References

Abrams, M.J., Rothery, D.A., and Pontual, A. 1988. Mapping in the Oman ophiolite using enhanced Landsat Thematic Mapper images, Tectonophysics, 151:387-401.

Al Chalabi, M.1970. Interpretation of two-dimensional magnetic profiles by non-linear optimization. Bolletino Geofisica Teoretica Application 12: 3-20.

Altermann, W.1989. Facies Development in the Permian Petchabun Basin Central Thailand.Berlin: VWB-Verlag for Wissenschaft and Bildung, 275 p.

Airo, M.L., and Ruotoistenmaki, T. 2000. Magnetic signatures of finnish bedrock and their relationship with geological boundaries. Abstract in: Pesonen, L., Korja, A. and Hjelt, S-E. editors. Lithosphere 2000.Report S-41, Institute of Seismology, University of Helsinki.

Assavapatchara, S., Charusiri, P., and Khontaprab, C. 1997. The Permian carbonate rocks in Thailand. In Dheeradilok, P. et al., editors. Proceedings of the International Conference on Stratigraphy and Tectonic Evolution of SE Asia and the South Pacific, p.134. Aug.19-24, Department of Mineral Resources, Bangkok, Thailand. (Abstract).

Baranov, V. 1957. A new method for interpretation of aeromagnetic maps: Pseudo-gravimetric anomalies. Geophysics 26: 359-383.

Baranov, V., and Naudy, H. 1964. Numerical calculation of the formula of the reduction to magnetic pole. Geophysics 29: 67-79.

Barr, S.M., and Macdonal, A.S. 1991. Toward a Late Paleozoic– Early Mesozoic Tectonic model for Thailand. Journal of Thai Geosciences 1: 11-22.

Beckinsale, R.D., Suensilpong, S., Nakapadungrat, S., and Walsh, J.N. 1979. Geochronology and geochemistry of granite magmatism in Thailand relation a plate tectonic model. Journal of the Geological Society of London, 136:529-540.

Bhattacharyya, B.K. 1964. Magnetic anomalies due to prism-shaped bodies with arbitrary polarization. Geophysics 29 : 517-531.

Bhattacharyya, B.K. 1965. Two-dimensional harmonic analysis as a tool for magnetic interpretation. Geophysics 30: 829-857.

Bleakley, D., Stephens, E. A., Cratchley, C.R, Workman, D.R., Newman, D., Cogger, N., and Sanevong, P., Thanvarachorn, P., Intrakhao, B., and Chaungpaisal, S. 1965. Regional

Geology of the Loei-Chiengkarn area of Thailand and Detailed Investigation of the Phu Khum Lead-Zine Mineral Prospect. London: Over Seas Geological Survey, 67 p.

Bott, M.H.P. 1967. Solution of the linear inverse problem in magnetic interpretation with application to oceanic magnetic anomalies. Geophysical Journal of the Royal astronomical Society, 13: 313-323.

Brown, G.F., Buravas, S., Charajavanaphet, J., Jalichandra, N., Johnston, W.D., Sresthaputra, V., and Taylor, G.C. 1951. Geological reconnaissance of mineral deposits of Thailand. Bulletin .U.S. Geological Survey. 984 (1953); Washington-Royal Department of Mines, Geological Survey Member, 1: 183 p.

Bunopas, S. 1981. Paleogeographic history of western Thailand and adjacent part of Southeast Asia-a plate tectonic interpretation. Ph.D. thesis, Victoria University of Wellington, New Zealand. 811 p.

Bunopas, S., and Vella, P. 1983. Tectonic and geologic evolution of Thailand. Workshop on Stratigraphic Correlation of Thailand and Malaysia. Sept. 8-10, Haad Yai, Thailand. Technical Paper 1: 307-323.

Bunopas, S. 1988. Summary of Geology of Loei Area and Accompanying 1:100,000 Geological Map. Mineral Resources Development Project, Department of Mineral Resources, Thailand, 61 p.

Bunopas, S. 1991. The pre-collision and belts of Shan-Thai and Indochina micro-continents in Thailand. Proceeding of the papers presented at the first International Symposium of the IGCP Project 321, Gondwana: Dispersal and Accretion of Asia, pp. 25-30. Nov. 25-30, Kunming, China.

Bunopas, S. 1992. Regional Stratigraphic Correlation in Thailand. Proceedings of the National Conference on Geologic and Mineral Resources of Thailand: Potential for Future Development, pp.189-208. Nov.17-24, Department of Mineral Resources, Bangkok, Thailand.

Bunopas, S., and Vella P 1992. Geotectonics and Geologic Evolution of Thailand. Proceedings of the National Conference on Geologic and Mineral Resources of Thailand: Potential for Future Development, pp.209-228. Nov.17-24, Department of Mineral Resources, Bangkok, Thailand.

Clark, D.A. 1997. Magnetic petrophysics and magnetic petrology: aids to geological interpretation of magnetic survey. JGSO Journal of Australian Geology and Geophysics 17(2): 83-103.

Chairangsee, C., Hinze, C., Machareonsap, S., Nakornsri, N., Silpalit, N., and Sinpool-Anunt, S. 1990. Geological Map of Thailand 1:50,000: Explanation for the sheets Amphoe Pak Chom 5345 II, Ban Na Kha 5344 I, Ban Huai Khop 5445, King Amphoe Nam Som 5444 IV. Hannover: Geologisuhes Jahrbuch, Reihe B, 55 p.

Chairangsee, C., Machareonsap, S. 1985. Geological map of Sheet Amphoe Wangsaphung 5343 I scale 1:50,000. Geological Survey Division, Department of Mineral Resources, Bangkok, Thailand. (in Thai).

Chairangsee, C., Machareonsap, S., and Sinpool-Anunt, S. 1986. Geological map of sheet Amphoe Pak Chom 5345 II, Ban Na Kha 5344 I scale 1:50,000. Geological Survey Division, Department of Mineral Resources, Bangkok, Thailand. (in Thai).

Chantharamee, S. 1978. Tectonic synthesis of the Lansang area and discussion of regional tectonic evolution. In: Proceedings of the Third regional Conference on geology and Mineral Resources of Southeast Asia. Nutalaya, P., editor, pp.177-186. Bangkok, Thailand.

Chareonpawat, A., Wongwanit, T., Tantiwanit, V., and Kitiprariwat, A. 1975. Geological map of sheet Changwat Loei CNE 47-12. scale 1:250,000. Geological Survey Division, Department of Mineral Resources, Thailand.

Charoenprawat, A., and Wongwanich, T. 1976. Preliminary Report on the geological Map of Changwat Loei Quadragle (ND44-12), 1:250,000. Department of Mineral Resources, 61 p. (in Thai).

Charusiri, P. 1989. Lithophile Metallogenetic Epochs of Thailand: A Geological and Geochonological Investigation. Ph.D Thesis, Queen's University, Canada, 819 p.

Charusiri P., Chonglakmani, C., Daorek, V., Supananthi, S., and Imsamut, S. 1994. Detailed Stratigarphy of the Ban Thasi, Lampang, Northern Thailand: Implications for Paleoenvironments and Tectonic History. In. P. Angsuwathana, T. Wongwanich, W. Tansathien, S. Wongsomsak, and J. Tulayatid editors, Proceedings of the International Symposium on Stratigraphic Correlation of Southeast Asia, IGCP 306, pp.226-224. Nov.15-20, Bangkok, Thailand.

Charusiri, P., Kosuwan, S., and Imsamut, S. 1997. Tectonic Evolution of Thailand: From Bunopas 1981's to a New Scenario. In Dheeradilok, P. et al., editors, Proceedings of the International Conference on Stratigraphy and Tectonic Evolution of SE Asia and the South Pacific, pp. 414-420. Aug.19-24, Department of Mineral Resources, Bangkok, Thailand.

Charusiri, P., Imsamut, S., Clark, A.H., Archibald, D. and Hisida, K .1989. Thailand, new suture and new terranes; a new geology synthesis. GEOSEA 9, pp. 46-47, Kuala Lumper 1998, (Programme and Abstracts).

Charusiri, P., Pongsapitch, W. and Kanthaprab, c. 1991. Granit belts in Thailand: New evidences from $^{40}Ar/^{39}Ar$ dating. Mineral resources Gazette, 36(1): 43-62.

Charusiri, P., Suwannachote, P., Nuchanong, T., Saengsila, S. and Yaemniyom, S. 1995. Alteration and Pb-Zn (Au) mineralization of the Phu Chang area, Changwat Loei, NE Thailand: Implications for a proposed genetic model. Proceedings of the international Conference on Geology, Geotechnology, Wannakao, L., editor-in chief, pp. 201-203. Department of Geotechnology, Khon Haen University, Khon Kaen, Thailand,

Charusiri, P., Daorerk, V., Archibald, D., Hisada, K., and Ampaiwan, T. 2002. Geotectonic evolution of Thailand: A New Synthesis. Journal of the Geological Society of Thailand No.1, 2002: 1-20.

Chaodumrong, P., Chairangsee, C., and Sanunseiang, S. 1983. Mineral Potential of Amphoe Nadaung, Changwat Loei and Amphoe Naklang Changwat Udontani. Geological Survey Division, Department of Mineral Resources, Thailand. 28 p.(in Thai).

Chaodumrong, P. 1992. Stratigraphy, sedomentology and tectonic implications of the Lampang Group, Central north Thailand (Ph.D. thesis). University of Tasmania, Tasmania, 230 p.

Chonglakmani, C., Meesook, A., and Suteetorn, V. 1985. Jurassic Stratigraphy of Thailand. In P.Thanvarachorn, S. Hokjaroen, and W. Yanungme (editors.), Conference on Geology and Mineral Resources Development of Northeastern Thailand, Nov. 26-29, pp. 77-83. Department of Geotechnology, Khon Khaen University.

Chuaviroj, S. 1997. Deformation in Khorat plateau. In Dheeradilok, P. et al., editors, Proceedings of the International Conference on Stratigraphy and Tectonic Evolution of

SE Asia and the South Pacific, pp. 321-325. Aug.19-24, Department of Mineral Resources, Bangkok, Thailand.

Cooper, M.A., Herbert, R., and Hill, G.S. 1989. The structural evolution of Triassic intermontane basin in northeastern Thailand. In: T. Thanasuthipitak, and P. Ounchanun (Editors). Proceedings of International Symposium on Intermontane Basin: Geology and Resource. pp. 231-242, Chiang Mai University, Thailand.

Crosta, A.P., and Moore, J. McM. 1989. Geological mapping using Landsat Thematic Mapper imagery in Almeria Province. south-east Spain, International Journal of Remote Sensing, 103: 505-514 .

Daorerk, V., Charusiri, P., Seusutthiya, K., and Maopech, N. 2002. Petrography and Geochemistry of some Igneous Rocks at Ban Bun Tan, Nong Bua Lamphu, NE Thailand. The Symposium on Geology of Thailand, p.295. Aug.26-31, Bangkok, Thailand. (Abstract).

Dobrin, M.B. 1985. Introduction of Geophysical Prospecting. McGRAW-Hill Book Company, Canada, 630 p.

Evans, A. M. 1980. An introduction to ore geology. Blackwell, Oxford, 231 p.

Fedi, M., and Rapolla, A. 1999. 3-D inversion of gravity and magnetic data with depth resolution, Geophysics V 64 (2): 452-460.

Fontaine, H. 1986. The Permian of Southeast Asia. CCOP Technical Bulletin, 18: 111 p.

Fontaine, H., Suteethorn, V., and Verchard, D. 1994. The Carboniferous Corals of South east Asia with new Discoveries in Laos and Thailand. In P. Angsuwathana, T. Wongwanich, W.Tansathien, S. Wongsomsak, and J. Tulyatid (editors), Proceedings of International Symposium on Stratigraphic Correlation of Southeast Asia, IGCP 306. p.42.Nov. 15-20, Bangkok, Thailand.

Fontaine, H., and Suteethorn, V. 1986. Discovery of Widespread Bashkirian Limestone Northeastern of Loei, In T. Silakul (ed.), Proceedings Anniversary Technical Meeting, pp. 199-206. Department of Geological Science, Chiang Mai University.

.Fontaine, H., and Ingavat, R. 1982 The Lower Carboniferous in Thailand. Proceedings of the10th International Stratigraphy Geololgy Carboniferous Congress, Madrid 1983, pp.129-132, Madrid 21.

Galong, W., and Tulyatid, J. 1992. Airborne geophysical data interpretation of eastern Loei area: An aid for geological mapping and mineral exploration. In C. Piancharoened. Proceedings of National Conference on Geological Resources of Thailand: Potential for Future Development, pp. 70-85. Nov. 17-24, Department of Mineral Resources, Bangkok, Thailand.

Galong, W., Kiattiwongchai, T., Tongchit, P., Wisedsind, W., and Bunnop, N. 1999. Airborne Geophysical Survey and Country Development. Economic Gazette, 4:1-7, DMR, Bangkok, Thailand. (in Thai).

OASIS, 2002. User manual. OASIS Montaj, Toronto, Canada.

Geophysical Exploration Technology (GETECH) 1995. South East Asia Gravity Project. technical Report, Department of Earth Sciences, University of Leeds, UK.

Grant, F.S., and Dodds, J. 1972. MAGMAP FFT processing system development notes: Paterson, Grant and Watson Limited, Canada.

GOPH547, 2003. Gravity and magnetic: Laboratory 4, Filtering and Euler Deconvolution of Magnetic Data, University of Calgaly, Canada.

Gunn, P.J. 1997a. Quantitative methods for interpreting aeromagnetic data. JGSO Journal of Australian Geology and Geophysics 17(2): 105-114.

Gunn, P.J.,1997b, Regional magnetic and gravity responses of extensional sedimentary, JGSO Journal of Australian Geology and Geophysics 17(2): 115-132.

Gunn, P.J., and Almod, R. 1997. A method for calculating equivalent layers corresponding to large aeromagnetic and radiometric grids. Exploration Geophysics (in press).

Gunn, P.J, Michell, J., and Meixner, A. 1996. Evaluation and structuring of Bass and Durrom basin as delineated by aeromagnetic data. Australia Geological Survey Organisation, Record 1996/14.

Gunn, P.J., Maidment, D., and Milligan, P.R. 1997. Interpreting aeromagnetic data in area of limited outcrop. JGSO Journal of Australian Geology and Geophysics 17(2): 115-132.

Hansen, R.O., and Pawlowski, R.S. 1989. Reduction to the pole at low latitude by Wiener filtering. Geophysics 54: 1607-1613.

Hutchison, C.S. 1985. Economic Deposits and their Tectonic Setting. Macmilan Publishers Ltd, London. 365 p.

Hutchison, C.S.1989. Geology Evolution of South-East Asia. Oxford, Clarendon Press, 368 p.

Intasopa, S. 1993. Petrology and Geochronology of the Volcanic Rocks of the Central Thailand Volcanic Belt. Ph. D. thesis, University of New Brunswick. 242 p.

Intasopa, S. and Dunn, T. 1994. Petrology and Syn-Nd isotropic systems of the basalts and rhyolites, Loei, Thailand. Journal of Southeast Earth Sciences, 9: 167-180.

Isles, D. 1990. Aeromagnetic application in low magnetic latitudes. Extract of presentation to low latitudes workshop, Adelaide University, Australia.

Jacobson, H.S., Pierson, C.T., Danusawad, T., Japakasetr, T., Inthuputi, B., Siriratanamongkol, C., Prarassrnkul, S., and Pholhan, N. 1969. Mineral Investigations in Northern Thailand. Washington D.C.: Geological Survey Professional Paper 618, United State Government Printing office, 96 p.

Jantaranipa, W., Vongpromek, R., Sukko, T., and Preammanee, J. 1981. Application of Enhanced Landsat to Mineral Resources of Loei Province, Northeastern Thailand. Economic Geology Bulletin No.30, Economic Geology Division, Department of Mineral Resources, Bangkok, Thailand, 40 p.

Jumnongthai, M., Nuchanong, T. and Sektheera, S., 1992. Critical review on regional geochemistry exploration for base metals and gold mineralization along the Loei-Phetchabun fold belt. Proceedings of National Conference on Geological Resources of Thailand: Potential for Future Development, pp. 434-499. Nov.17-24, Department of Mineral Resources, Bangkok, Thailand.

Jungyusuk, N., and Khositanont, S. 1992. Volcanic rocks and associated mineralization in Thailand. Proceedings, National Conference on Geologic Resources of Thailand : Potential for Future Development , pp.522-538, Nov.17-24, Department of Mineral Resources, Bangkok, Thailand.

Katz, M. 1982. Lineament analysis of Landsat imagery applied to mineral exploration, in Laming. D.J.C., and Gibbs, A.K. editors. Mineral exploration techniques in tropical forest areas: Geosciences in International Development, AGID Report No 7:157-166.

Keating, P., and Zerbo, L. 1996. An improved technique for reduction to the pole at Low latitudes. Geophysics 61: 131-137.

Kenting Earth Sciences International Limited KESIL. 1989. Follow-up Survey Report for Airborne Geophysical survey of the Mineral Resources Development Project. Contract No 50/2527 Loei Area., Ottawa, Canada.

Kitisan, N. 1985. Geological map of sheet Ban Yuak 5444III. scale 1:50,000. Geological Survey Division, Department of Mineral Resources, Bangkok, Thailand. (in Thai).

Kulmarajan, P. 1987. Gold deposit in Loei and Nong Khai provinces. Proceedings of the Conference on Geology of Thailand, p.3. Aug.13-14. Department of Mineral resources, Bangkok, Thailand. (in Thai).

Lemieux, S., Ross, G. M. and Cook, FA. 2000. Crustal geometry and tectonic evolution of the Archean crystalline basement beneath the southern Alberta Plains, From new seismic reflection and potential-field studies. Canadian Journal of Earth Science, 19 : 1473-1491.

Laosu, P. 1988. Geophysical survey for Gold deposit Phu Tam Pha, Amphoe Meung and Ban Had Kkum Pee Amphoe Pak Chom, Changwat Loei. Proceedings of Mining Conference 1988, Department of Mineral Resources, Bangkok, Thailand. p.81-91. (in Thai).

Macleod, I.N., Jones, K., and Ting Fan Dai. 1993. 3-D analytic signal in the interpretation of total magnetic field data at low magnetic latitude. Exploration Geophysics 24: 679-688.

Metcafe, I., 1995, Gonwana Dispersion and Asian accretion, Proceedings of the IGCP Symposium of Geology of SE Asia, Hanoi, 1995 : 233-266.

Meesook, A. 1994. Marine Jurassic Stratigraphic and Bivalve Paleontology of Thailand, Ph.D. dissertation, University of Auckland :189-200.

Mendonca, C.A., and Silva, J.B.C. 1993. A stable truncated series approximation of the reduction to the pole operator. Geophysics 58: 1084-1090.

McGrath, P., and Hood, P. 1973. An automatic least squares multi-model method of magnetic interpretation. Geophysics 38: 349-358.

Milligan, P.R., and Gunn, P.J. 1997. Enhancement and presentation of airborne geophysical data. JGSO Journal of Australian Geology and Geophysics 172 : 63-76.

Mineral Resources Development Project (MRDP). 1988. Geology of Loei area. Geological Complication and Editing Section, Geological Research and Technology Geological Survey Division, Bangkok, Department of Mineral Resources, Thailand, 61 p.

Mitchell, A.G.H., and Garson, M.S. 1984. Mineral Deposits and Global Tectonic Settings. Academic Press Inc, London. 405 p.

Mudges, S.T. 1991. New developments in resolving detail in aeromagnetic data. Exploration Geophysics 27: 277-284.

Naidu, P.S., and Mathew, M.P. 1998. Digital analysis of aeromagnetic map: detection of fault. Journal of Applied Geophysics 38:169-179.

Nakapadungrat, S., and Putthapiban, P. 1992. Granites and associated mineralization in Thailand. National conference on Geologic Resources of Thailand: Potential for Future Development, Department of Mineral Resources, Nov.17-24. Bangkok, Thailand.

Nakornsri, N., and Silpalit, N.1986. Geological map of sheet Huai Khop 5445III and Amphoe Nam Som 5444IV. scale 1:50,000. Geological Survey Division, Department of Mineral Resources, Bangkok, Thailand. (in Thai).

Neawsuparp, K., and Charusiri, P. 2000. Lineaments Analysis from Landsat Data for Structural Geology and Mineral Occurrences in Loei Area, Northeastern Thailand. Proceedings of the International Conference on Applied Geophysics November,9-10, 2000, Chiang Mai, Thailand.

Neawsuparp, K., and Charusiri, P. 2002. New discovery of ultramafic rocks and the major thrust fault in Loei-Nong Bua Lumpu area, NE Thailand using enhanced aeromagnetic data. Proceedings of International Symposium on Stratigraphic Correlation of Southeast Asia, IGCP 411, p.44. Nov.15-25, Pitsanulok, Thailand.

Panjaswatwong, Y., Chantaramee, S., Limtrakun, P., and Pirarai, K. 1997. Geochemistry and tectonic setting of eruption of central Loei volcanic in the Pak Chom area, Loei, northeast Thailand. The International Conference on Stratigraphy and Tectonic Evolution of Southeast Asia and the South Pacific, pp. 287-302. Aug.19-24, Bangkok, Thailand.

Pearson, W.C., and Skinner, C.M. 1982. Reduction to the pole of low magnetic anomalies: Present at the 52nd Ann. Internet. Mtg. and Expos., Society. Exploration Geophysics.

Phuttapiban, P. 1987. Geology in Loei AEM and Mineral Potential. Proceedings of the Conference on Geology of Thailand, pp.13-14. Aug.13-14, Department of Mineral resources, Bangkok, Thailand. (in Thai).

Putthapiban, P. 2002. Geology and Geochronology of Igneous Rocks of Thailand. The Symposium on Geology of Thailand, pp. 261-283. Aug. 26-31, Bangkok, Thailand.

Pilkington, M., Miles, W.F., Ross, G.M., and Roest, W.R. 2000. Potential Field signatures of buried Precambrian basement in the Western Canada Sedimentary Basin. Canadian Journal of Earth Science, 37:1453-1471.

Plijm, B.A., and Marshak, S. 1997. Earth Structure, an introduction to structural geology and tectonic. WCB/McGraw-Hill, 495 p.

Rajagopalan, S. 1997. The 3-D Analytic signal: A creative solution or a waste of time: In Preview Conference Edition, 12th Geophysics Conference and Exhibitan, Sydney, ASEG, p.66.

Rajagopalan, S. 1987. The use of "automatic gain contrl" to display vertical magnetic gradient data. Exploration Geophysics 18 : 166-169.

Rajagopalan, S., and Milligan, P. 1995. Image enhancement of aeromagnetic data using automatic gain control. Exploration Geophysics 25: 173-178.

Rangubpit, W. 2003. Image Processing and Interpretation of Aeromagnetic and Resistivity data over two 1:50,000 map sheet area of Ban Yuak and Ban Sup, Loei area, Thailand. M.Sc. Thesis, University of New South Wales, Australia (unpublished).

Roest. W.R., Verhoef, V., and Pilkington, M. 1992. Magnetic interpretation using the 3-D analytic signal, Geophysics 57:116-125.

Rybokov, M., Goldshmidt, V., Pleisher, L., and Ben-Gai, V. 2000. 3-D gravity and magnetic interpretation for the Haita Bay area (Israel). Journal of Applied Geophysics 44: 353-367.

Safon, C., Vasseur, G., and Creu, M. 1977. Some application of linear programming to the inverse gravity problem. Geophysics 42:1215-1299.

Sashida, K., Igo, H., Hisada, K., Ichiro, Nakornsri, N., and Amphornmaha, A. 1993. Occurrence of PaleoZoic and Early Mesozoic Radiolaria in Thailand (preliminary report). Journal of Southeast Asia Earth Science, 8: 97-108.

Salyapongse, S., and Putthapiban, P. 1997. A reconsideration of Nan Suture. Proceedings of the International Conference on Stratigraphy and Tectonic Evolution of Southeast Asia and the South Pacific, pp. 403-411. Bangkok, Thailand.

Sawkins, F.J. 1976. Massive Sulfide Deposits in Relation to Geotectonics, Metellogenics and Plate Tectonics. Geological Association of Canada. Special papers 14: 221-240.

Seusutthia, K., and Maopeth, N. 2001. Petrography and Geochemistry of Ultramafic rocks at Ban Bun Tan, Suwankhuha Sub-district, Nong Bua Lumphu Province. Department of geology, Chulalongkorn, University, Bangkok, Thailand, 84 p. (unpublished)

Sillitoe, R.H. 1980. Ore porphyry copper and Kuroko-type massive sulfide deposits Incompatible ? Geology 8: 10-14.

Sillitoe, R.H. 1982. Extensional habitats or rhyolite-hosted massive sulfide deposits. Geology 10: 403-407.

Silpalit, N., Chairangsee, C.1982.Geological map of sheet Ban Sup 5344II. scale 1:50,000. Geological Survey Division, Department of Mineral Resources, Bangkok, Thailand. (in Thai).

Silpalit, N., and Chairangsee, C. 1983. Geological map of Sheet Ban That 5344 III and Changwat Loei 5343 IV. scale 1:50,000. Geological Survey Division, Department of Mineral Resources, Bangkok, Thailand. (in Thai).

Silva, J.B.C. 1986. Reduction to the pole as an problem and its application to low-latitude anomalies: Geophysics 51: 369-382

Sitthithawon, E., and Wasuwanich, P. 1992. Metallogenic Map of Thailand. Proceeding of the National Conference on Geologic and Mineral Resources of Thailand: Potential for Future Development, pp.1-15. Nov. 17-24, Department of Mineral Resources, Bangkok, Thailand.

Thanomsap, S. 1990. Structural Development on the Khorat Plateau and Its Western Adjacent Area. In P.Charusiri, S. Jarupongsakul, and V.Pisutha-Arnond eds., Proceedings of The Technical Conference on Development Geology for Thailand into the year 2000, pp.29-38. Dec.13-14, Department of Geology, Chulalongkorn University, Bangkok, Thailand.

Tarlowski, C., Gunn, P.J., and Mackey, T. 1997. Enhancements of the magnetic map of Australia. AGSO Journal of Australian Geology and Geophysics 172: 77-82

Telford, W.M., Geldart, L.P., Sherift, R.E., and Keys, D.A. 1986. Applied Geophysics. Cambridge University press, New York, 860 p.

Toft, P.B., Scowen, P.A.H., Arkani-Hamed, J., and Francis, D. 1993. Demagnetization by hydration in deep-crustal rocks in the Grenville Province of Quebec, Canada: Implication for magnetic anomalies of continental collision zones. Geology 21: 999-1002.

Tulyatid, J. 1995. Reduction of Nationwide Aeromagnetic Reduction to the Pole, Reduction to the Equator, and Its Derivative Grids of Thailand, Mineral Resources Development Division Repot, No. 3/1995, Department of Mineral Resources, Thailand.

Waterhouse, J.B. 1982. New Carboniferous Brachiopod genera from Huai Bun Nak, Northeast Thailand. Paleontology. 56: 1-2.

Wellman, E. 1998. Mapping of geophysical domains in the Australian Crust using gravity and magnetic anomalies. In Structure and evolution of the Australian continent Edited by J.braun, j.Dooley, B. Goleby, R.van der Hilst, and C. Kloowijk. American Geophysical Union, Geodynamics series 26: 59-71.

Wielchowsky, C. C. and Young, J. D. 1985. Regional Facies Variation in Permian of the Petchaboon Fold and Thrust Belt, Thailand. In P.Thanvarachorn, S. Hokjaroen, and W. Yanungme (editors), Conference on Geology and Mineral Resources Development of Northeastern Thailand, pp. 41-45. Nov. 26-29, Department of Geotechnology, Khon Khaen University.

Whitaker, A. 1994. Integrated geological and geophysical mapping of Southwestern Western Australia. Australian Geological Society Organization, Journal of Geology and Geophysics 15:313-328.

Wongwanich, T., Tansathien, W., Leevongcharoen, S., Paengkaw, W., Thiamwong, P., Cheroenmit, J., and Saengsrichan, W. 2002. The Lower Paleozoic Rocks of Thailand. The Symposium on Geology of Thailand, pp. 16-28. August 26-31, Bangkok, Thailand.

Workman, D.R. 1975. Tectonic Evolution of Indochina. Journal of Geological Society of. Thailand, 1: 3-19.

Yaemniyom, S. 1985. Review on matalic mineral potential in Northeastern Thailand. Proceedings of the Conference on the Geology and Mineral Resources Development of the Northeast Thailand, p.165-187. Khon Kaen University, Khon Kaen, Thailand.

Yamned, S. 1999. Ore Mineralgraphy of Thung Kham Deposit, Amphoe Muang, Changwat Loei. Department of geology, Chulalongkorn University, Bangkok, Thailand, 84 p (unpublished).

Yanagida, J.1974. Middle Carboniferous Brachiopads from Loei, Northeastern Thailand. Geology and Palaeontology Southeast Asia 14: 7-24.

Yanagida, J. 1975. Upper Carboniferous Brachiopods from Wang Saphung, Northeastern Thailand. Geology and Palaeontology Southeast Asia 16:1-32.

Appendices

Appendix I

Detail of the computer software used in this study

1 **Chris DBF** is a software system for processing geophysical data such as magnetic radiometric and gravity data. Because of a small package software (About 5 MB), so it is suitable for using on a PC and Laptop. Features of this software cover all of data processing including editing, conversion of grid type, grid filtering, line filtering, imaging, contour, sunshade, gridding and stacked profiles. It is created by Chris Martin of Chris DBF Company, Western Australia.

2 **Oasis montaj** core software platform is the software environment that is required to run all Geosoft software applications and Tools. Applications are software packages that provide the software capabilities required for a specific earth sciences software application (Mineral Exploration, Oil and Gas Exploration, UXO Detection, Earth Sciences and Environmental). The Oasis montaj environment provides direct access to data contained in Oasis databases through a spreadsheet window and an integrated profile display window. The Oasis database is a high-performance database that provides efficient storage and access for very large spatial data sets. The platform enables you to edit maps interactively, apply dynamic linking to maps and track the map creation processes. Visual data links are provided to dynamically connect data in the spreadsheet, profile and map views. Data processing is achieved through the application of Geosoft executable functions (GXs), which can be used to control all aspects of the data processing sequence and environment. DAT Technology (for Accessing Grids and Images) enables the platform to use a variety of grid and image formats in Oasis montaj.

3 **Model Vision Pro** is software for modeling in 2D and 3D dimensions for magnetic and gravity data. It created by the Encom Technology Pty Ltd., Australia. This software can build simple high performance geological models or complex multi-body models and can compare the simulated responses with the field data. Each object has

constant physical properties, but the combination of many objects can produce complex model of the subsurface. Both the magnetic and gravity response can be computed for the following of object classes: plunging polygonal prism, horizontal polygonal prism, tabular and dyke.

5 ER Mapper is a comprehensive, technically excellent and easy to use product for displaying, enhancing and integrating all kinds of digital information. ER Mapper is unique in the data-imaging world because of its ability to work from raw data, immediately applying processing and enhancing options. Working from raw data maintains the data at original accuracy and reduces the need for disk storage for intermediate files. The real-time response allows for a flexible try-it-and-see approach. ER Mapper and other image processing software have had quite different evolutions. ER Mapper was designed to take advantage of the hardware and operating systems available today. Other image processing software was developed in the 1970's and could not take advantage of some of the latest software technology such as interactive processing and dynamic compilation. (Copyright from Earth Resource Mapping Ltd.

6 ArcView is designed by ESRI with the concept that the majority of users will not be interested in GIS data manipulation. They want to use the data to perform management functions as an information system. Thus, a few technical ArcInfo users may create and edit the data themes while 100s more will use the data as a management tool. This is not to imply data editing isn't possible with ArcView, only that most users will be interested in it as a management tool There are several ArcView extensions. The basic features of ArcView contain high quality mapping, geographic and tabular data editing, spatial analysis, geocoding, multiple data integration, customization with avenue, map projections, tabular analysis and image integration.

Appendix II

Table 1 Detail of sample cllested from the Loei area

No	East	North	Rock types	Sus (SI)
1-1	716260	1970138	Sandstone, brown	9.16E-05
1-2				1.32E-04
2-1	716260	1970138	Sandstone, grey	3.53E-04
2-2				3.60E-04
3-1	803033	1996046	Chert, dark grey	5.31E-04
3-2				5.35E-04
4-1	802743	1989284	Chert, brown	4.68E-05
4-2				5.51E-05
5-1	808763	1984304	slate, dark grey	5.05E-04
5-2				4.32E-04
6-1	809412	1984596	Andesite	4.40E-02
6-2				5.27E-02
7-1	811905	1982265	Andesite	4.01E-02
7-2				2.28E-02
8-1	808925	1981701	Andesite	3.31E-02
8-2				3.35E-02
9-1	813444	1970590	Limestone	5.47E-05
9-2				5.58E-05
10-1	818022	1969362	siltstone	1.17E-03
10-2				1.06E-03
10-3				3.52E-04
10-4				1.35E-03
11-1	788066	1945304	marble	-1.30E-05
11-2				-1.21E-05
12-1	787310	1943572	vitic-tuff?	-1.14E-05
12-2				-9.69E-06
13-1	771623	1944952	Andesite	5.55E-02
13-2				5.81E-02
14-1	770973	1944995	tuff	2.31E-03
14-2				2.11E-03

Table 1 Detail of sample cllested from the Loei area (cont.)

No	East	North	Rock types	Sus (SI)
15-1	752382	1955822	Diorite	1.00E-02
15-2				1.62E-02
16-1	758551	1960107	slaty shale	2.47E-04
16-2				2.26E-04
17-1	766576	1958295	silt/shale	2.71E-04
17-2				1.98E-04
18-1	785306	1977777	Granodiorite	1.59E-03
18-2				1.41E-03
19-1	779918	1951592	Qtz-monsonite	2.16E-02
19-2				2.13E-02
20-1	785253	1960765	Qtz-monsonite	2.28E-02
20-2				3.19E-02
21-1	818189	1934701	Sandstone	3.10E-04
21-2				3.00E-04
22-1	196500	1946200	Peridotite	1.13E-03
22-2				1.18E-03
23-1	806205	1938538	Limestone	1.22E-05
23-2				3.11E-06
24-1	204194	1923672	Conglomerate	7.38E-04
24-2				7.24E-04
25-1	206284	1922713	Siltstone/sand	3.71E-04
25-2				4.19E-04
25-3				2.98E-04
25-4				3.25E-04
26-1	204581	1927539	Sandstone	7.44E-05
26-2				7.69E-05
27-1	198218	1943511	Peridotite	3.03E-02
27-2				4.72E-02
27-3				3.41E-02
27-4				2.53E-02
28-1	197000	1943700	Serpentinite	6.31E-02
28-2				6.26E-02

Table 1 Detail of sample cllested from the Loei area (cont.)

No	East	North	Rock types	Sus (SI)
29-1	198900	1940300	Gabbro-fine grain	6.54E-03
29-2				3.34E-03
29-3				9.84E-03
30-1	196700	1945000	Gabbro-fine grain	8.68E-04
30-2				8.36E-04
30-3				7.29E-04
31-1	194000	1948800	Gabbro-fine grain	1.04E-03
31-2				9.55E-04
32-1	196700	1945000	Crytal tuff	6.71E-04
32-2				6.02E-04
33-1	784976	1961325	Hematite	2.86E-03
33-2				9.79E-03

Appendix III

Table 2 Summery of the result on density for rocks of the Loei study area

No	East	North	Rock types	S.1	S. 2	S.3	v	DRY	WET	Den-D	Den-W
1-I	716260	1970138	Sandstone, brown	2.6	2.5	2.9	18.85	45	49	2.38727	2.59947
1-II				2.6	2.9	2.55	19.23	49	50	2.5485	2.60051
2-I	716260	1970138	Sandstone, grey	2.6	2.7	2.6	18.25	45	45	2.46548	2.46548
2-II				2.4	2.4	2.4	13.82	47	50	3.39988	3.6169
3-I	803033	1996046	Chert, dark grey	2.5	2.7	2.4	16.2	43	45	2.65432	2.77778
3-II				2.5	2.5	2.6	16.25	45	45	2.76923	2.76923
4-I	802743	1989284	Chert, brown	2.7	2.5	2.7	18.23	47	49	2.57888	2.68861
4-II				2.6	2.7	2.9	20.36	52	52	2.55428	2.55428
5-I	808763	1984304	slate, dark grey	2.6	2.7	2.7	18.95	50	52	2.63797	2.74348
5-II				2.5	2.6	2.6	16.9	40	42	2.36686	2.48521
6-I	809412	1984596	Andesite	2.7	2.55	2.65	18.25	50	54	2.74044	2.95967
6-II				2.77	2.6	2.64	19.01	50	55	2.62974	2.89271
7-I	811905	1982265	Andesite	2.6	2.5	2.7	17.55	47	54	2.67806	3.07692
7-II				2.6	2.75	2.57	18.38	50	55	2.72101	2.99312
8-I	808925	1981701	Andesite	2.55	2.6	2.7	17.9	50	52	2.79314	2.90487
8-II				2.6	2.65	2.5	17.23	45	50	2.61248	2.90276
9-I	813444	1970590	Limestone	2.73	2.7	2.55	18.8	45	50	2.39412	2.66013
9-II				2.55	2.65	2.7	18.25	43	50	2.35678	2.74044
10-I	818022	1969362	siltstone	2.6	2.55	2.45	16.24	45	50	2.77034	3.07815
10-II				2.5	2.45	2.53	15.5	40	45	2.58127	2.90393
10-III				2.6	2.55	2.6	17.24	40	45	2.32045	2.61051
10-IV				2.7	2.7	2.55	18.59	45	52	2.42072	2.79728
11-I	788066	1945304	marble	2.6	2.55	2.6	17.24	50	50	2.90057	2.90057
11-II				2.6	2.6	2.7	18.25	50	50	2.73943	2.73943
12-I	787310	1943572	vitic-tuff?	2.6	2.7	2.95	20.71	45	45	2.17297	2.17297
12-II				2.6	2.9	2.75	20.74	45	48	2.17024	2.31493
13-I	771623	1944952	Andesite	2.7	2.7	2.6	18.95	50	50	2.63797	2.63797
13-II				2.6	2.7	2.65	18.6	50	50	2.68774	2.68774
14-I	770973	1944995	tuff	2.7	2.7	2.8	20.41	55	55	2.69449	2.69449
14-II				2.7	2.6	2.7	18.95	50	50	2.63797	2.63797

Table 2 Summery of the result on density for rocks of the Loei study area (cont.)

No	East	North	Rock types	S.1	S. 2	S.3	v	DRY	WET	Den-D	Den-W
15-I	752382	1955822	Diorite	2.6	2.65	2.65	18.26	50	55	2.73845	3.0123
15-II				2.6	2.55	2.65	17.57	45	50	2.56126	2.84584
16-I	758551	1960107	slaty shale	2.65	2.75	2.7	19.68	45	46	2.28702	2.33784
16-II				2.7	2.55	2.55	17.56	40	42	2.27833	2.39224
17-I	766576	1958295	silt/shale	2.7	2.7	2.6	18.95	45	45	2.37417	2.37417
17-II				2.5	2.7	2.6	17.55	40	42	2.2792	2.39316
18-I	785306	1977777	Granodiorite	2.75	2.65	2.6	18.95	50	55	2.63887	2.90276
				2.63	2.6	2.7	18.46	50	50	2.70818	2.70818
19-I	779918	1951592	Qtz-monsonite	2.55	2.6	2.55	16.91	45	45	2.6617	2.6617
19-II				2.45	2.55	2.6	16.24	45	45	2.77034	2.77034
20-I	785253	1960765	Qtz-monsonite	2.65	2.6	2.6	17.91	45	48	2.512	2.67947
20-II				2.65	2.6	2.7	18.6	45	50	2.41896	2.68774
21-I	818189	1934701	Sandstone	2.6	2.5	2.7	17.55	43	44	2.45014	2.50712
21-II				2.75	2.6	2.7	19.31	45	48	2.331	2.4864
22-I	196500	1946200	Peridotite	2.5	2.7	3.5	23.63	50	52	2.1164	2.20106
22-II				2.6	2.6	2.7	18.25	55	55	3.01337	3.01337
23-I	806205	1938538	Limestone	2.7	2.7	2.65	19.32	50	50	2.58819	2.58819
23-II				2.7	2.6	2.75	19.31	50	50	2.59	2.59
24-I	204194	1923672	Conglomerate	2.7	2.4	2.8	18.14	45	46	2.48016	2.53527
24-II				2.7	2.7	2.6	18.95	50	50	2.63797	2.63797
25-I	206284	1922713	Siltstone/sand	2.6	2.8	2.6	18.93	45	45	2.37743	2.37743
25-II				2.65	2.7	2.55	18.25	45	45	2.4664	2.4664
25-III				2.6	2.65	2.65	18.26	45	46	2.46461	2.51937
25-IV				2.7	2.5	2.7	18.23	45	50	2.46914	2.74348
26-I	204581	1927539	Sandstone	2.75	2.6	2.6	18.59	45	45	2.42066	2.42066
26-II				2.6	2.6	2.6	17.58	40	40	2.27583	2.27583
27-I	198218	1943511	Peridotite	2.5	2.5	2.6	16.25	40	40	2.46154	2.46154
27-II				2.5	2.7	2.5	16.88	40	40	2.37037	2.37037
27-III				2.6	2.55	2.8	18.56	40	40	2.15471	2.15471
27-IV				2.7	2.7	2.5	18.23	40	40	2.19479	2.19479
28-I	197000	1943700	Serpentinite	2.8	2.6	2.8	20.38	50	52	2.4529	2.55102
28-II				2.8	2.6	2.8	20.38	50	52	2.4529	2.55102

Table 2 Summery of the result on density for rocks of the Loei study area (cont.)

No	East	North	Rock types	S.1	S. 2	S.3	v	DRY	WET	Den-D	Den-W
29-I	198900	1940300	Gabbro-fine grain	2.8	2.6	2.7	19.66	50	50	2.54375	2.54375
29-II				2.8	2.8	2.6	20.38	50	51	2.4529	2.50196
29-III				2.7	2.4	2.7	17.5	45	50	2.57202	2.8578
30-I	196700	1945000	Gabbro-fine grain	2.55	2.7	2.5	17.21	50	52	2.90487	3.02106
30-II				2.65	2.6	2.7	18.6	50	55	2.68774	2.95651
30-III				2.5	2.75	2.6	17.88	50	51	2.7972	2.85315
31-I	194000	1948800	Gabbro-fine grain	2.6	2.65	2.7	18.6	55	55	2.95651	2.95651
31-II				2.9	2.5	2.8	20.3	60	60	2.95567	2.95567
32-I	196700	1945000	Crytal tuff	2.7	2.6	2.6	18.25	50	50	2.73943	2.73943
32-II				2.7	2.7	2.4	17.5	45	46	2.57202	2.62917
33-I	784976	1961325	Hematite	2.6	2.5	2.8	18.2	80	82	4.3956	4.50549
33-II				2.6	2.4	2.8	17.47	80	85	4.57875	4.86493

Curriculum Vitae

Name:	Kachentra Neawsuparp
Place of birth:	Lopburi
Year of birth:	1961
Education and Degree:	Chiang Mai University, Chiang Mai, Thailand, B.Sc, (Geology).
	Chiang Mai University, Chiang Mai, Thailand. M.Sc. (Applied Geophysics).
Related work experience:	Senior Geologist, Geotechnics Division Department of Mineral Resources, Thailand