into purchase and reconstruction of the new building at Ďumbierska st. in Banská Bystrica that will serve as the Center of Sciences of SAS.

5. Organisation of PhD studies, other pedagogical activities

i. List of accredited programmes of doctoral studies (as stipulated in the previously effective legislation as well as in the recently amended Act on the Universities)

till 2010:	12-20-9	Paleontology	
	12-26-9	Tectonics	
from 2005	4.1.32.	Petrology	
	General Geology	4.1.31	Paleontology
		4.1.33	Tectonics

ii. Summary table on doctoral studies (number of internal/external PhD students; number of students who completed their study by a successful thesis defence; number of PhD students who quitted the programme)

PhD study	31.12.2003			31.12.2004			31.12.2005			31.12.2006		
number of potential PhD supervisors	7			6			6			4		
PhD students	number	defended thesis	students quitted									
internal	11	0	3	9	3	4	7	1	3	6	2	1
external	1	0	0	2	0	1	2	0	0	3	0	0
supervised at external institution by the research employees of the assessed organisation												

Postdoctoral positions supported by

a) external funding (specify the source)

b) internal funding - the Slovak Academy of Sciences Supporting Fund of Stefan Schwarz

VRŠANSKÝ P. – from 1.5.2006

iii. Summary table on pedagogical activities in undergraduate programmes for each year

Teaching	2003	2004	2005	2006
lectures (hours/year)	887	779	769	466
practicum courses (hours/year)	426	414	392	259
supervised diploma works (in total)	17	16	15	18
members in PhD committees (in total)	9	7	8	9
members in DrSc. committees (in total)	2	2	2	3
members in university/faculty councils (in total)	1	2	3	3
members in habilitation/inauguration committees (in total)	5	4	2	3

iv. List of published university textbooks

- [1] AUBRECHT R. - HALOUZKA R. - KOVÁČ M. - KREJČÍ O. - KRONOME B. - NAGYMAROSY A. - PLAŠIENKA D. - PŘICHYSTAL A. - WAGREICH M.: Geological structure of Alpine - Carpathian - Pannonian contiguous area and adjacent Bohemian massif slopes. Bratislava: Univerzita Komenského, 2003. 85 s. ISBN 80-223-1578-8.

v. Number of published academic course books

vi. List of joint research laboratories/facilities with the universities

- [1] Joint research laboratory of the study of mixed-layered silicates. Laboratory was established in 1994 upon the agreement between GI SAS and FNS Comenius University Bratislava (Head of the laboratory, V. Šucha, substituted by P. Uhlík)

vii. Supplementary information and/or comments on doctoral studies and pedagogical activities

During years 2003-2006 the total of 33 internal postgraduate students studied in Geological Institute, with average 8.25 per year. From them 6 students successfully defended their theses and 11 students quitted studies without defending. From 8 external students (2 per year) nobody defended and 1 quitted. Thus the successful students make up ca. 1/5 of the total number.

From those who submitted and defended their theses all work in the field of geology. Three continue in their work in our institute, one an engineering geology company and one in a museum. Those who quitted mostly work outside of geology in more attractive jobs. One postdoc is supported by the Fund of Štefan Schwartz.

On average per year 9 our scientific workers take part in pedagogical process giving lectures mostly at the Faculty of Sciences of Comenius University (Bratislava), Matej Bel University (Banská Bystrica) and Masaryk University (Brno) where they supervise diploma and master theses.

6. Direct output to the society (applications of results, popularisation and outreach activities)

i. List of the most important results of applied research projects

- [1] Regional policy in relation to raw materials of the Banská Bystrica region (SPIŠIAK J.)

ii. List of the most important studies commissioned for the decision-making authorities, the government and NGOs, international and foreign organisations

- [1] member of Advisory committee State environment protection for anorganic nature, Banská Bystrica (JELEŇ S.) 2003
- [2] mapping of important abiotic events outside Velka Fatra Mts, in cooperation with Administration of Velká Fatra National Park, 2002-2003 (BENDÍK A.) 2003

- [3] State environmental protection in redevelopment of endangered localities, expertise survey for Podbranč locality (SOTÁK J.) 2003
- [4] elaboration and suggestioning of the Nature and Land environment protection law, part – protection of anorganic nature (MŽP SR) – SOTÁK J. 2003
- [5] State environmental protection in redevelopment of endangered localities – SOTÁK J. 2004
- [6] elaboration and suggestioning of the Nature and Land environment protection law, part – protection of anorganic nature (MŽP SR) – SOTÁK J., 2004
- [7] State environmental protection in redevelopment of endangered localities, SOTÁK J., 2005
- [8] elaboration and suggestioning of the Nature and Land environment protection law, part – protection of anorganic nature (MŽP SR) – SOTÁK J., 2005
- [9] Regional policy in relation to raw materials of the Banská Bystrica region – elaborated by SPIŠIAK J.

iii. List of the most important popularisation activities

2003

- [1] A talk with TV3 television at the Gold panning competition in Zlatá Baňa (JELEŇ S.)
- [2] The richness hidden in our volcanoes, Sme newspaper, 23.1.2003 (VASS D. - KONEČNÝ)
- [3] Three talks given for Slovak Radio on following topics: Investigation of the sea floor, Slovakia's raw materials, Earthquake events (VOZÁR J.)

2004

- [4] A series of papers in Quark popular science magazine on topics: wine and geology,
- [5] Egyptians and gold, A trace of cosmic body impact in the Vysoké Tatry Mts. (ANDRÁŠ P. – MICHALÍK J.)
- [6] A report on Nerpa, the Bajkal seal in the Czech popular science journal Vesmír (VRŠANSKÝ P.)

2005

- [7] A series of papers in Quark popular science magazine on topics: Cyprideis, witnesses of the old lakes, Enigma of the Egyptian blue, Cold and warm, Is CO₂ guilty? (PIPÍK R. – ANDRÁŠ P.)
- [8] Interviews in relation to Sumatra earthquake and tsunami in TV Markíza (VOZÁR J.)
- [9] Discussion in STV on the participation of Slovakia in the investigation of the seas and oceans (VOZÁR J.)
- [10] Slovak radio: two interviews on The week of science and technology (SPIŠIAK J.)
- [11] Five lectures within The week of science, and 750 Anniversary of Banská Bystrica (ANDRÁŠ P. – JELEŇ S. – PIPÍK R. – SOTÁK J.)
- [12] Three excursions for mineral collectors from Austria
- [13] Exhibition Kamenár 2005 in Trenčín. The presentation of the SAS awarded as the most attractive in the exhibition.

2006

- [14] The life in the history of the planet Earth. The conference organized by Slovak Commission at the UNESCO (MICHALÍK J.)

- [15] The week of science and technology: Four special posters presented in the Matej Bel University in Banská Bystrica (From kilometres to nanometers, Mineralogy close-up, Micro-world of nature, Gold as we do know it).
- [16] Excursions for students from Uppsala (Sweden) (BROSKA I. – JELEŇ S.) and for mineral collectors from Austria (JELEŇ S.)
- [17] Nerpa Bajkala. National Geographic (Russian Edition), 3, p.36-43. (VRŠANSKÝ P.).

iv. List of patents issued abroad, incl. revenues

[1]

v. List of the patents issued in Slovakia, incl. revenues

[1]

vi. List of licences sold abroad, incl. revenues

[1]

vii. List of licences sold in Slovakia, incl. revenues

[1]

viii. List of contracts with industrial partners, incl. revenues

- [1] č.51/2003/UK **Zonation and chemical inhomogeneity of accessory minerals as the important indicator of the genesis of the Western Carpathian granites and rhyolites** (PRIF UK Bratislava) - HRDLIČKA M. (04.-12.2003), 32 000,-Sk
- [2] HZ 101/02 **General geological map of the Slovak Republic in scale 1:200 000** (ŠGÚDŠ) -BROSKA I. - VOZÁR J. (1998-2004), 43 500,- Sk
- [3] HZ 103/02 **Genesis of the orthogneisses in Tatric Unit of the Nízke Tytry Mts. (mainly area of the Jasenská and Bystrá Valley – geochemical and geochronological data** (ŠGÚDŠ) - PETRÍK I. - BROSKA I., (1998-2004), 44 970,- Sk
- [4] 12-01-9/100 **Temperature-pressure changes in the earth of the Western Carpathians** (ŠGÚDŠ), JANÁK M., (2003-2004), 76 000,- Sk
- [5] HZ 43/02 **CARTA –International co-operation in geology** (MŽP SR? Geocomplex a.s. Bratislava), VOZÁR, J., (1998-2004), 100.000,-Sk
- [6] HZ 14 02 **Technological research of nonmetallic raw materials and their economic and environmental exploitation.** (ŠGÚDŠ), BIRŇ A. (2003-2005), 247 165,- Sk
- [7] HZ 09/03 **A use of magnetotelluric measurements in the interpretation of deep structure and verification of geological (seismic/gravity) transects in the eastern part of Western Carpathians.** (ENVIGEO s.r.o., Banská Bystrica), VOZÁR J., (2003-2005), 1 547 770,- Sk
- [8] HZ 27 98 **Characteristic of the accessory minerals from the selected granitic rocks of the Slovak Ore Mountains.** (ŠGÚDŠ), BROSKA I., (2003-2005), 36 675,- Sk

- [9] HZ – 2898 **Evaluation of the geological-raw material potential of the Slovenské rudohorie Mts. – West part and possibility of its exploitation (scientific project, concerning the geological evolution of the Western Carpathians (ŠGÚDŠ), BROSKA I., (2000-2005), 51 343,- Sk**
- [10] HZ 90/03 **Characteristic of the accessory minerals from the selected granitic rocks of the Slovak Ore Mountains. (ŠGÚDŠ), BROSKA I., (2003-2005), 36 675,- Sk**
- [11] HZ 55/05a. **Regional geological maps (ŠGÚDŠ), BROSKA I., (2005-2006), 24 000,- Sk**
- [12] HZ 55/05b. **Description of the samples of the oil drills (Unichema s.r.o., Bratislava), BROSKA I., (2005), 35 000,- Sk**
- [13] HZ 71/06 **Regional policy in relation to raw materials of the Banská Bystrica region (VUC Banská Bystrica), SPIŠIAK J. (2005-2006), 1 250 000,- Sk**
- [14] HZ 83/06 **Maps of paleovolcanic reconstruction of rhyolite volcanites in Slovakia and analysis of magmatic and hydrothermal processes (ŠGÚDŠ), - LEXA J., (2006-2010), 283 300,- Sk**
- [15] HZ 7804 **Geological map of the Malé Karpaty Mts in scale 1:50 000 (ŠGÚDŠ), BROSKA I., (2006-2008), 49 300,-**

ix. List of research projects with industrial partners, incl. revenues

[1]

x. Summary of outreach activities

Outreach activities	2003	2004	2005	2006	total
studies for the decision sphere, government and NGOs, international and foreign organisations	3	1	1	1	6
articles in press media/internet popularising results of science, in particular those achieved by the Organization	4	14	9	11	38
appearances in telecommunication media popularising results of science, in particular those achieved by the Organization	5		8	7	20
public popularisation lectures	16		22	15	53

xi. Supplementary information and/or comments on applications and popularisation activities

Most of our “applied science” contracts carried out by our institute involved application of the scientific work in applied geology projects of other institutions – geological mapping in the field, biostratigraphic analyses, interpretations of geophysical measurements, mineralogy/petrology etc. So, the obtained results could be used in our

scientific work as well. The commissioned studies regarded regional resource and environmental problems (Banská Bystrica region) where our experience in metallogeny and environmental geochemistry of mining dumps and mining waters could be utilized. Right now we are negotiating new contracts with mining companies exploring in Slovakia for gold and communities interested in utilization of the geothermal energy.

Our institute pays attention also to the popularization of geology. Papers and accounts addressing a general public appear every year in relevant Slovak and foreign magazines. Topics arise either from our own findings (unique processes, rocks and/or fossils) or from the society demands – several our scientists reacted to global and/or local events as for example the year 2005 tsunami, seismic activities occurring in Slovakia, and to environmental problems (radon hazards or mining in historical localities). Popularization is traditionally focused on the presentation of research results by lectures, popular papers and exhibitions. Twenty appearances in the AV media popularising earth science results (Slovak Television, TV Markíza, TA3, Slovak radio, VIVA) and 36 popularising articles (Quark, Správy SAV, Historická revue, SME, Pravda, Nový čas, Trend, regional press) are the most remarkable outreach of the institution within the period 2003 – 2006.

Geological Institute takes part traditionally in the “Week of Science” every November. One of the highlights was the talk given by Doc. J. Michalík in 2004 on the “*Martian geological mission*”. Our branch in Banská Bystrica has been especially active in presentations on grounds of the Matej Bel University, in organising excursions for the public, excursions for students and teachers of the secondary schools and visits with mineral collections to children in hospital. The institute’s exposition at the exhibitions *Kamenár 2005* and *2006* (Trenčín) was awarded (along with other participating institutes of SAS) as the most attractive exposition.

Following these activities, the Geological Institute SAS has been successful in launching a new project of the Slovak Research and Development Agency focused to the geology popularization (principal investigator Dr. S. Jeleň). Elaboration and publication of the Educational guide to the geological-geographical sites of the Central Slovakian region is its main goal.

7. Background and management. Staffing policy and implementation of findings from previous assessments

i. Summary table of personnel

Personnel	2003	2004	2005	2006
all personel	58	56	59	54
research employees from Tab. Research staff	25	25	26	25
FTE from Tab. Research staff	18,768	19,299	20,819	23,15
averaged age of research employees with university degree	47,28	48,28	48,34	44,8

ii. Professional qualification structure

Number of	2003	2004	2005	2006
DrSc.	4	5	5	3
PhD / CSc.	16	16	16	17
Prof.	0	1	1	0
Doc./Assoc. Prof.	0	0	1	2

iii. Status and development of research infrastructure incl. experimental, computing and technical base (description of the present infrastructure, premises, and material and technical resources. Infrastructure, instrumentation and major technical equipment necessary for the achievement of the objectives specified in the research Concept)

While infrastructure of the Geological institute covers essential research requirements, we can not be satisfied. Our needs are not covered completely, and a part of the equipment is already outdated. Missing laboratory facilities are contracted in other institutions in Slovakia or abroad. The necessary access to high-tech facilities is secured via our wide international cooperation.

Thanks to the improved financing during last years via VEGA and APVV projects our computing facilities have been upgraded. By now each one of researchers and doctorands works with adequate hardware and software. As the last item we shall install this spring the institute's communication server to enable an efficient communication among researchers from both branches of the institute, efficient exchange of data and information and a joint work on common documents (our project teams often include researchers from both branches as well as researchers from other institutions in Slovakia and abroad).

Naturally, the institutes operates laboratories for preparation of samples for chemical analyses (milling and homogenization), mineral separation by magnetic field, gravity and heavy liquids, grain-size separation, clay mineral separation and thin/polished section preparation. A part of the equipment in theses laboratories is rather old and will be replaced soon – equipment of the clay mineral separation lab in Banská Bystrica along with moving to the new building and a new saw and polishing mashine will be purchased for the lab in Bratislava to enable preparation of top quality polished sections for petrological research.

Our optical laboratories in Banská Bystrica and Bratislava as well as some of the researchers are equipped with stereo microscopes (micropaleontology, mineralogy) and polarization microscopes (petrography) of standart quality (Jenapol, Amplival). A new top-quality stereomicroscope in Banská Bystrica (Olympus) is equipped with digital photo-camera and software for digital image analysis. A digital camera has been purchased also to the one of the polarizing microscopes in Bratislava. As of now we are perhaps missing one really top-quality polarizing microscope equipped with digital camera for petrological work and photo-documentation, that may serve in future also for fluid/melt inclusion studies as we have already two researchers in this field (currently we are contracting time in the ŠGÚDŠ and PriF UK labs).

We do have access on the contract basis to the ŠGÚDŠ Microprobe lab. and VEGA and APVV grants provide enough resources to secure reasonable extent of analyses.

Our mineralogical and petrological work may require soon a greater access to Raman spectroscopy. We are now using international cooperation to gain access to the relevant equipment, however, it will be the next one in our plans for the infrastructure upgrade.

The X-ray diffraction laboratory equipped with the high-quality diffractometer Philips is oriented to the identification and phase analysis of the powder samples. Oriented samples, prepared by the sedimentation of the clay fraction on the glass plates are used for the research of clay minerals. A new instrument for preparation of un-oriented samples has been purchased in 2006.

In Banská Bystrica we operate the Total Carbon Analyser by Strohlein and a microscope to study vitrinite reflectance. This equipment supports our studies of low-grade metamorphism in sedimentary formations based on clay minerals and fluid inclusions.

The unique Central European Ar Laboratory in Bratislava began operations in 2004, after moving the equipment from Geocentrum in Vienna. Routine geochronological $^{39}\text{Ar}/^{40}\text{Ar}$ measurements started after few months of improving the laboratory conditions in 2005. The laboratory is equipped with VG 5400 Noble Gas Mass Spectrometer and special Ar extraction line suitable for precious $^{39}\text{Ar}/^{40}\text{Ar}$ geochronological dating of various kinds of geological samples. The laboratory was widely used in the last year by research groups not only from Slovakia but also from the Czech Republic, Austria, France, Germany, Portugal and Poland. Separation of minerals to be dated is carried out using existing facilities in Bratislava and Banská Bystrica. Especially the separation lab in Bratislava needs upgrading.

We are equipped with essential instruments to carry out paleontological work. Facilities for dissolution and washing of samples are available as well as stereomicroscopes to separate individual microfossils. Optical observation is nowadays gradually replaced by Scanning Electron microscopy. Our scanning electron microscope TESLA housed in Bratislava is still working, however, it is out of date. A new SEM will be purchased this year using combined resources of the APVV project, SAS and our institute. That will be a considerable step forward in quality and productivity of our work in the field of micropaleontology.

iv. Status and development of bibliographic resources, activities of the Organisation's library and/or information centre

The library of the Geological Institute SAS is a public scientific library specialized to geological sciences. The library is part of the SAS library-information network, headed by the Central library of the SAS.

The main task of the library is to provide library-information services for scientific workers and investigators, to develop and maintain information databases, to distribute and exchange scientific publications of the Institute and by dissemination of the scientific knowledge to support and improve the cultural knowledge of the society.

The library gains, elaborates, saves and makes accessible information sources mostly from the inorganic nature sciences. The library fond comprises monographs, maps, special and language dictionaries, PhD theses, scientific and business trip reports, but mainly periodicals, which the library obtains by exchange for the Institute's journal *Geologica carpathica*.

The library provides the following services: bibliographical, informational, searching, customs, copying, lending, inter-library and international lending. During years 2003-2006, the library registered 3193 visitors, 1365 outside lendings, 7313 inside lendings.

Since year 2005 the library registers all monograph types in modul "Registration of monographs" ARL Rapid Library including retrospective. By December 31, 2006

661 monography titles (1365 exemplars) has been registered thereby contributing to the creation of a General catalogue of books of SAS institutes and database of authorities.

Status and completing of the library fond in 2003-2006:

Sources	Status (2002)	Increment (2003)	Loss	Status (2003)
Books	8 057	44	338	7 763
Magazines	10 312	219	30	10 501
Maps	2 075	24	0	2 099
Unpublished documents	809	9	0	818
TOTAL	21 253	296	368	21 181

Sources	Status (2003)	Increment (2004)	Loss	Status (2004)
Books	7 763	29	605	7 187
Magazines	10 501	236	6	10 731
Maps	2 099	24	0	2 123
Unpublished documents	818	10	13	815
TOTAL	21 181	299	624	20 856

Sources	Status (2004)	Increment (2005)	Loss	Status (2005)
Books	7 187	46	147	7 086
Magazines	10 731	174	443	10 462
Maps	2 123	34	12	2 145
Unpublished documents	815	7	4	818
TOTAL	20 856	261	606	20 511

Sources	Status (2005)	Increment (2006)	Loss	Status (2006)
Books	7 086	65	0	7 151
Magazines	10 462	173	9	10 626
Maps	2 145	90	13	2 222
Unpublished documents	818	5	0	823
TOTAL	20 511	333	22	20 822

v. Describe how the results and suggestions of the previous assessment were taken into account

The last assessment report in 2002 recommended:

1. Modernisation of technical and information services
2. Publishing the research results in more prestige journals with higher impact factor
3. To force on PhD students to successful finishing their studies in time
4. To develop such research programmes, which the institute is able to maintain at world-wide standards

The modernisation of network working stations and servers at both working places of the institute improved the computing facilities. At present time personal computers show good quality and are maintained together with the network by an expert. The establishment of Ar laboratory in the Institute in 2005 followed from the recommendation of the last assessment. This facility which is housed in the institute is important also for the international use. The last year its service was used by research groups from the Czech Republic, Austria, France, Germany, Portugal, Hungary, Serbia and Poland.

In recent years our researchers published their results in journals with IF above 1 more commonly than in previous years. In total, 23 papers appeared in journals with IF > 1. Among them 14 papers with IF 1-2, 8 papers are in journals with IF 2 – 3, one paper was published in journal with IF=3.08. Taking into account that the average IF of geological journals is approx. 1.5, we consider these results fairly good.

The PhD students have better opportunities for their researched activity at the Geological Institute SAS. The improved financial supported by better financed projects, convenient information service (PCs, access to the journal databases etc.) give them a chance to finish their studies at time. Six students within period 2003-2006 have finished their study usefully.

Research programmes of the institute are focused on petrology and geology. In these two programmes the Institute is accredited to supervise PhD students. The papers which appeared in high impacted journals are mainly from the petrology branch, but geology is also maintained at high level. In this sense, key research programmes are developed in world-wide standards. The supplementary research activity in the area of environmental geology is developed for its practical significance.

vi. Supplementary information and/or comments on management, research infrastructure, and trends in personnel development

The Geological Institute of the Slovak Academic Sciences is composed of two branches – Bratislava and Banská Bystrica. The headquarters of the institute are in Bratislava. Internal organization of the institute is simple: the two branches are headed and their work organized by the first and second deputy directors respectively. The Institute has no research departments and the research is organised according to running projects. Central European Argon Lab in Bratislava and laboratories in Banska Bystrica are led on the informal basis. Such a model of organisation offers a better flexibility in decisions and seems to be vital. The top management of the institute includes also a science secretary (overlooking project and graduate studies agendas) and the head of the administration department (head + 2 persons). The Institute as the so called “contribution organisation” is a legal entity and has independent accounting.

The inseparable part of the institute is the Editorial office of *Geologica Carpathica*, which is Institute’s international scientific journal.

Management of the institute is avoiding as much as possible autocratic ways of supervision. Essential executive decisions are taken by the management board. Several specialized commissions have been established to assist the director with his organisational work. The overall control of work in the institute and preparation of research plans and activities is in the competency of the scientific board, which is an elected body.

A concept of the research, accepted by the Scientific board, is oriented at two principal scientific programs – “A complex analysis of structure and evolution of the Alpine-Carpathian orogen” and “Dynamics of sedimentary basins and fossil ecosystems” and to a supplementary applied science field – “environmental mineralogy and geochemistry of past mining activities”. These scientific programs are guaranteed by internationally recognized senior scientists of the institute. Our aim is to reach in the

research a higher degree of coordination among individual researchers and in that way to create a possibility for fundamental advances in understanding relevant geological entities.

We are aware of the fact that our research infrastructure should be in a better shape. A great effort is devoted to this agenda. Our plans are quite clear (see the part about research infrastructure), however, available resources are the limiting factor. Our success in launching VEGA and APVV projects has already contributed to this goal. New projects will be needed to further improve the infrastructure status. The missing infrastructure is more or less successfully replaced by our cooperation with other laboratories in Slovakia and scientists abroad having an access to high-tech instruments.

There are several aspects of the personal development worth of commentary: (1) we are engaged actively in the graduate students training and in that way in the preparation of young researchers that will strengthen our research in the principal scientific programs; (2) thanks to the age structure in the institute there is not a danger of the generation gap; (3) the management stimulates personal “growth” and research productivity by all means; (4) new researchers are selected strictly on the basis of their abilities and compatibility with our program; (5) we are ready not to renew contracts with researchers that are not productive enough. For that reason a system was developed for evaluating scientific workers based on their scientific activities compatible with Institute’s evaluation criteria. Our aim is to build up two strong teams of researchers that will bring their fields of research to the international recognition.

Other information relevant to the assessment

The Geological Institute of the Slovak Academy of Sciences is expecting a major reconstruction of the working place in Banská Bystrica. It should be accomplished as soon as possible. The building purchased by the institute from the town of Banská Bystrica is an old elementary school, which needs a reconstruction. The plan of adaptation is ready, a construction company has been chosen and the contract of reconstruction signed. Unfortunately, the institute is now in possession of resources only for the initial stage of reconstruction as the planned sale of the old building has been stopped because of a temporary government restriction regarding the sale of the state property. Following the sale the reconstruction will be a relatively rapid process because the institute has already chosen the builder. With moving to the new building the working conditions will be improved significantly, especially in laboratory facilities.

The reconstruction problems expect the Institute also in the building at the Valašská ulica, Bratislava where relatively large adaptation is necessary to upgrade the separation laboratory for needs of the CEAL laboratory. Geological Institute shares the building at the Valašská ulica with the Institute of Botany, which also needs a reconstruction for their national herbaria. Therefore we believe that financial budget for the reconstruction for the both institutions will come as a support from the Presidium of the SAS.