

## Jan Kutina 1924-2008



Dr. Jan Kutina passed away on August 14<sup>th</sup> 2008 at Holy Cross Hospital in Maryland, USA. He had a long and distinguished career and is mostly known for his international work in ore deposit and metallogenic research through the International Association of the Genesis of Ore Deposits (IAGOD). He published hundreds of publications on numerous subjects and has had a major impact on the way the geologic community views the global distribution of ore deposits.

Jan was born in 1924 in Prague. He completed his studies at the Charles University in Prague in 1949 with the degree in Science (RNDr, Rerum Naturalium Doctor) and Pharmacy (PhMr, Magister of Pharmacy). He received the title CSc (equivalent of PhD) from the Charles University in 1957. In 2001, he was awarded the title DrSc (Doctor of Science) from the Academy of Science of the Czech Republic. In 1962 he served as Vice-Dean of the Faculty of Science of the Charles University.

Kutina's dissertation work for the RNDr degree dealt with the ore geochemistry of ore veins in the Kutná Hora district in Central Bohemia. In addition to this, his early research work dealt with crystallography (teramethylol-cyclopentanone, miargyrite). His main studies in Czechoslovakia were focused on the veins in the Příbram Pb-Zn district in Central Bohemia, where he described and interpreted a complex evolution of infilling in ore veins. He contributed to the interpretation of coccade textures of ore veins in general. He also studied colloform textures of zinc sulfides. Significant is his contribution to the classification of zoning in hydrothermal ore deposits in which he defined monoascendent and polyascendent zoning.

In 1963 he was Chairman of the international symposium "Problems of Post-magmatic Ore Deposition", held in Prague and attended by about 300 scientists. This meeting focused on the zoning within ore deposits and within ore fields. The conference also resulted in several articles in *Economic Geology*, in *World Mining* and two symposium volumes that were published by the Czechoslovak Academy of Sciences.

The idea for a new international association was first put forward at the 1963 meeting in Prague, and between 1964 and 1965, he helped organize the International Association on the Genesis of Ore Deposits (IAGOD), working closely with Prof. C.F. Park, Earl Inverison, H.L. Barnes, V.I. Smirnov and D.S. Korzhinskii and other scientists. He served as Secretary General of the IAGOD from 1964 to 1969 and later was chairman of the IAGOD Commission on Tectonics of Ore Deposits (CTOD) and the Working Group of Global Tectonic and Metallogeny.

Until 1968 Jan Kutina held an Associate Professorship at Charles University, Prague, Czechoslovakia. He first came to the United States in 1968 at the invitation of Lehigh University

in Bethlehem, Pennsylvania. In September, 1976 he received permanent residence in the USA and in May, 1980, became a naturalized US citizen. After publishing the paper “Hydrothermal Ore Deposits in the Western United States: A New Concept of Structural Control of Distribution” in the journal *Science* (vol.165, p.1113-1119), Jan was invited by the Geological Survey of Canada, Ottawa, to study structural control of ore deposits in the Abitibi area of the Canadian Shield.

Since, 1968 Jan Kutina conducted systematic studies of the relations among metallogeny and deep tectonics. His experience was based on investigations conducted during mineral exploration programs by the United Nations, Bethlehem Steel Corp., Geological Survey of Canada, W.A. Bowes, Inc., and the United States Geological Survey. During the period between 1977 and 1980 he was Principal Investigator of a metallogenic project sponsored by the National Science Foundation that resulted in a number of publications.

Jan Kutina compiled mineral prognosis maps for parts of twenty countries. Two of these maps helped in new mineral discoveries, the first a nickel deposit in Burundi, and the second a Cu-Mo porphyry discovery in Nevada. Additional several other mineral discoveries resulted from his work.

He held academic positions at universities in Czechoslovakia, United States, and Japan as well as research and associate/visiting Professor positions through individual invitations from several countries.

Since 1980 Jan Kutina was a Research Professor at the American University where he taught Earth Sciences and developed a Laboratory of Global Tectonics and Metallogeny within the Chemistry Department. In conjunction with the Laboratory of Global Tectonics and Metallogeny, he was the Chief Editor of the international journal “Global Tectonics and Metallogeny”, published by the E. Schweizerbartsche Verlagsbuchhandlung in Stuttgart, Germany. He also held a faculty appointment with the U.S. Geological Survey, Reston Virginia.

In the years 1985 to 1988 he was Principal Investigator, together with Dr. Mohammed Bensaid, Director Geological Survey of Morocco, of the project “Block Structures of the Lithosphere and its Role in the Genesis and Distribution of Metallic ore Deposits”, which was funded by the Agency of International Development.

He co-chaired with A.V. Heyl an international project “Parameters Controlling the distribution of Large Ore Deposits, Ore Clusters, Mineral Belts and Metallogenic Provinces”, which held workshops in New Mexico, Sweden and Washington D.C at the 1989 International Geological Congress in Washington, D.C.

Jan Kutina was also much involved in another project (IGCP project No. 354 “Economic Superaccumulations of Metals in the Lithosphere”), with workshops in the United States, China, Venezuela, Australia and Great Britain. The project, administered by the Chinese Academy of Geological Sciences in 1995-2001, revealed that (1) deep lithospheric structures have played a major role in the genesis and distribution of giant and supergiant concentrations of metals in the crust, and (2) that large ore clusters formed over long periods of time by successive stages of mineralization.

Jan was made an Honorary Life member of IAGOD in 1994. He remained active in international congresses within the IAGOD/CTOD Working Group of global Tectonics and Metallogeny until his death. He prepared, jointly with Dr. Patrick T. Taylor of the NASA Goddard Space Flight Center (Geodynamics Branch), the international workshop: “Deep Structure of the Earth and

Concentration of Metals in the Lithosphere: A Geodynamic Approach” with a discussion on “New Ways of Mineral Exploration” held in September 18-20, 2001 at the Goddard Center.

Jan Kutina was a member of nine of the most outstanding national (British, French, German, Brazilian, and the United States) and international scientific geologic societies and was given the honor of being elected to Honorary Membership of several societies. He spoke fluent English, Czech, German and Russian. Jan Kutina worked closely with his many friends around the world, notably Academician Pei Rongfu, Beijing, and recently with Angela Craciun of the World Mineralogy Organization.

Jan Kutina has been the recipient of countless awards and accolades from every part of the world. We were privileged to have witnessed and to have been associated with parts of the important and productive career of a great scientist. Jan is survived by his wife and son in Prague and his daughter, who lives in Toronto.

*Stephen Peters, Miroslav Stemprek, Nigel Cook*

### **Selected bibliography**

- Kutina, J., 1950. Chemistry of ore veins from the gallery of St. Antony of Padua from Poličany near Kutná Hora on the basis of spectral analyses. *Rozpravy II. třídy Czech Academy* 59, no. 24, 1-25. (in Czech), 1-20 (in Czech)
- Kutina, J., 1951. Morphology of miargyrite from Kutná Hora. *Rozpravy II. třídy České akademie* 61, no. 38, 1-16. (in Czech)
- Kutina, J., 1952. On the origin, generations and growth of gypsum crystals from the surroundings of Prague - Malešice. *Zap. Vsesoyuz. Mineralog. Obsch.* 81, No.4, 264-278. (in Russian).
- Kutina, J., 1953. Geochemische Bemerkungen zu den Zinkblenden aus dem Erzgebiet von Kutná Hora (Kuttenberg) in der Tschechoslowakei. *Chemie der Erde* 16, 316-326.
- Kutina, J., 1953. Mikroskopischer und spektrographischer Beitrag zur Frage der Entstehung einiger Kolloidalstrukturen von Zinkblende und Wurtzit. *Geologie* 1 (6), 436-452.
- Kutina, J., 1953. Selektive Verdrängung der inneren Teile der Arsenkieskristalle usw. aus Horní Malá Úpa (Ober – Kleinaupa), Riesengebirge. *Neues Jahrbuch für Mineralogie Abhandlungen* 86, 86-102.
- Kutina, J., 1954. On the combination of ore microscopy and spectrography in geochemical investigation of ore veins. 19<sup>th</sup> International Geological Congress, section XII, CR, 55-71.
- Kutina, J., 1955. Beitrag zur Methodik der genetischen Untersuchung von Anschliffen in der Erzmikroskopie. *Chemie der Erde* 17, 176-180.
- Kutina, J., 1955. Genetische Diskussion der Makrotexturen bei der geochemischen Untersuchung des Adalbert-Hauptganges in Příbram. *Chemie der Erde* 17, 241-323.
- Kutina, J., 1956. A contribution to the study of the zoning in ore veins and the character of the ore-forming solutions. XX International Geological Congress, Resúmenes de los trabajos presentados, p. 95-96.
- Kutina, J., 1956. „Fossile Grenze“, wichtige Erscheinung beim Erzmikroskopischen Studium des relativen Alters von Mineralien in Anschliffen. *Chemie der Erde* 18, 1-13.
- Kutina, J., 1957. Studium der Steigungsrichtung erzführender Lösungen und der Zonalität am Adalbert-Hauptgang in Příbram. *Chemie der Erde* 19, 1-37.
- Kutina, J., 1957. A contribution to the classification of zoning in ore veins. *Acta Univ. Carolina, Geologica* 3 (2), 197-225.
- Kutina, J., Sedláčková, J., 1961. The role of replacement in the origin of some coccade textures. *Economic Geology* 56, 149-176.
- Kutina, J., Tělupil, A., 1966. Prospection for ore veins along the Clay Faults (Příbram Ore Field) with application of the principle of equidistances. *Věst. Ústřed. Ústavu Geol.* 41 (6), 431-433. (in Czech).
- Kutina, J., Pokorný, M., Veselá 1967. Empirical prospecting net based on the regularity distribution of ore veins with application to the Jihlava mining district, Czechoslovakia. *Economic Geology* 62, 390-405.

- Kutina, J., Tělužil, A., Adam, J., Pačesová, M., 1967. On the vertical extent of ore deposition and possible source of some elements of the Příbram ore veins. *Applied Earth Science, Transactions, Institution of Mining and Metallurgy* 76, 11-12.
- Kutina, J., 1969. Ge-Tl-As type of a colloform sphalerite from Katha District, Burma. *The India Mineralogist* 10, 146-151.
- Kutina, J., 1969. Hydrothermal ore deposits in the western United States: A new concept of structural control of distribution. *Science* 165, 1113-1119.
- Kutina, J., 1971. The Hudson Bay Paleolineament and anomalous concentration of metals along it. *Economic Geology* 66, 314-325.
- Kutina, J., 1972. Regularities in the distribution of hypogene mineralization along rift structures. *International Geological Congress, 24<sup>th</sup> Session, Montreal, Section 4*, p. 65-73.
- Kutina, J., 1974. Relationships between the distribution of big endogenic ore deposits and the basement fracture pattern. Examples from four continents. In: Hodgson, R.A. et al. (Eds.), *Proceedings, First Conference on Basement Tectonics, Utah Geological Association Publication* 5, p. 565-593.
- Kutina, J., 1974. Structural control of volcanic ore deposits in the context of global tectonics. *Bulletin Volcanologique* 37-4, 1039-1069.
- Kutina, J., 1975. Tectonic development and metallogeny of Madagascar with reference to the fracture pattern of the Indian Ocean. *Geological Society of America Bulletin* 86, 582-592.
- Kutina, J., 1976. Lithospheric plate motions – one of the factors controlling distribution of ore deposits in some mineral belts. *Mineralium Deposita* 11, 83-92.
- Kutina, J., 1980. Regularities in the distribution of ore deposits along the ‘Mendocino latitude’, western United States. *Global Tectonics and Metallogeny* 1, 134-193.
- Kutina, J., Bowes, W.A., 1982. Structural criteria defining the Granite Mountain area in NW-Nevada as a target for mineral exploration. *Global Tectonics and Metallogeny* 1, 336-354.
- Bowes, W.A., Kutina, J., Aaker, S.K., Fredriksson, K., Golightly, D.V., 1982. A porphyry-type Mo-Cu discovery at Granite Mountain, Nevada: Predictions based on mineralogical and geochemical study of zoning. *Global Tectonics and Metallogeny* 1, 402-439.
- Kutina, J., 1983. Global tectonics and metallogeny: Deep roots of some ore-controlling fracture zones. A possible relation to small-scale convective cells at the base of the lithosphere? *Advances in Space Research* 3 (2), 201-214.
- Kutina, J., 1986. A study of residual gravity maps to delineate deep controls of ore deposits in the Colorado Mineral Belt. In: Aldrich, M.J., Laughlin, A.W. (Eds.), *Proceedings 6<sup>th</sup> International Conference on Basement Tectonics, International Basement Tectonics Association, Salt Lake City, Utah* p. 175-188.
- Kutina, J., Hildenbrand, T.G., 1987. Ore deposits of the western United States in relation to mass distribution in the crust and mantle. *Geological Society of America Bulletin* 99, 30-41.
- Kutina, J., 1988. Deep controls of ore deposits in the western United States examined by residual gravity maps, magnetic and seismic data. In: G. Kisvarsanyi, G., Grant, S.K. (Eds.), *Proceedings North American Conference on Tectonic Control of Ore Deposits and the Vertical and Horizontal Extent of Ore Systems, University of Missouri-Rolla*, p. 14-35.
- Kutina, J., 1988. Criteria indicating a block structure of the upper mantle and its role in metallogeny. In: Zachrisson, E. (Ed.), *Proceedings, 7<sup>th</sup> IAGOD Symposium 1986, Schweizerbart, Stuttgart*, p. 111-129.
- Kutina, J., 1991. Metallogeny of mantle-rooted structures extending across the western edge of the Proterozoic North American craton. *Global Tectonics and Metallogeny* 4, 21-51.
- Kutina, J., Bennani, A., Fredriksson, K., Nelen, J., Golightly, D.W., Brown, F.W., Brown, Z.A., Rait, N., Moore, R., 1992. The gabbro-dolerite magmatism of the Foum Zguid region: Relation to deep structure of Morocco and possible potential for cobalt, nickel and platinum group metals. In: Mason, R. (Ed.), *International Basement Tectonics Association, Publication No.7, Kluwer, Netherlands*, p. 175-193.
- Kutina, J., 1993. Northern extension of the East African Rift System and its intersection with an EW-trending belt of magnetic lows: structural and metallogenic implications for Sudan and Ethiopia. *Proceedings, 8<sup>th</sup> IAGOD Symposium, Schweizerbart, Stuttgart*, p. 31-41.

- Kutina, J., 1995. The role of linear and circular megastructures in global metallogeny. A new look at the South Africa – eastern South America connection. Centennial GeoCongress, Johannesburg. Extended Abstracts, Geological Society of South Africa, p.142-145.
- Kutina, J., 1995. Regional mantle-rooted discontinuities extending transversely to the margins of cratons and adjacent mobile belts. Metallogenic implications. *Global Tectonics and Metallogeny* 5, 7-18.
- Kutina, J., 1996. Possible relationships between mantle convection and deep structure of the lithosphere. Implications for mineral exploration. *Global Tectonics and Metallogeny* 6, 35-39.
- Kutina, J., 1998. A major structural intersection in the basement of the Okavango Basin, NE of Tsumeb, Namibia, indicated by satellite magnetometry and other data. *Global Tectonics and Metallogeny* 6, 205-213.
- Kutina, J., 1999. The Transaustralian 25 S discontinuity and associated structures. Investigation of their role in concentrating metals, especially nickel and cobalt. *Global Tectonics and Metallogeny* 7, 135-139.
- Kutina, J., 2001. The role of transregional mantle-rooted structural discontinuities in the concentration of metals: With examples from the United States, China, Uzbekistan, Burma, and other countries. *Global Tectonics and Metallogeny* 7, 159-182.
- Kutina, J., 2001. Deep lithospheric structure: Manifestation of granitic intrusions and associated tin deposits of the Amazon Basin in the pattern of anomalies of the Global Magnetic Anomaly maps based on satellite measurements. Unpublished report prepared for the NASA Goddard Space Flight Center, May 20, 2001, 8 pp.+ 17 figs.
- Kutina, J., 2003. Geochemical health hazards above the intersections of orogenic belts by deep- rooted structural discontinuities, and in areas adjacent to orogenic belts: Example from the Appalachians. *Global Tectonics and Metallogeny* 8, 183-205.
- Kutina, J., Taylor, P.T., 2003. Satellite altitude magnetic anomalies – Implications for mineral exploration: A review. *Global Tectonics and Metallogeny* 8, 89-105.
- Kutina, J., Pei, R., Heyl, A.V., 2003. The role of deep lithospheric structure in the genesis and distribution of giant and supergiant concentrations of metals in the crust. *Global Tectonics and Metallogeny* 8, 9-49.
- Taylor, P.T., Kutina, J., 2004. Satellite-altitude geopotential fields and crustal mineralization (abstract). Geological Society of America, Northeastern Section, March 25-27, 2004.
- Kutina, J., 2004. Transregional Structures of South America and Their Role in Metallogeny. Report prepared under a project for Votorantim Metais, Vazante, Minas Gerais, Brazil. Part I, 15 pp. + 32 figs., 1 table. - February 20, 2004; Part II, 12 pp. + 23 Figs. – April 20, 2004; Part III: A metallotect-potential zone in southern Bolivia and northern Argentina, enclosing Faja Eruptiva de la Puna. A case study, 8 pp. + 12 figs. (unpublished).
- Kutina, J., 2006. Metallotect-potential zones – a powerful tool for defining targets in mineral exploration. Extended Abstracts, 12<sup>th</sup> Quadrennial IAGOD Symposium, Moscow, Russia, 21<sup>st</sup> – 24<sup>th</sup> August 2006. CD-ROM. Science and Our Future” Foundation, Moscow.