

IZKAZNICA:**IME IN PRIIMEK: Simon PIRC****ROJEN:** 02. 03. 1932 v Lipnici pri Radovljici, Slovenija**DIPLOMIRAL:** 1961 na Univerzi v Ljubljani**DOKTORIRAL:** 1979 na Pensilvanijski državni univerzi v ZDA**NAZIV:** 1991, redni univerzitetni profesor, geologija**PODROČJE DEJAVNOSTI:** geokemija, statistika, ekonomska geologija**POMEMBNI DOSEŽKI:** *Mentor 39 diplom, 13 magisterijev in 9 doktoratov.**Dve univerzitetni študentski Prešernovi nagradi.**Avtor ali soavtor 71 znanstvenih ali strokovnih člankov.*

Po osnovni šoli v Kropi in na Srednji Dobravi in realni gimnaziji v Ljubljani je leto dni študiral gradbeništvo na Univerzi v Ljubljani, nato pa smer praktična geologija na isti univerzi. Leta 1961 je diplomiral kot profesor geologije; naziv je bil pozneje spremenjen v univerzitetni diplomirani inženir geologije. Leta 1975 je opravil magisterij iz geologije na Univerzi v Ljubljani in 1979 doktorat iz mineralogije in geokemije na Pensilvanijski državni univerzi v ZDA.

Njegovo strokovno izobraževanje se je začelo s študentsko prakso na geološkem kartiranju Bizeljskega, inženirsko-geološki prospekcijski v Črni Gori, rudarjenju premoga v Porurju v Nemčiji in sledenju svinčevo-cinkovih rud v okolici Mežice. Diplomsko delo je obsegalo regionalno geološko kartiranje ozemlja med Dobrovo in Šmarno goro. Kot ekonomski geolog na Geološkem zavodu Ljubljana je bil udeležen pri raziskavah urana v Sloveniji in Makedoniji, svinčevo-cinkovih nahajališč v Sloveniji in svinčevo-cinkovih, železovih in bakrovih rud v Alžiriji. Konec šestdesetih let je bil vodja rudnih raziskav Geološkega zavoda Ljubljana v Alžiriji. Del tamkajšnjih raziskovalnih dejavnosti so bile geokemične raziskave, pri katerih je uvedel vzorčenje pobočnega materiala za geokemično prospekcijsko svinčevo-cinkovih nahajališč. Nadaljno strokovno pot mu je prizadela leta 1969 prometna nesreča s trajnimi posledicami pri hoji.

Po zaposlitvi na odseku za geologijo na Univerzi v Ljubljani leta 1970 se je sprva ukvarjal z raziskavami na področjih nahajališč mineralnih surovin, mineralogije in geokemičnih prospekcijskih metod, zlasti ob uporabi statistike. V svojem magistrskem delu je statistično obdelal prospekcijsko bakra na območju Cerčna. Od leta 1976 do 1979 je bil na Pensilvanijski državni univerzi v ZDA vključen v raziskave uranovih nahajališč v Pensilvaniji. Predmet njegove doktorske disertacije je bila študija porazdelitve urana in drugih kemičnih prvin v devonski Catskillski formaciji v osrednji Pensilvaniji. Njegovo nadaljnje raziskovalno delo na Univerzi v Ljubljani je od leta 1979 dalje teklo na področjih geokemije, statistike in ekonomske geologije. Geokemične raziskave so obsegale študije kemične sestave kamnin, tal, vodnega sedimenta, vode, rastlinja in ozračja, razvoj postopkov geokemične prospekcijske in kartiranja, zlasti v območjih kraških karbonatnih kamnin, kjer so temeljile na vzorčenju

IDENTITY CARD:**FIRST AND LAST NAME:** **Simon PIRC****BORN:** 2nd March 1932 at Lipnica near Radovljica, Slovenia**GRADUATED:** 1961, University in Ljubljana**PH.D.:** 1979, Pennsylvania State University, USA**TITLE:** 1991, Ordinary University Professor of Geology**SPECIALIZATION:** Geochemistry, Statistics, Economic Geology**IMPORTANT ACHIEVEMENTS:** *Advisor to 39 B.S. diplomas, 13 M.S. and 9 Ph.D. theses.
Two University Prešern awards to students.**Author or co-author of 71 scientific or professional papers.*

After the elementary school at Kropa and Srednja Dobrava and secondary school at Ljubljana, he studied for a year construction engineering at the University in Ljubljana, and afterwards the practical geology at the same university. In 1961 he obtained his diploma in geology; the degree was later changed to that of the university diploma engineer of geology. In 1975 he obtained the master's degree in geology at the University in Ljubljana, and in 1979 the doctorate in mineralogy and geochemistry at the Pennsylvania State University in the USA.

His professional experience started with student practice in geological mapping in eastern Slovenia, engineering-geological prospecting in Montenegro, coal mining in the Ruhr area of Germany and exploration for lead-zinc ores at Mežica in Slovenia. His diploma work was in regional mapping of an area just north-west of Ljubljana. As an economic geologist at the Geologic Survey of Ljubljana he took part in prospecting for uranium in Slovenia and Macedonia, lead-zinc in Slovenia and lead-zinc, iron and copper deposits in Algeria. End of sixties he was named head of Geologic Survey Ljubljana mineral exploration groups in Algeria. A part of the exploration activities consisted of geochemical methods to which he introduced the use of slope material sampling for lead-zinc prospecting. His further career was affected by a traffic accident in 1969 that resulted in a walking disablement.

After joining in 1970 the Geology Department of the University in Ljubljana, he first did research in mineralogy, ore deposits and geochemical prospecting methods, especially with application of statistical methods. His master's work comprised statistical interpretation of copper prospecting in the area of Cerklje in Slovenia. From 1976 to 1979, at the Pennsylvania State University, he took part in studies of uranium mineralizations in Pennsylvania. The subject of his PhD thesis was the distribution of uranium and other elements in the Devonian Catskill Formation in Pennsylvania. His further research work at the Ljubljana University from 1979 on concerned geochemistry, statistics and economic geology. Research in geochemistry can be divided between studies of elemental distributions in rocks, soils, stream sediment, water, plants, coals and atmosphere, development of procedures for geochemical prospecting and mapping, especially in karstic carbonate areas where it was based on spring sediment, water moss and soil sampling; experimental geochemical

studenčnega sedimenta, vodnega mahu in tal, eksperimentno geokemično kartiranje Slovenije z redkim vzorčenjem tal, potočnega mulja, potočne in studenčne vode in rastlin, in študije, povezane tudi z geomedicino, antropogenega onesnaževanja kot posledice rudarjenja, metalurške industrije, energetike in kmetijstva ter vojaških dejavnosti. V Sloveniji je uvedel v geokemično prakso vzorčenje vodnih mahov in raziskave posledic vojevanja, in predlagal uporabo poplavnega sedimenta in hišnega prahu za geokemične raziskave. Na področju statistike je uvajal uporabo različnih metod kakor analizo variance, korelacijsko in regresijsko analizo in multivariatne metode za reševanje različne geološke in geokemične problematike. Vzorčne sheme, temelječe na analizi variance, razvite za različne geokemične raziskave in kartiranja v merilih od širokega regionalnega do lokalnega, omogočajo oceniti naravno variabilnost in hkrati vzorčno in laboratorijsko napako, pa tudi oceniti stabilnost izdelanih geokemičnih kart. Bivariatne metode so bile uporabljene za primerjave različnih pristopov in parametrov in multivariatne metode za interpretacijo rezultatov prospekcijskih in kartiranj, vrednotenje termalnih vod in ugotavljanje izvora ter napovedovanje vedenja jamskih vod. V geološko prakso je uvajal metode nadzora kakovosti vzorčenja in analitike. Raziskave na področju ekonomske geologije so obsegale statistične primerjave različnih metod določanja vsebnosti in geostatistične pristope ocenjevanja nahajališč mineralnih surovin. Omeniti velja tudi, da je prevedel precej geoloških tekstov v angleščino.

Svoje pedagoško delo je začel kot demonstrator za časa drugostopenjskega študija. Leta 1970 je bil izvoljen za asistenta na Univerzi v Ljubljani, izvajal je vaje rudne mikroskopije in ekonomske geologije. Od 1976 do 1979 je bil raziskovalni asistent na Pensilvanijski državni univerzi. Na Univerzi v Ljubljani je bil leta 1980 izvoljen za docenta, leta 1985 za izrednega profesorja in 1991 za rednega profesorja. Študentom geologije je predaval predmete geokemija, pozneje geokemija in okolje, statistika, ekonomska geologija, tuja strokovna literatura in nadzor kakovosti raziskovalnih metod, študentom rudarstva in geotehnologije tehnično geologijo in študentom krajinarstva uvod v geologijo. V predmetnik študija geologije je uvedel predmet geokemija, v katerem je namenil več poudarka kozmokeemiji, planetologiji in okoljskim temam. Pouk statistike je usmerjal glede na uporabnost v geologiji v sodobne uni-, bi- in multivariatne metode, parametrične in neparametrične, in v osnove Matheronove geostatistike. Razširil je okvire predmeta ekonomska geologija s povečanjem ekonomske tematike in uvedbo rednih študentskih ekskurzij v tujino; v zadnjih desetih letih je s študenti obiskal Albanijo, Avstrijo, Bosno in Hercegovino, Austrijo, Croatijo, Češko republiko, Hrvaško, Italijo, Madžarsko, Makedonijo, Nemčijo in Poljsko. V predmetu uporaba tuje strokovne literature so se študenti naučili uporabljati svoje prejšnje znanje jezikov za branje, prevajanje in povzemanje geoloških besedil in dokumentacije, izpolnjevanje obrazcev in vprašalnikov ter pisanje poročil in korespondence. Kratki tečaj nadzora kakovosti v okviru predmeta raziskovalne metode v mineralogiji je nudil študentom statistično osnovo za korektno vzorčenje, merjenje in analitiko.

Sredi devetdesetih let je začel proces prilagajanja predmetnikov na geološkem, rudarskem in metalurškem odseku evropskim normam. Sodeloval je v izdelavi interdisciplinarnega univerzitetnega podiplomskega študija okolja na Univerzi v Ljubljani.

mapping of Slovenia based on wide spaced sampling of soil, stream sediment, stream water, spring water and vegetation, and studies, also associated to geomedicine, of anthropogenic pollution caused by mining, metallurgy, industry, energy generation and agriculture as well as military activities. To Slovenia he introduced the sampling of water mosses and investigation of military pollution, and proposed the use of overbank sediment and house dust as sampling materials. In statistics, various methods, as the analysis of variance, correlation and regression analysis and multivariate methods were applied for solving a variety of geologic and geochemical problems. The sampling designs based on analysis of variance, developed for various geochemical investigations and mapping, from broad regional to local scales, permitted the assessment of the natural variability and of sampling and laboratory error as well as of the stability of maps produced. Bivariate methods were applied for comparison of different approaches and parameters, and multivariate methods for interpretation of prospecting and mapping results, classification of geothermal waters, and interpretation of sources and predicting of behavior of groundwaters in mines. Methods of quality control of sampling and analytical work were introduced into geological practice. Research performed in economic geology comprises statistical comparison of various methods of ore grade determination and geostatistical assessment of deposits.

It should be mentioned also that he has translated a number of geologic texts from Slovenian into English.

His teaching experience started during the undergraduate studies as a student demonstrator. In 1970 he was appointed teaching assistant at the University in Ljubljana responsible for Ore microscopy and Economic geology. From 1976 to 1979 he was research assistant at the Pennsylvania State University. In 1980 he was elected assistant professor at the University in Ljubljana, in 1985 associated professor and in 1991 ordinary professor. His responsibili-



Med leti 1983 in 2002 je vodil nekaj mednarodnih geokemičnih raziskovalnih programov: od 1984 do 1993 je bil jugoslovanski in pozneje slovenski vodja treh raziskovalnih projektov z geokemiki iz Združenih držav, v letih 1991-1995 dveh slovensko-avstrijsko-hrvaških projektov v okviru skupnosti Alpe-Jadran in 1996-1998 slovensko-makedonskega raziskovalnega projekta. Bil je jugoslovanski in pozneje slovenski nacionalni koordinator dveh projektov UNESCO IGCP, in sicer št. 259 and 360, obeh s tematiko strokovne priprave na bodočo geokemično karto sveta. V nadaljevanju tega še sodeluje v izdelavi geokemičnega atlasa Evrope. V Sloveniji je od 1983 do 2002 vodil nacionalne programe geokemičnih raziskav *supergene cone* in premogov.

Na Univerzi v Ljubljani je bil dvakrat predstojnik geološkega odseka in dvakrat predstojnik katedre za mineralogijo in ekonomsko geologijo. Od 1998 je predsednik slovenskega nacionalnega odbora za geološke programe UNESCO. Je član Slovenskega geološkega društva in mednarodnih Združenja prospekcijskih geokemikov in Društva za okoljsko geokemijo in zdravje. Član uredniškega odbora revij *Geologija*, *RMZ-Materiali* in *geookolje* ter *Geologia Croatica*.

Od upokojitve konec leta 2002 vzdržuje živ stik z geologijo z mentorstvi, nekaj predavanji, raziskavami in dejavnostjo v strokovnih organizacijah.

POMEMBNEJŠE REFERENCE – SOME REFERENCES

- PIRC, S. (1973): Geologija sinčevno-cinkovega rudišča Kherzet Youssef (Geology of the lead and zinc deposit Kherzet Youssef). *Rud.-metal. zb.*, 315-335.
- PIRC, S. (1977): Uran v kamninah, vodah in muljih na območju Posavskih gub v Sloveniji (in Slovenian: Uranium in rocks, waters and stream sediments in the Sava Folds area in Slovenia). *Rud.-metal. zb.*, 335-375.
- PIRC, S., ROSE, A. W. (1981): Uranium anomalies in paleo-aquifers near sandstone type uranium deposits in the Devonian Catskill Formation of Pennsylvania. *Journal Geochem. Explor.* 14, 219-231.
- PIRC, S., MAKSIMOVIČ, Z. (1986): Methodology for geochemical mapping in Yugoslavia. In: THORNTON, Iain (Ed.). *Proceed. 1st Internat. Symp. Geochem. and Health*. London: Science Reviews Ltd., 31-44.
- PIRC, S., LENARČIČ, T., MCNEAL, J. M., PROHIĆ, E., SVRKOTA, R. (1991): Geochemical mapping of carbonate terrains. *Trans. inst. Min. Metall. (Sect. B: Appl. earth. sci.)*, B74-B87.
- PIRC, S., BUDKOVIČ, T. (1996): Remains of World War I geochemical pollution in the landscape. In: RICHARDSON, Mervyn (Ed.). *Environmental xenobiotics*. London: Taylor & Francis, chapter 20, 375-418.
- JURANJ, N., PIRC, S., ŠAJN, R., BRENCIČ, M. (1999): Mapping Slovenia with water sampled at springs. *Rud.-met. zb.* 46, 515-529.

ties comprised the courses of Geochemistry, later Geochemistry and environment, of Statistics, Economic geology, Foreign geologic literature and Quality control in research Work for geology students, and Technical geology for students of mining and geotechnology. He introduced the subject of geochemistry to geological curriculum of the Ljubljana University, adding to it more accent on cosmochemistry and planetology as well as on the environmental topics. The teaching of statistics he oriented to geological needs by covering modern uni-, bi- and multivariate methods, parametric and non-parametric, and basics of Matheron's geostatistics. He widened the scope of Economic Geology to economic topics, and introduced regular students' field trips to foreign countries; in the last ten years Albania, Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Germany, Hungary, Italy, Macedonia and Poland were visited in this frame. In the Foreign Literature course the students were taught to use in geology their foreign languages' knowledges: for reading, translating and summarizing geological texts and documents, filling out forms and answering examination questions, and writing reports and correspondence. The Quality Control lectures in the frame of the Research Methods in Mineralogy course provided the statistical base for sampling and measurement resp. analytics. He started the process of harmonization of the Geology, Mining and Metallurgy courses with the European curricula, and took part in establishing the Interdisciplinary graduate program of Environmental studies at the Ljubljana University.

From 1983 to 2002 he was in charge of several international geochemical research programs: in 1984-1993 co-leader of three Yugoslav-American (and later Slovenian-American) research projects, in 1991-1995 of two Slovenian-Austrian-Croatian projects and in 1996-1998 of a Slovenian-Macedonian research project. He was the Yugoslav and later Slovenian national coordinator for two UNESCO IGCP projects, 259 and 360, concerned with international geochemical mapping; in continuation of the latter, he keeps cooperating in elaboration of the Geochemical atlas of Europe. From 1983 to 2002 he headed the Slovenian national geochemical programs concerned with the supergene zone and coal.

He has been twice head of the Geology Department and twice head of the Chair of Mineralogy and Economic Geology at the Ljubljana University. From 1998 on he is the chairman of the Slovenian UNESCO-IGCP Committee.

He has been a member of the Slovenian Geologic Society, Association of Exploration Geologists and of the Society for Environmental Geochemistry and Health. He is a member of editorial boards of the journals *Geologija*, *RMZ-Materials* and *Geoenvironment and Geologia Croatica*.

Since his retirement end of 2002 he still keeps close contact with geology by advising, some teaching, research, writing and activities in professional organizations.