REFERENCES

Adams, D.C. and Keller, G.R., 1994. Possible extension of the Midcontinent rift in west Texas and eastern New Mexico. *Canadian Journal of Earth Sciences 31, 709-720.*

Adams, D.C. and Keller, G.R., 1996. Precambrian basement geology of the Permian Basin regionof west Texas and eastern New Mexico: a geophysical perspective. *Am. Association of Pet. Geol. Bulletin 80, 410-431.*

Allen, T. and Chamberlain, C.P., 1989.Thermal consequences of mantled gneiss dome emplacement. *Planetary Earth Sciences Letter 93, 392-404.*

Allsopp, H.L., Burger, A.J. and Van Zyl, C., 1967. A Minimum age for the Premier Kimberlite Pipe yielded by biotite Rb-Sr measurements, with related galena isotopic data. *Earth Planetary Science Letters 3, 161-166.*

Allsopp, H.L., Erlank, A.J. and Hornung, G., 1973. Rb-Sr measurements on the Umkondo dolerites of Rhodesia: In symposium on granites, gneisses and related rocks. *Geological Society of South Africa, Special Publications No. 3, 217.*

Allsopp, H.L., Kramers, J.D., Jones, D.L. and Erlank, A.J., 1989. The age of the Umkondo group, eastern Zimbabwe, and implications for palaeomagnetic correlations. *South African Journal of Geology 92, 11-19.*

Anderson, E.M. 1951. The dynamics of faulting and dyke formation with applications to Britain. *Oliver & Boyd, 2nd edition, Edinbury, 206p.*

Anderson, E.M., 1938. The dynamics of sheet intrusion. *Proc. R. Society, Edinburgh 58, 242-251.*

Baer, G. and Reches, Z., 1991. Mechanics of emplacement and tectonic implications of the Ramon Dyke systems, Israel. *Journal of Geophysical Research 96, 11895-11910.*

Baer, G., Beyth, M. and Reches, Z., 1994. Dykes emplaced into fractured basement, Timna Igneous Complex, Israel. *Journal of Geophysical Research 99, 24039-24051.*

Barker, S. D., 1970. Compositions of granophyre, myrmekite and graphic granite. *Geological Society of America Bulletin 81, 3339-3350.*

Barton, C.M., Carney, J.N. and Crow, M.J., 1991. The Geology of the country around Rushinga and Nyamapanda. *Zimbabwe Geological Survey Bulletin 2, 220p.*

Barton, C.M., Carney, J.N., Crow, M.J. and Simango, S., 1985. Geology of the Archaean cratonic margin and the Zambezi-Mozambique orogenic belt in northeast Zimbabwe. *Annals of the Geological Survey of Zimbabwe 10, 1-39.*

Barton, J.M., Jr., and Copperthwaite, Y.R., 1983. Sr-isotopic studies of some intrusive rocks in the Ahlmann Ridge and Annandagstoppane, Western Queen Maud Land, Antarctica. In Oliver, R.L., James, P.R. and Jago, J.B. (Eds.), Antarctic Earth Science. *Cambridge University Press, Cambridge, 59-62.*

Best, M. G., 1982. Igneous and metamorphic petrology. *W. H. Freeman and Company, New York, 630p.*

Billings, M.P., 1972. Structural geology. *Prentice-Hall, Englewood Cliffs, N.J, 606p.*

Bond, G., 1951. Structure and metamorphism in the Chimanimani Mountains. *Trans. Geological Society of South Africa 54, 69-84.*

Botha, B.J.V., Grobler, N.J., and Burger, A.J., 1979, New U-Pb age measurements on the Koras Group, Cape Province and its significance as a time-reference horizon in

eastern Namaqualand: *Transactions of the Geological Society of South Africa 82, 1-5.*

Bowring, S.A., Erwin, D.H., Jin, Y.G., Martin, M.W., Davidek, K. and Wang, W., 1998. Geochronology of the end-Permian mass extinction. *Science 280, 1039-1045.*

Bristow, J.W., Armstrong, R.A. and Allsopp, H.L., 1982. A note on the geology and geochronology of the Tsange Gabbros. *Transactions Geologicals Society of South Africa 85, 135-139.*

Buchan, K.L., Ernst R.E., Hamilton, M.A. Mertanen, S., Pesonen, L.J. and Elming, S.-Å., 2001. Rodinia: the evidence from integrated paleomagnetism and U-Pb geochronology. *Precambrian Research 110, 9-32.*

Burger A.J. and Walraven, F., 1979. Summary of age determinations carried out during the period April 1978 to March 1979. *South Africa Geological Survey Annals 12, 209-218.*

Burger, A.J. and Walraven, F., 1980. Summary of age determinations carried out during the period April 1978 to March 1979: *South Africa Geological Survey Annals 14, 109-118.*

Button, A., 1977. Stratigraphic history of the middle Proterozoic Umkondo basin in the Chipinge area, southeastern Rhodesia. *Information Circular, Economic Geology Research Unit, University of Witwatersrand, Johannesburg 108, 42p.*

Cahen, L., Snelling, N.J., Delhal, J., and Vail, J.R, 1984. The geochronology and evolution of Africa. *Oxford, Clarendon Press, 512p.*

Carney, J.N., Aldiss, D.T. and Lock N.P., 1994. The geology of Botswana. *Botswana Geological Survey Bulletin 37, 113p.*

Carvalho, H. and Alves, P., 1993. The Precambrian of SW Angola and NW Namibia. *Communicações do Instituto de Investigação Científica Tropical, Lisboa, Portugal, Série de Ciencias da Terra 4, 38p.*

Carvalho, H., Crasto, J.P., Siva, Z.C.G. and Vialette Y., 1987. The Kibaran cycle in Angola-a discussion. *Geological Journal 22, 85-102.*

Chamberlain, R.T. and Link, T.A., 1927. The theory of laterally spreading batholiths. *Journal of Geology 35, 319-357.*

Cheney, E.S., Barton, J.M.Jr. and Brandl, G., 1990. Extent and age of the Soutpansberg sequences of southern Africa. *South African Journal of Geology 93, 664-675.*

Chenjerai, K.G., 1995. The Mutare greenstone belt: Geology, geochemistry and gold mineralisation. *PhD. Thesis, Cuvillier Verlag Göttingen, 177p.*

Chiwara, V.U., 2003. Late Archaean Paleoproterozoic tectonics in the Northern Marginal Zone, Limpopo Belt, around Renco Mine, Implications for gold mineralisation. *Mphil. Thesis, University of Zimbabwe, Unpublished, 154p.*

Clemens, J.D. and Mawer, C.K., 1992. Granitic magma transport by fracture propagation. *Tectonophysics 204, 339-360.*

Cliff, R.A., 1985. Isotopic dating in metamorphic belts. *Journal of Geological Society of London 142, 97-110.*

Clifford, T.N., Barton E.S., Retief, E.A., Rex, D.C. and Fanning, C.M., 1995. A crustal progenitor for the intrusive anorthosite-charnockite Kindred of the Cupriferous Koperberg Suite, O′okiep District, Namaqualand, South Africa; New isotope data for the country rocks and the intrusives. *Journal Petrology 36, 231-258.*

Coffin, M.F., and Eldholm, O., 1994, Large igneous provinces: Crustal structure, dimensions, and external consequences: *Reviews of Geophysics 32, 1-36.*

Compston, W. and McElhinny, M.W., 1975. The Rb-SrAge of the Mashonaland dolerites of Rhodesia and its significance for palaeomagnetic correlation in Southern Africa. *Precambrian Research 2, 305-315.*

Courtillot, V., Jaupart, C., Manighetti, I., Tapponnier, P. and Besse, J., 1999. On causal links between flood basalts and continental breakup. *Earth Panetary Science Letters 166, 177-195.*

Coward, M.P., James, P.R. and Wright, L., 1976. Northern margin of the Limpopo Mobile Belt. *Geological Society of America Bulletin 87, 601-611.*

Cox, K. G., Bell, J. D., and Pankhurst, R. J., 1979. The interpretation of igneous rocks. *George Allen and Unwin, London, 445 p.*

Currie, K.L. and Ferguson, J., 1970. The mechanism of magma of intrusion of lamprophyre dykes indicated by "offsetting" of dykes. *Tectonophysics 9, 525-537.*

Dalziel, I.W.D., 1991, Pacific margins of Laurentia and East Antarctica-Australia as a conjugate rift pair: evidence and implications for an Eocambrian supercontinent: *Geology 19, 598-601.*

Dalziel, I.W.D., 1992. On the organisation of American plates in the Neoproterozoic and the breakdown of Rodinia: *GSA Today 2, 237-241.*

Dalziel, I.W.D., 1995. Earth before Pangea. *Science America 272, 58-63.*

Dalziel, I.W.D., 1997. Neoproterozoic – Palaeozoic geograpghy and tectonics: Review, hypothesis, environmental speculation. *Geological Society of America Bulletin 108, 16-42.*

Dalziel, I.W.D., Mosher, S. and Gahagan, L.M., 2000. Laurentia-Kalahari collision and the assembly of Rodinia. *Journal of Geology 108, 499-513.*

Delaney, P.T., Pollard, D.D., Ziony, J.I. and McKee, E.H., 1986. Field relations between dykes and joints: Emplacement processes and palaeostress analysis. *Journal of Geophysical Research 91, 4920-4938.*

Dirks, P.H.G.M., 1999. The Zimbabwe craton and adjacent Mozambique Orogenic Belt. *Part 4 BSc. Honours Field Trip Guide. Department of Geology University of Zimbabwe, Unpublished.*

Dirks, P.H.G.M., Jelsma, H.A., Vinyu, M. and Munyanyiwa, H., 1998. The structural history of the Zambezi Belt in northeast Zimbabwe; Evidence from crustal extension during the early Pan African. *South African Journal of Geology 101, 1-15.*

Dirks, P.H.G.M., Kröner, A., Jelsma, H.A. and Vinyu, M.L., 1997. The Makuti Group (NW Zimbabwe): A Suture Zone in the Zambezi Belt. *Abstracts, 17th Colloquium on African Geology and Coference on Intraplate Magmatism and Tectonics of Southern Africa, 12.*

Eastin, R., Faure, G. and Neethling, D.C., 1970. The Age of the Trollkjerllrygg Volcanics of Western Queen Maud Land. *Antarctic Journal of United States 5, 157.*

Ernst, R.E. and Buchan, K.L., 2001. Large mafic magmatic events through time and links to mantle-plume heads. In: Ernst, R.E. and Buchan, K.L. (Eds.), Mantle plumes: Their identification through time. *Geological Society of America Special Paper 352, 483-575.*

Faure, G., 1986. Principles of isotope geology. *John Wiley and Sons, 589p.*

Gibson, R.L., Robb, L.J., Kisters, A.F.M. and Cawthorn, R.G., 1996. Regional geology setting and geological evolution of the Okiep Copper District, Namaqualand, South Africa. *South African Journal of Geology 99, 107-120.*

Goldich, S.S. and Mudrey, M.G.Jr., 1972. Dilatancy model of discordant U-Pb zircon ages. In: Contributions to recent geochemistry and analytical chemistry (Vinogradov volume). *Nauka, Moscow, 415-418.*

Goscombe, B., Armstrong, R. and Barton J.M., 1998. Tectonomorphic evolution of the Chewore Inliers: Partial re-equilibration of high-grade basement during the Pan African Orogeny. *Journal of Petrology 39, 1347-1384.*

Goscombe, B., Armstrong, R. and Barton, J.M., 2000. Geology of the Chewore Inliers, Zimbabwe: Constraining the Mesoproterozoic to Palaezoic evolution of the Zambezi Belt. *Journal of African Earth Sciences 30, 589-627.*

Gose, W.A., Helper, M.A., Connelly, J.N., Hutson, F.E., and Dalziel, I.W.D., 1997. Paleomagnetic data and U-Pb isotopic age determinations from Coats Land, Antarctica: implications for late Proterozoic plate reconstructions. *Journal of Geophysical Research 102, 7887-7902.*

Green, J.C., 1992. Proterozoic rifts. In: Condie, K.C. (Ed.), Proterozoic crustal evolution. *Elsevier, Amsterdam 97-149.*

Grimes, S.W., 1999. The Grenville Orogeny in West Texas: Structure, kinematics, metamorphism and depositional environment of the Carrizo Moutain Group. *PhD. Thesis, University of Texas, Austin (Unpublished).*

Grobler, N.J., Botha, B.J.V., and Smit, C.A., 1977, The tectonic setting of the Koras Group. *Transactions of the Geological Society of South Africa 80, 167-175.*

Groenewald, P.B., Grantham, G.H. and Watkeys, M.K., 1991. Geological evidence for a Proterozoic to Mesozoic link between southeastern Africa and Dronning Maud Land, Antarctica: *Geological Society of London Journal 148, 1115-1123.*

Groenewald, P.B., Moyes, A.B., Grantham, G.H. and Krynauw, J.R., 1995. East Antarctica Crustal Evolution: Geological Constraints and Modeling in Western Dronning Maud Land. *Precambrian Research 75, 231-250.*

Hahn, L. and Steiner, L., 2001. The Geology of the country west of Guruve, Makonde and Guruve districts: *Geological Survey of Rhodesia Bulletin 96, 187p.*

Hahn, L., Höehndorf, A., Kreuzer, H. and Resch, M., 1991. New geochronological data from the Zimbabwe craton, Limpopo belt, Zambezi mobile belt and from basic dykes. *Geologisches Jahrbuch A127, 519-552.*

Hall, A., 1992. Igneous Petrology. Longman Scientific and Technical, 573p.

Hanson, R.E., 2003. Proterozoic geochronology and tectonic evolution of Southern Africa. In: Yoshiada, M., Windley, B., and Dasgupta, S. (Eds.), Proterozoic East Gondwana: Supercontinent assembly and breakup. *Geological Society of London Special Publication 206, 428-463.*

Hanson, R.E., Harmer, R.E., Key, R.M., Blenkinsop, T.G., Bullen, D.S., Dalziel, I.W.D., Gose, W.A., Hall, R.P., Kampunzu, A.B., Mukwakwami, J., Munyanyiwa, H., Pancake, J.A. and Ward, S.E., *In press*. Mesoproterozoic magmatic and tectonic evolution of the Kalahari Craton, in Kampunzu, A.B., Hanson, R.E., Key, R., McCourt, S and Tack, L. (Eds.), *Kibaran Orogenic System of Africa: Journal of African Earth Sciences Special Issue.*

Hanson, R.E., Brueckner, H.K., Onstott, T.C., Wardlaw, M.S., Johns, C.C., and Hardcastle, K.C., 1988, Reconnaissance geochronology, tectonothermal evolution, and regional significance of the Middle Proterozoic Choma-Kalomo block, southern Zambia: *Precambrian Research 42, 39-61.*

Hanson, R.E., Crowley, J.L., Bowring, S.A., Ramezani, J., Gose, W.A., Dalziel, I.W.D., Pancake, J.A., Siedel, E.K., Blenkinsop, T.G. and Mukwakwami, J., 2004. Coeval large-scale magmatism in the Kalahari and Laurentian cratons during Rodinia Assembly. *Science 304, 1126-1129.*

Hanson, R.E., Hargrove, U.S., Martin, M., Bowring, S.A., Krol, M.A., Hodges, K.V., Munyanyiwa, H. and Blenkinsop, T.G., 1998a. New Geochronological constraints on the tectonic evolution of the Pan African Zambezi Belt, south-Central Africa. *Journal of African Earth Sciences, Special Abstracts Issue, 10th International Gondwana Conference 27, 104-105.*

Hanson, R.E., Martin, M.W., Bowring, S.A., and Munyanyiwa, H., 1998b. U-Pb zircon age for the Umkondo dolerites, eastern Zimbabwe: 1.1 Ga-large igneous province in Southern Africa/East Antarctica and possible Rodinia correlations. *Geology 26, 1143-1146.*

Hanson, R.E., Wilson, T.J. and Munyanyiwa, H. 1994. Geologic evolution of the Neoproterozoic Zambezi Orogenic Belt in Zambia. *Journal of African Earth Sciences 18, 135-150.*

Hargraves, R.B., Hattingh, P.J. and Onstott, T.C., 1994. Palaeomagnetic results from the Timbavati Gabbros in the Kruger National Park, South Africa. *South African Journal of Geology 97, 114-118.*

Hargrove, U.S., 1999. Geochronology, structure and metamorphism of part of the Pan African Zambezi Orogenic Belt, Mount Darwin area, northeastern Zimbabwe. *Unpublished MSc. Thesis, Texas Christian University, Fort Worth, 145p.*

Hartnady, C.J.H., 1991. Plate tectonics: About turn of supercontinents. *Nature 352, 476-478.*

Haslam, H.W., Brewer, M.S., Darbyshire, D.P.F. and Davis, A.E., 1983. Irumide and post-Mozambiquian plutonism in Malawi. *Geological Magazine 120, 21-35.*

Hawkesworth, C., Kelley, S., Turner, S., Le Roex, A. and Storey, B., 1999. Mantle processes during Gondwana break-up and dispersal. *Journal of African Earth Sciences 28, 239-261.*

Hegenberger, W., and Burger, A.J., 1985, The Oorlogsende Porphyry Member, South West Africa/Namibia: its age and regional setting. *Namibia Geological Survey Communications 1, 23-29.*

Hill, R.I., 1991. Starting plumes and continental break-up. *Earth Planetary Science Letters 104, 398-416.*

Höehndorf, A., Broedrick, T.J, Kramers, J.D., Besang, C. and Carl,C., 1990. Age determination of the Proterozoic Deweras lavas, Zimbabwe: Another case of too old Sm-Nd ages. *Precambrian Research.*

Hoffman, P.F. 1989. Speculations on Laurentia's first gigayear (2.0 to 1.0). *Geology 17, 135-138.*

Hoffman, P.F., 1991. Did the breakout of Laurentia turn Gondwanaland inside-out? *Science 252, 1409-1412.*

Hogan, J.P. and Gilbert, M.C., 1997. The A-type Mount Scott Granite Sheet: Importance of crustal magma traps. *Journal of Geophysical Research 100, 15779-15793.*

Hogan, J.P., Price, J.D. and Gilbert, M.C., 1998. Magma traps and driving pressure: consequences for pluton shape and emplacement in extensional regime. *Journal of Structural Geology 20, 1155-1168.*

Holzer, L., Kamber , B.S. , Kramers, J.D., Frei, R., 1995. The tectonometamorphic event at 2.0 Ga in the Limpopo Belt and the resetting behaviour of chronometers at high temperature. In: McManus, M.N.C., (Ed.) Proterozoic crustal and metallogenic evolution. *Special Publication of the Geological Survey of Namibia, Windhoek, 127-138 .*

Hyndman, D. W., 1985. Petrology of igneous and metamorphic rocks. *McGraw-Hill Book Company, New York, 786p.*

Irvine, T.N. and Baragaar, W.R.A., 1971. A guide to the chemical classification of the common volcanic rocks. *Canadian Journal Earth Sciences 8, 523-548.*

Jacobs, J., Thomas, R.J. and Weber, K., 1993. Accretion and indentation tectonics at the southern edge of the Kaapvaal craton during the Kibaran (Grenville) Orogeny. *Geology 21, 126p.*

Jelsma, H, A., 1993. Granites and greenstones in northern Zimbabwe: Tectono-thermal evolution and source regions. *PhD. Thesis, Vrije Universiteit, Amsterdam, The Netherlands, 268p.*

Johnston, S.T., Gose, W.A., Thomas, R.J., Elington, B.M. and Armstrong, R.A., 2000. New palaeomagnetic and age data from the southern Natal Belt, South Africa. *Journal of African Earth Sciences, Special Abstracts Issue, GSSA 27: Geocongress 2000 31, 35.*

Jolly, R.J.H. and Sanderson D.J. 1995. Variation in the form and distribution of dykes in the Mull swarm, Scotland. *Journal of Structural Geology 17, 1543-1557.*

Jolly, R.J.H. and Sanderson, D.J., 1997. A Mohr circle construction for the opening of a pre-existing fracture. *Journal of Structural Geology 19, 887-892.*

Jones, D.L. and McElhinny, 1966. Paleomagnetic correlation of basic intrusions in the precambrian of Southern Africa. *Journal of Geophysical* Research 71, 543-552.

Kamber, B.S., Kramers, J.D., Napier, R., Cliff, R.A. and Rollinson, H.R., 1995b. The Triangle Shear Zone, Zimbabwe, revisited: New data document and important event at 2.0Ga in the Limpopo Belt. *Precambrian Research 70, 191-213.*

Kamber, B.S., Wijbrans, J.R., Biino, G.G., Villa, I.M. and Davies, G., 1995a. Archaean granulites of the Limpopo Belt, Zimbabwe: One slow exhumation or two rapid events? *Tectonics 15, 1414-1430.*

Kampunzu, A.B., Armstrong, R.A., Modisi, M.P. and Mapeo, R.B.M., 2000a. Ion microprobe U-Pb ages on detrital zircon grains from the Ghanzi Group: Implications for the identification of a Kibaran-age crust in northwest Botswana. *Journal of African Earth Sciences 30, 579-587.*

Kampunzu, A.B., Kapenda, D. and Manteka, B., 1991. Basic magmatism and geotectonic Evolution of the Pan-African Belt in Central Africa: Evidence from the Katangan and west Congolian Segments. *Tectonophysics 190, 363-371.*

Kampunzu, A.B., Tembo, F., Matheis, G., Kapenda, D. and Huntsman-Mapila P., 2000b. Geochemistry and tectonic setting of mafic igneous units in the Neoproterozoic

Katangan basin, Central Africa: Implications for Rodinia breakup. *Gondwana Research 3, 125-153.*

Keller, G.R., Hills, J.M., Baker, M.R. and Wallin, E.T., 1989. Geophysical and geochronological constraints on the extent and age of mafic intrusions in the basement of west Texas and eastern New Mexico. *Geology 17, 1049-1052.*

Key, R.M. and Mapeo, R., 1999. The Mesoproterozoic history of Botswana and the relationship of the NW Botswana Rift to Rodinia. *Episodes 22, 118-122.*

Kröner, A., 1993. Proterozoic mobile belts compatible with the plate tectonic concept. In: Medaris, L.G., Jr., Byers, C.W., Mickelson, D.M. and Shanks, W.C. (Eds.), Proterozoic geology: Selected papers from an international proterozoic symposium. *Geological Society America Memoir 161, 59-74.*

Krynauw, J.R., Behr, H.J. and Van den Kerkhof, A.M. 1994. Sill emplacement in wet sediments: Fluid inclusion and cathodoluminescence studies at Grunhogna, western Dronning Maud Land, Antarctica. *Journal of the Geological Society of London 151, 777-794.*

Krynauw, J.R., Hunter, D.R. and Wilson, A.H., 1988. Emplacement of sills into wet sediments at Grunehogna, western Dronning Maud Land, Antarctica. *Journal of the Geological Society of London 145, 1019-1032.*

Krynauw, J.R., Watters, B.R., Hunter, D.R. and Wilson, A.H., 1991. A review of the field relations, petrology and geochemistry of the Borgmassivet intrusions in the Grunehogna province, western Dronning Maud Land, Antarctica, in Thomson, M.R.A., Crame, J. and Thomson, J.W., (Eds.), Geological evolution of Antarctica. Cambridge, *Cambridge University Press, 33-39.*

Leitner, E.G. and Phaup, A.E., 1974. The Geology of the country around Mount Darwin. *Geological Survey of Rhodesia Bulletin 73, 151p.*

Lockett, N.H., 1979. The Geology of the Country Around Dett. *Geological Survey of Rhosdesia Bulletin 85, 197p.*

Lofgren, G., 1974. An experimental study of plagioclase morphology. *American Journal of Science 274, 243-273.*

Ludwig, K.R., 1980. Calculation and uncertainties of U-Pb isotope data. *Earth and Planetary Science Letters 46, 212-220.*

Maboko, M.A.H. and Nakamura, E., 1995. Sm-Nd garnet ages from the Uluguru granulite complex of eastern Tanzania: further evidence for post-metamorphism slow cooling in the Mozambique belt. *Precambrian Research 74, 195-202.*

Maboko, M.A.H., Boelrijk N.A.I.M., Priem, H.N.A. and Verdurmen, E.A.T., 1985. Zircon U-Pb and biotite Rb-Sr dating of the Wami River granulites, eastern granulites, Tanzania: evidence for approximately 715 Ma granulite facies metamorphism and final Pan-African cooling approximately 475 Ma ago. *Precambrian Research 30, 361-378.*

Maboko, M.A.H., McDougall, I. And Zeitler, P.K., 1990. Dating late Pan-African cooling in the Uluguru granulite complex of eastern Tanzania using the $^{40}Ar/^{39}Ar$ technique. *Journal of African Earth Sciences 9, 159-167.*

Manhica, A.D.S.T., Grantham, G.H., Armstrong, R.A., Guise, P.G. and Kruger, F.J., 2001. Polyphase deformation and metamorphism at the Kalahari Craton-Mozambique Belt boundary. In: Miller, J.A., Holdsworth, R.E., Buick, I.S. and

Hand M. (Eds). Continental reactivation and reworking. *Geological Society London Special Publication 184, 303-321.*

Manyeruke, T.D., 2001. Economic potential of the Chimbadzi Hill, Rafingora in Zimbabwe. *BSc Hons. Thesis, Dept. of Geology, Univ. of Zimbabwe, 75p (Unpublished).*

Manyeruke, T. D., Blenkinsop, T.G., Bucholz, P., Love, D., Oberthür, T., Vetter, U.K. and Davis, W.D., *In press*. The age and petrology of the Chimbadzi Hill Intrusion, NW Zimbabwe: first evidence for early Paleoproterozoic magmatism in Zimbabwe.

Manyeruke, T.D., 2001. Economic potential of the Chimbadzi Hill, Rafingora in Zimbabwe. *BSc Hons. Thesis, Dept. of Geology, Univ. of Zimbabwe, 75p (Unpublished).*

Mariga, J., 1999. Structural and geochronological evolution of deep-crustal granulites, supracrustal rocks and deformed plutons in the Zambezi orogenic belt, Rusambo Mission area, northeastern Zimbabwe. *MSc. Thesis, Texas Christian University, 113p.*

Marrett, R. and Allmendinger, R.A., 1990. Kinematic analysis of fault-slip data. *Journal of Structural Geology 12, 973-986.*

Martin, A.K. and Hartnady, C.J.H., 1986. Plate tectonic development of the south west Indian Ocean: a revised reconstruction of East Antarctica and Africa. *Journal of Geophysical Research 91, 4767-4786.*

Master, S., 1991. The origin and controls on the distribution of copper and precious metal mineralisation at the Mangula and Norah Mines, Mhangura, Zimbabwe. *PhD. Thesis, University of the Witwatersrand, Johannesburg.*

McBirney, A.R., 1984. Igneous Petrology. *Freeman, Cooper and Company, California, 504p.*

McCourt, S. and Vearncombe, J.R., 1991. Shear zones of the Limpopo Belt and adjacent graitoid-greenstone terranes: Implications for late Archaean collision tectonics in Southern Africa. *Precambrian Research 55, 571-587.*

McCourt, S., Hilliard, P., Armstrong, R.A., and Munyanyiwa H., 2001. SHRIMP U-Pb zircon geochronology of the Hurungwe granite north-west Zimbabwe: Age constraints on the timing of the Magondi orogeny and implications for the correlation between the Kheis and Magondi belts. *South African Journal of Geology 104, 39-46.*

McDougall, I., 1963. Potassium-argon age measurements on dolerites from Antarctica and South Africa. *Journal of Geophysical Research 68, 1535-1545.*

McElhinny, M.W. and Opdyke, N.D., 1964. The Palaeomagnetism of the Precambrian dolerites of eastern Southern Rhodesia: An example of rock correlation by magnetism. *Journal of Geophysical Research 69, 2465-2475.*

McElhinny, M.W., 1966. The palaeomagnetism of the Umkondo lavas, eastern Southern Rhodesia. *Royal Astronomical Society Geophysical Journal 10, 375-381.*

McElhinny, M.W., Briden, J.C., Jones, D.L. and Brock, A., 1968. Geological and geophysical implications of paleomagnetic results from Africa. *Reviews of Geophysics 6, 211-238.*

Meert, J.G. and Van der Voo, R., 1997. The assembly of Gondwana 800-550 Ma. *Journal of Geodynamics 23, 223-235.*

Meert, J.G., Van der Voo, R. and Ayub, S., 1995. Paleomagnetic investigations of the late Proterozoic Gagwe lavas and Mbodzi complex, Tanzania and assembly of Gondwana. *Precambrian, 69, 113-131.*

Meschede, M., 1986. A method of discriminating between different types of mid-ocean ridge basalts and continental tholeiites with the Nb-Zr-Y diagram. *Chemical Geology 56, 207-218.*

Miller, R.McG., 1983. The Pan-African Damara Orogen of southwest Africa/Namibia. In: Miller, R.McG. (Ed.), Evolution of the Damara Orogen of southwest Africa/Namibia. *Geological Society of South Africa Special Publication 11, 431-515.*

Mkweli, S., Kamber, B.S. and Berger, M., 1995. A Westward continuation of the Zimbabwe Craton, Northern Marginal Zone tectonic break and new age constraints on the timing of the thrusting. *Journal of the Geological Society of London 152, 77-83.*

Modie, B.N.J., 1996. Depositional environment of the Meso- to Neoproterozoic Ghanzi-Chobe Belt, northwest Botswana. *Journal of African Earth Sciences 22, 255-268*.

Moen, H.F.G., 1987, The Koras Group and related intrusives north of Upington: A reinvestigation. *South Africa Geological Survey Bulletin 85, 20 p.*

Mosher, S., 1998. Tectonic Evolution of the Southern Laurentian Grenville Orogenic Belt. *Geological Society of America Bulletin 110, 1357-1375.*

Moyes, A.B., Krynauw, J.R. and Barton, J.M., Jr., 1995. The age of the Ritscherflya Supergroup and Morgmassivet Intrusions, Dronning Maud Land, Antarctica. *Antarctic Science 7, 87-97.*

Mukasa, S.B., Wilson, A.H. and Carlson, R.W., 1998. A multielement geochronologic study of the Great Dyke, Zimbabwe: significance of the robust and reset ages. *Earth and Planetary Science Letters 164, 353-369.*

Mukwakwami, J., Blenkinsop, T.G., Hanson, R. and Munyanyiwa, H., 2001. Umkondo igneous province and Mesoproterozoic Umkondo basin in eastern Zimbabwe: Possible relevance to Rodinia. *Geological Society of America abstracts with programmes 33, 155.*

Munyanyiwa, H., 1997. The Mozambique Belt of Zimbabwe. *Fieldtrip Guide for Conference on Intraplate Magmatism and Tectonics of Southern Africa (Harare, Zimbabwe, 13-17 September), 32 p.*

Munyanyiwa, H., 1999. Geochemical study of the Umkondo dolerites and lavas in the Chimanimani and Chipinge Districts (eastern Zimbabwe) and their regional implications. *Journal of African Earth Sciences 28, 349-365.*

Nakashima, Y., 1993. Static stability and propagation of a fluid-filled edge crack in rock; implication to for fluid transport in magmatism and metamorphism. *Journal of Physics of the Earth 41, 189-202*.

Nicholson, R., 1985. The Intrusion and Deformation of Tertiary Minor Sheet Intrusions, west Suardal, Isle of Skye, Scotland. *Journal of Geology 20, 53-72.*

Nicholson, R., and Pollard, D.D., 1985. Dialation and linkage of echelon cracks. *Journal of Structural Geology 20, 53-72.*

Nyama, N., 1999. The geology and structure of the central part of the Mutare Greenstone Belt. *BSc. Honours Thesis,University of Zimbabwe, Unpublished, 47p.*

Oberthür, T., DavisD.W., Blenkinsop, T.G.B. Höhndorf, A., 2002. A precise U-Pb mineral ages, Rb-Sr and Sm-Nd systematics for the Great Dyke, Zimbabwe – Constraints on crustal evolution and and metallogenesis of the Zimbabwe Craton. *Precambrian Research 113, 293-305.*

Odé, H., 1957. Mechanical analysis of the dyke pattern of the Spanish Peaks area, Colorado: *Geological Society of America Bulletin 68, 567-576.*

Pancake, J.A., 2001. Geochronological and palaeomagnetic studies of Mesoproterozoic mafic igneous rocks in Botswana. *M.S. thesis (unpublished), Texas Christian University, Fort Worth, Texas, USA, 163p.*

Parfitt, E.A. and Peacock, D.C.P., 1999. Detailed mapping of dyke geometries at Easdale, Scotland, *Geosciences 10, 8-10.*

Payne, C.D.B., 1984. The Geology of the Gairezi sediments of the Umkondo group in the Inyanga area with special reference to structure and stratigraphy. *Unpublished BSc. Honours Thesis, University of Zimbabwe, 60p.*

Pearce, J.A. and Cann, J.R., 1973. Tectonic setting of basic volcanic rocks determined using trace element analyses. *Earth and Planetary Science Letters 19, 290-300.*

Pearce, J.A., and Norry, M.J., 1979. Petrogenetic implications of Ti, Zr, Y and Nb variations in volcanic rocks. *Contributions Mineralogy Petrology 69, 33-47.*

Peate, D.W., and Hawkesworth, C.J., 1996. Lithospheric to asthenospheric transition in low Ti-flood basalts from southern Paranà, Brazil. *Chemical Geology 127, 1-24.*

Peters, M., Haverkamp, B., Emmermann, R., Kohnen, H. and Weber, K., 1991. Paleomagnetism, K-Ar dating and geodynamic setting of igneous rocks in western and central Neuschwabenland, Antarctica, in Thomson, M.R.A., Crame, J. and Thomson, J.W., (Eds.), Geological evolution of Antarctica: Cambridge, *Cambridge University Press, 549-555.*

Pfurr, N., Ahrendt, H., Hansen, B.T. and Weber K., 1991. U-Pb and Rb-Sr isotopic study of granitic gneisses and associated metavolcanic rocks from the Rostock massifs, southern margin of the Damara orogen: implications for lithostratigraphy of this segment. *Namibia Geological Survey Communications 7, 35-48.*

Phaup, A.E., 1973. Chemical analysis of the rocks, ores and minerals of Rhodesia. *Geological Survey of Rhodesia Bulletin 71, 297p.*

Pollard, D.D., 1973. Derivation and evaluation of a mechanical model for sheet intrusions. *Tectonophysics 19, 233-269.*

Porada, H. and Berhorst, V., 2000. Towards a new understanding of the Neoproterozoic-early Palaeozoic Lufilian and northern Zambezi Belts in Zambia and the Democratic Republic of Congo. *Journal of African Earth Sciences 30, 727-771.*

Powell, C.McA., Jones, D.L., Pisarevsky, S. and Wingate, M.T.D., 2001. Paleomagnetic constraints on the position of the Kalahari craton in Rodinia. *Precambrian Research, 110, 33-46.*

Priem, H.N.A., Boelrijk, N.A.I.M., Hebeda, E.H., Verdurmen, E.A.Th. and Verschure, R.H., 1971. Isotopic dating in the Kamativi tin belt, Southern Rhodesia. *Geologie Mijnbouw 50, 619-624.*

Ramsay, J.G. and Huber, M.I., 1987. The techniques of modern structural geology. *Academic Press, 1, 306p.*

Reid, D.L., Ransome, I.G.D., Onsott, T.C. and Adams, C.J., 1991. Time of emplacement and metamorphism of late Precambrian mafic dykes associated with Pan-African

Gariep orogen, Southern Africa: Implications for the age of the Nama Group. *Journal of African Earth Sciences, 13, 531-541.*

Reimold, W.U., Pybus, G.Q.J., Kruger, F.J., Layer, P.W. and Koeberl, C., 2000. The Anna's Rust Sheet and related gabbroic intrusions in the Vredefort Dome-Kibaran magmatic event on the Kaapvaal Craton and beyond? *Journal of African Earth Sciences 31, 499-521.*

Richards, M.A., Duncan, R.A., and Courtillot, V.E., 1989, Flood basalts and hot-spot tracks: Plume heads and tails: *Science 246, 103-107.*

Robb, L.J., Armstrong, R.A. and Waters, D.J., 1999. The history of granulite-facies metamorphism and crustal growth from single zircon U-Pb geochronology, Namaqualand, South Africa. *Journal Petrology 40, 1747-1770.*

Roberts, J.L. and Sanderson, D.J., 1971. The intrusive form of some basaltic dykes showing flow lineation. *Geological Magazine 108, 489-499.*

Rollinson, H.R. and Blenkinsop, T.G., 1995. The magmatic, metamorphic and tectonic evolurion of the Northern Marginal Zone of the Limpopo Belt in Zimbabwe. *Journal of Geological Society of London 152, 66-75.*

Rollinson, H.R., 1993. Using geochemical data. *Longman Scientific and Technical Longman Group Limited, 352p.*

SACS (South African Committee for Stratigraphy), 1980, Stratigraphy of South Africa. Part 1 (Comp. L.E. Kent). Lithostratigraphy of the Republic of South Africa, southwest Africa/Namibia, and the Republics of Bophuthatswana, Transkei and Venda. *South Africa Geological Survey Handbook 8.*

Saggerson, E.P. and Turner, L.M., (1976). A review of the distribution of metamorphism in the ancient Rhodesia Craton. *Precambrian Research 3, 1-53.*

Schwartz, M.O., Kwok, Y.Y., Davis, D.W., and Akanyang, P., 1996. Geology, geochronology and regional correlation of the Ghanzi Ridge, Botswana. *South African Journal of Geology 92, 1-10.*

Shaw, H., 1980. The fracture mechanics of magma transport from the mantle to the surface, in Hargraves, R.B., ed., Physics of magamatic processes. *Princeton, New Jersey, Princeton University Press, 201-264.*

Singletary, S.J., 1999. Geochronology and regional tectonic significance of isolated Precambrian bedrock exposures in the Kalahari Desert, Botswana. *M.Sc. thesis, Texas Christian University, Publication, 99p.*

Singletary, S.J., Hanson, R.E., Martin, M.W., Crowley, J.L., Bowring, S.A., Key, R.M., Ramokate, L.V., Direng, B.B. and Krol, M.A., 2003. Geochronolgy of basement rocks in the Kalahari desert, Botswana, and implications for regional Proterozoic tectonics. *Precambrian Research, In press.*

Slater, D., 1965. Structural and stratigraphical relationships in the Umkondo System of eastern Southern Rhodesia. *Ph.D. Thesis, University of Leeds, p Unpublished, 183.*

Snelling, N.J., 1966. Age determination unit. (Authorship not attributed). *Inst. Geol. Sci. Ann. Report, 1965, Pt, 2, Overseas Geological Surveys, 44-57.*

Snelling, N.J., Hamilton, E.I., Drysdall, A.R and Stillman, C.J., 1964. A review of age determinations from Northern Rhodesia. *Economic Geology 59, 961-981.*

Spear, F.S., 1993. Metamorphic phase equilibria and pressure-temperature-time paths. *Mineralogical Society of America, 799p.*

Stacey, J.S. and Kramers, J.D. 1975. Approximation of terrestrial lead isotope evolution by a two-stage model. *Earth and Planetary Science Letters 26, 207-221.*

Stagman, J.G., 1959. The geology of the country around Mangula Mine, Lomagundi and Urungwe District. *Geological Survey of Rhosdesia Bulletin 46, 84p.*

Stagman, J.G., 1961. The geology of the country around Sinoia and Banket, Lomagundi District. *Geological Survey of Southern Rhodesia Bulletin 49, 107p.*

Steiger, R.H. and Jäger, E., 1977. Subcommision on geochronology: convention on the use of decay constants in geo- and cosmochronology. *Earth and Planetary Science Letters 36, 359-362.*

Stern, R.J., 1994. Arc assembly and continental collision in the Neoproterozoic East African Orogen: Implications for the consolidation of Gondwanaland. *Revised Earth and Planetary Science 22, 319-351.*

Stern, R.J., 1996. Arc assembly and continental collision in the Neoproterozoic East African orogen: Implications for the consolidation of Gondwanaland. *Ann. Rev. Earth and Palanetary Sciences, 22, 319-351.*

Steven, N., Armstrong, R. and Moore, J., 2000. First geological description of a late Proterozoic (Kibaran) metabasaltic andesite-hosted chalcocite deposit at Omitiomire, Namibia. In: Cluer, J.K., Price, J.G., Struhsacker, E.M., Hardyman, R.F., and Morris (Eds.), Geology and ore deposits 2000: The Great Basin and beyond: Symposium proceedings, Reno, Nevada. *Geological Society of Nevada, 711-734.*

Stidolph, P.A., 1977, The Geology of the Country Around Shamva: *Geological Survey of Rhodesia Bulletin 78, 249p.*

Stocklmayer, V.R., 1978. The geology of the country around Inyanga. *Rhodesia Geological Survey, Bulletin 79, 173p.*

Stocklmayer, V.R., 1981. The Umkondo Group. In: Hunter, D.R. (Ed.), Precambrian of the Southern Hemisphere. *Elsevier, Amsterdam, 556–562.*

Storey, B.C., 1995. The role of mantle plumes in continental breakup: Case histories from Gondwanaland. *Nature 377, 301-308.*

Swift, W.H., 1962. The geology of the Middle Sabi Valley. *Southern Rhodesia Geological Survey, Bulletin 52, 30p.*

Tennant, R., 1995. A structural re-appraissal of the Chimanimani Mountains, Zimbabwe. *BSc. (Hon) dissertation (Unpublished), University of Zimbabwe.*

Tennick, F.P., 1976, The geology of the country around Magondi, Lomagundi, Hartely and Gatooma Districts. *Geological Survey of Rhodesia Bulletin 65, 314p.*

Thomas, R.J., Agenbacht, A.L.D., Cornell, D.H. and Moore, J.M., 1994. The Kibaran of Southern Africa: Tectonic evolution and metallogeny. *Ore Geology Reviews 9, 131-160.*

Thomas, R.J., Eglington, B.M., Evans, M.J., 1992. The petrology of the Proterozoic Equeefa Suite, southern Natal, South Africa. *South African Journal of Geology 95, 116-130.*

Tilton, G.R., 1960. Volume diffusion as a mechanism for discordant lead ages. *Journal of Geophysical Research 65, 2933-2945.*

Tingey, R.J., 1991. The regional geology of Archean and Proterozoic rocks in Antarctica. In: Tingey R.J. (Ed.), The geology of Antarctica. *Clarendon Press, Oxford, 1-73.*

Treloar, P.J. and Blenkinsop, T.G., 1995. Archaean deformation patterns in Zimbabwe – True indicators of Tibetan style crustal extrusion or not? In Coward, M.P. and Ries, A.C. (Eds.), Early Precambrian Processes Special Publication. *Geological Society of London 95, 87-108.*

Treloar, P.J. and Kramers, J.D., 1989. Metamorphism and geochronology of granulites and migmatitic granulites from the Magondi Mobile Belt, Zimbabwe. *Precambrian Research 45, 277-289.*

Treloar, P.J., Carney, J.N., Crow, M.J., Evans, J.A. and BartonC.M., 1990. Pressure-temperature-time paths of granulite facies metamorphism and uplift, northeast Zimbabwe. In: Vielzuf, D. and Vidal, P. (Eds.), Granulites and crustal evolution. *Kluwer Academic Publication, Netherlands, 223-241.*

Treloar, P.J., Coward, M.P. and Harris, N.B.W., 1991. Himalayan-Tibetan analogies for the evolution of the Zimbabwe Craton and Limpopo Belt. *Precambrian Research 55, 571-587.*

Tronnes, R.G. and Brandou, A.D., 1992. Mildly peraluminous high-silica granites in a continental : the Drammen and Finnemarka batholiths, Oslo Rift, Norway. *Contributions to Mineralogy and Petrology 118, 60-78.*

Tsunogae, T., Miyano, T. and Ridley, J.R., 1992. Metamorphic P-T profiles from the Zimbabwe Craton to the Limpopo Belt, Zimbabwe. *Precambrian Research 55, 259-278.*

Tucker, M.E., 1991. Sedimentary petrology: An introduction to the origin of sedimentary rocks. *Backwell Scientific Publications, 280p.*

Turner, F. G. and Verhoogen, J., 1960. Igneous and metamorphic petrolgy. *McGraw-Hill Publishing Company, New York, 694p.*

Tyndale-Biscoe, R., 1957. The geology of a portion of the Inyanga District. *Southern Rhodesia Geological Survey, Short Report 37, 11p.*

Tyrwhitt, D.S., 1966. Petrology, mineralogy and genesis of some copper deposits in the Middle Sabi Valley, Rhodesia. *Research institute of African Geology. PhD. Thesis, University of Leeds, 126p.*

Vail, J.R. and Dodson, M.H. 1969. Geochronology of Rhodesia. *Transactions of the Geological Society of South Africa 72, 79-114.*

Vail, J.R., 1966. Aspects of the stratigraphy and structure of the Umkondo System in the Manica Belt of Southern Rhodesia and Mozambique, and an outline of the general geology. *Transactions Geological Society South Africa 68, 13-30.*

Van Breeman, O., Dodson, M.H. and Vail, J.R. 1966. Isotopic age measurements on the Limpopo Orogenic Belt, Southern Africa. *Earth and Planetary Science 1, 401-406.*

Van Breeman. O., 1968. Geochronology of the Limpopo Orogenic Belt. PhD. *Thesis (unpublished), University of Leeds..*

Van Breemen, O., Aftalion, M., Pankhurst, R.J. and Richardson, S.W., 1979. Age of the Glen Dessary Syenite, Invernesshire: Diachronous Palaeozoic metamorphism across the Great Glen. *Scottland Journal of Geology 15, 49-62.*

Vinyu, M.L., Hanson, R.E., Martin, M.W., Bowring, S.A., Jelsma, H.A., Krol, M.A. and Dirks, P.H.G.M., 1997. U-Pb and $^{40}Ar/^{39}Ar$ Geochronological constraints on the tectonic evolution of the easternmost part of the Zambezi Belt, northeast Zimbabwe. *Precambrian Research.*

Vinyu, M.L., Martin, M.W., Bowring, S., Hanson, R., Jelsma, H.A. and Dirks, P., 1997. Tectonothermal Evolution of the Polymetamorphic Zambezi Belt in NE Zimbabwe: Constrains from U-Pb Single Grain Zircon Data. *In Abstract volume, Intraplate Magmatism and Tectonics of Southern Africa and the 17th Colloquium on African Geology, Harare, Zimbabwe, Geological Society of Zimbabwe, 52.*

Walraven, F., 1986. Geochemistry of the Timbavati Gabbro of the eastern Transvaal Lowveld, South Africa. *Transactions Geological Society of South Africa 87, 211-223.*

Wang, P and Glover, L., 1992. A tectonic test of the most commonly used geochemical discriminant diagrams and patterns. *Earth Science Reviews 33, 111-131.*

Ward, S.E., 2002. Petrogenesis of Mesoproterozoic mafic dykes and sills in Zimbabwe. *PhD. Thesis (Unpublished), University of Portsmouth, Portsmouth, U.K., 350p.*

Ward, S.E. and Hall, R.P., 2001. The Kamativi dykes of northeast Zimbabwe: A single "swarm". *Abstracts for International Dyke Conference 4, KwaZulu Natal, South Africa (26-29 June, 2001).*

Ward, S.E., Hall, R.P. and Hughes, D.J., 2000. Guruve and Mutare dykes: Preliminary indication of complex Mesoproterozoic mafic magmatic systems in Zimbabwe. *Journal of African Earth sciences 30, 689-701.*

Ward, S.E., Hall, R.P. and Hughes, D.J., 1999. Mesoproterozoic mafic dykes of northern Zimbabwe: A connection to the Umkondo Large Igneous Province? *Abstracts for International Geological Correlation Program Coference: Zambia, 1999 (Geological Society of Zambia, Kitwe, Zambia, July 12-26), 14.*

Watson, R.L.A., 1962. The geology of the country south of Mutare. *Rhodesia Geological Survey, Short Report 38, 10p.*

Watson, R.L.A., 1969. The geology of the Cashel, Mesetter and Chipinga areas. *Rhodesia Geological Survey, Bulletin 60, 85p.*

Watters, B.R., Krynauw, J.R. and Hunter D.R., 1991. Volcanic rocks of the Proterozoic Jutulstraumen Group in Western Dronning Maud Land, Antarctica. In: Thomson, M.R.A., Crame, J.A., Thomson, J.W. (Eds), Geological evolution of Antarctica. *Cambridge, Cambridge University Press, 41-46.*

Wéertman, J., 1971. Theory of water-filled crevasses in glaciers applied to vertical magma transport beast northeastath oceanic ridges. *Journal of Geophysical Research 76, 1171-1183.*

Wéertman, J., 1980. The stopping of a rising liquid filled crack in the earth's crust by a freely slipping horizontal joint. *Journal of Geophysical Research 85, 967-976.*

Weil, A.B., Van der Voo, R., Niocaill, C.M. and Meert, J.G., 1998. The Proterozoic supercontinent Rodinia: Paleomagnetically derived reconstructions for 1100-800 Ma. *Earth and Planetary Science Letters 154, 13-26.*

Werner, C. and Schmidt, B., 1995. Diplom-Kartierung in de Chimanimani. *BSc. (Hon) dissertation, Institut fur Geowissenschaften, Johannes-Universitat Mainz, Mainz, 65p.*

Wetherill, G.W., 1956. Discordant uranium-lead ages. *Trans. American Geophysical Union 37, 320-326.*

Wetherill, G.W., 1963. Discordant uranium-lead ages. Part2. Discordant ages resulting from diffusion of lead and uranium. *Journal of Geophysical Research 68, 2957-2965.*

White, R.S. and McKenzie, D., 1989. Magmatism at rift zones: The generation of volcanic continental margins and flood basalts. *Journal of Geophysical Research 94 7865-7729.*

White, R.S., and McKenzie, D., 1995, Mantle plumes and flood basalts: *Journal of Geophysical Research 100, 17543-17585.*

Wiles, M.C., 1972. The geology of the country around Sipolilo. *Geological Survey of Rhodesia Bulletin 63, 76p.*

Wilson, G., 1970. Wrench movements in the Aristarchus region of the moon. *Proc. Geol. Association 81, 595-608.*

Wilson, J.F. Jones, D.L. and Kramers J.D., 1987. Mafic dyke swarms in Zimbabwe, In Halls, H.C., and Fahrig, W.F., (Eds.), Mafic dyke swarms: *Geological Association of Canada Special Paper 34, 433-444.*

Wilson, J.F., 1964. The geology of the country around Fort Victoria. *South Rhodesia Geological Survey Bulletin 58, 147p.*

Wilson, J.F., and Jones, D.L., 1990. A craton and its cracks: Some of the behaviour of the Zimbabwe block from the late Archean to the Mesozoic in response to horizontal movements, and the significance of some mafic dyke fracture patterns. *Journal of Earth Sciences 10, 483-501.*

Wilson, J.F., Jones, D.L., and Kramers, J.D., 1985, Mafic dyke swarms in Zimbabwe: *in* Abstracts: *International Conference on Mafic Dyke Swarms, University of Toronto, Toronto, Ont., Canada, 188.*

Wilson, M., 1989. Igneous petrogenesis: A global tectonic approach. *Unwin Hyman, London, 466p.*

Wilson, T.J., Hanson, R.E., and Wardlaw, M.S., 1993. Late Proterozoic evolution of the Zambezi Belt, Zambia. Implications for regional Pan African tectonics and shear displacement in Gondwana. In: Findlay, R.H., Unrug, R., Banks, M.R. and Veevers, J.J. (Eds.). Gondwana eight. *Balkema, Rotterdam, 69-82.*

Wingate, M.T.D., 2000. Ion microprobe and baddeleyite ages for the great dyke and its satelite dykes, Zimbabwe. *South African Journal of Geology 103, 74-80.*

Wingate, M.T.D., 2001. SHRIMP baddeleyite and zircon ages for an Umkondo dolerite sill, Nyanga Mountains, Eastern Zimbabwe. *South African Journal of Geology 103, 13-22.*

Winkler, H.G.F., 1979. Petrogenesis of Metamorphic Rocks. *Springer-Verlag New York Heidelberg Berlin, 348p.*

Wood, D.A., Joron, J.L. and Treuil, M., 1979. A re-appraisal of the use of trace elements to classify and discrimnate between magma series erupted in different tectonic settings. *Earth and Planetary Science Letters 45, 326-336.*

Yardley, B.W.D, 1989. An Introduction to Metamorphic Petrology. *Longman Scientific and Technical, 248p.*

York, D., 1969. Least squares fitting of a straight line with correlated errors. *Earth and Planetary Science Letters 5, 320-326*