

Appendix A Articles compiled geochemical data by DODAI

- Abukuma Mountains Petrological and Mineralogical Research Group*, 1998, Old basements.* *In* Ibaraki Nat. Mus. ed. *The 1st general research report of the Ibaraki Nature Museum*, Ibaraki Nat. Mus., 31–44.***
- Abukuma Mountains Petrological and Mineralogical Research Group*, 2007, Rocks and minerals in the northwestern part of the Ibaraki Prefecture.* *In* Ibaraki Nat. Mus. ed. *The 4th general research report of the Ibaraki Nature Museum*, Ibaraki Nat. Mus., 47–84.***
- Akasaki, E., Kamei, A. and Owada, M., 2013, Magma process of the Kibe Granite (One of the Younger granitoids) in the Yanai area of the Ryoke Belt, southwest Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **42**, 159–173.**
- Arai, H., Miyashita, A., Tanabe, K. and Mamoru, M., 2011, Petrological and mineralogical characterizations of jadeite-bearing rocks from the Mikabu greenstones in the Shimonita area, Kanto Mountains, Central Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **40**, 177–194.**
- Asaki, T. and Yoshida, T., 1998, Subduction-zone type greenstones from the northern Shimanto belt in southeastern Tokushima Prefecture, Southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **93**, 83–102.**
- Asaki, T. and Yoshida, T., 1999, Alteration of basalts from the Shimanto belt in southeastern Tokushima Prefecture, Southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **94**, 11–36.**
- Asaki, T., Yoshida, T., Osozawa, S. and Aoki, K., 1993, Geology and geochemistry of in-situ greenstones from the Shimanto Belt in Southern Tokushima Prefecture, Japan. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **26**, 65–113.***
- Asaki, T., Yoshida, T., Osozawa, S. and Ishikawa, M., 1999, Chemical compositions of basaltic rocks in the Inui, Sumatagawa, and Komyo groups, Shimanto Belt, southern Akaishi Mountains. *Mem. Geol. Soc. Japan*, **52**, 181–194.**
- Asano, M., Tanaka, T. and Suwa, K., 1990, Sm-Nd and Rb-Sr ages of the Hida metamorphic rocks in the Wada-gawa area, Toyama Prefecture. *Jour. Geol. Soc. Japan*, **96**, 957–966.**
- Collaborative Research Group for the Granites around Lake Biwa (CRGGLB), 1997, Granitic masses around Lake Biwa, southwest Japan: Part 4 Geology and petrography of the Hira Granite pluton. *Earth Sci. (Chikyu Kagaku)*, **51**, 188–198.**
- Collaborative Research Group for the Granites around Lake Biwa (CRGGLB), 2000, Granitic masses around Lake Biwa, southwest Japan: Part 5 The Tanakami Granite pluton. *Earth Sci. (Chikyu Kagaku)*, **54**, 380–392.**
- Collaborative Research Group for the Granites around Lake Biwa, 2008, Formation of the Hiei Granite pluton and its geological implications for the Cretaceous felsic magmatism in southwest Japan. *Jour. Geol. Soc. Japan*, **114**, 53–69.**
- Fujimoto, Y., 2006, Petrology of the Taiheizan composite granitic rocks, Akita Prefecture, Northeast Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **35**, 253–269.**

- Fujimoto, Y. and Yamamoto, M., 2010, On the granitoids in the Shirakami mountains and correlation to the Cretaceous to Palaeogene granitoids distributed in the Northeast Japan. *Earth Sci. (Chikyu Kagaku)*, **64**, 127–144.**
- Fujinaga, K. and Kato, Y., 2001, Geochemistry of ferromanganese sediment formed by a ridge collision in the late Cretaceous southwestern Japan: geochemical analogy to a modern hydrothermal sediment at a mid-ocean ridge. *Resour. Geol.*, **51**, 29–40.**
- Fujinaga, K., Nozaki, T., Nakayama, K. and Kato, Y., 2011, Rare earth resource potential of the Aki strata-bound Fe-Mn deposit in the Northern Shimanto belt, central Shikoku, Japan. *Resour. Geol.*, **61**, 1–11.**
- Furukata, C., Nakagawa, M., Hirose, W. and Adachi, Y., 2010, Geochemical character of Early-Middle Miocene volcanic rocks from central Hokkaido: characterization of magma-related back-arc spreading at the margin of the volcanic field. *Jour. Geol. Soc. Japan*, **116**, 199–218.**
- Geshi, N., 2003, Development of the middle Miocene Otoge volcanic complex, Shitara district, central Japan. *Jour. Geol. Soc. Japan*, **109**, 580–594.**
- Hara, H., Ueno, H., Tsunoda, K., Hisada, K., Shimizu, M., Takeuchi, K. and Ozaki, M., 2010, Geology of the Mitsumine District. Quadrangle Series, 1: 50,000. Geol. Surv. Japan, AIST, 110p**
- Hayashi S., Yoshida, T., Sato, M., Nakamoto, O., Oguchi, T. and Aoki, K., 1993, Geochemistry of Late Miocene-Early Pliocene Momoyake Volcanic Rock, Northeast Japan. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **26**, 53–64.***
- Hayashi, T., Yoshida, T. and Aoki, K., 1990, Geochemistry of the Tanohata zoned pluton in Kitakami Mountains, Japan. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **23**, 45–65.***
- Hirahara, Y. and Shuto, K., 2003, Internal structure and formation of the Cape Sukoton doleritic intrusion, Rebus Island, Hokkaido, Japan. *Jour. Geol. Soc. Japan*, **109**, 442–458.**
- Hirano, N. and Okuzawa, K., 2002, Occurrence of the sandstone included in the alkali-basalt lava flow from the western Mineoka Belt, Boso Peninsula, Japan, and its tectonic significance. *Jour. Geol. Soc. Japan*, **108**, 691–700.**
- Honda, T. and Kimura, K., 2003, Distribution and behavior of major and trace elements in Tokyo Bay, Mutsu Bay and Funaka Bay marine sediments. *Bull. Soc. Sea Water Sci. Jpn.*, **57**, 166–180.**
- Hoshi, H., Iwano, H., Danhara, T. and Yoshida, T., 2003, Fission-track dating of the Shionomisaki igneous complex, Kii Peninsula, Japan. *Jour. Geol. Soc. Japan*, **109**, 139–150.**
- Igarashi, S., Arima, M., Kimura, J.-I. and Shuto, K., 2007, Petrology of the volcanic rocks from the Torikabuto Volcano, North Fossa Magna, central Japan –Differentiation process of calc-alkaline volcanic rocks–. *Jour. Geol. Soc. Japan*, **113**, 565–584.**
- Igarashi, S., Arima, M., Kimura, J.-I. and Shuto, K., 2012, Petrogenesis of the early Pleistocene volcanic rocks in the Sekita Mountains and the Shikumi river basin, North Fossa Magna, Central Japan – Differentiation process of tholeiitic basaltic magma–. *Japan. Mag. Mineral. Petrol. Sci.*, **41**, 103–121.**
- Ikawa, T. and Nagao, T., 1996, Genetic relationships between basalts and andesites in the Taradake

- volcanic area, Northwest Kyushu. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **91**, 321–338.**
- Ikedo, K. and Hayasaka, Y., 1994, Rb-Sr ages of the Yakuno rocks from the Northern Subzone of the Maizuru Terrane, Kyoto Prefecture, Southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **89**, 454–464.**
- Imaoka, T., Nakamura, T., Matsusato, H., Iizumi, S. and Itaya, T., 2001, Provenance study of rocks used in stone chamber of Myotokujiyama tumulus, Yamaguchi Prefecture, Japan and its archaeological significance. *Archaeol. Nat. Sci.*, **43**, 1–23.**
- Ishida, H., Ishiwatari, A. and Kagami, H., 1998, The Mt. Wasso moonstone rhyolite welded tuff in the Neogene Hokuriku Group, central Japan. *Jour. Geol. Soc. Japan*, **104**, 281–295.**
- Ishida, T., Arai, S., Ishiwatari, A., Hisada, K. and Matsuzawa, M., 1992, Greenstones from the south marginal part of the Cretaceous Sanchu belt in the Kanto Mountains, central Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **87**, 174–186.**
- Ishihara, S., 2002, Chemical characteristics of the mineralized granitoids (II). *Bull. Geol. Surv. Japan*, **53**, 673–688.**
- Ishihara, S., 2003, Chemical contrast of the Late Cretaceous granitoids of the Sanyo and Ryoke Belts, Southwest Japan: Okayama-Kagawa Transect. *Bull. Geol. Surv. Japan*, **54**, 95–116.
- Ishihara, S., 2005a, Geology of the Hiraiwa fluorite deposits and their relevance to the fluorine metallogenic province in Japan. *Bull. Geol. Surv. Japan*, **56**, 167–176.**
- Ishihara, S., 2005b, Source diversity of the older and early Mesozoic granitoids in the Hida Belt, central Japan. *Bull. Geol. Surv. Japan*, **56**, 117–126.**
- Ishihara, S. and Chappell, B. W., 2007, Chemical compositions of the late Cretaceous Ryoke granitoids of the Chubu District, central Japan – Revisited. *Bull. Geol. Surv. Japan*, **58**, 323–350.
- Ishihara, S. and Chappell, B. W., 2008a, Chemical compositions of the late Cretaceous granitoids across the central part of the Abukuma Highland, Japan – Revisited. *Bull. Geol. Surv. Japan*, **59**, 151–170.
- Ishihara, S. and Chappell, B. W., 2008b, Chemical compositions of the Paleogene granitoids of eastern Shimane Prefecture, Sanin District, Southwest Japan. *Bull. Geol. Surv. Japan*, **59**, 225–254.
- Ishihara, S. and Chappell, B. W., 2010a, Chemical compositions of the Miocene granitoids of the Okueyama, Hoi mine and Takakumayama plutons, Outer Zone of SW Japan. *Bull. Geol. Surv. Japan*, **61**, 17–38.
- Ishihara, S. and Chappell, B. W., 2010b, Petrochemistry of I-type magnetite-series granitoids of the northern Chile, Highland Valley, southern B. C., Canada, Erdenet mine, Mongolia, Dexing mine, China, Medet mine, Bulgaria, and Ani mine, Japan. *Bull. Geol. Surv. Japan*, **61**, 383–415.
- Ishihara, S. and Chappell, B. W., 2012, Petrochemistry of the Late Cretaceous-Paleogene igneous rocks in the Ikuno-Akenobe mines area, Southwest Japan. *Bull. Geol. Surv. Japan*, **63**, 181–202.
- Ishihara, S., Hirano, H. and Tani, K., 2012, Jurassic granitoids intruding into the Hida and Sangun metamorphic rocks in the central Sanin District, Japan. *Bull. Geol. Surv. Japan*, **63**, 227–231.**
- Ishihara, S. and Hoshino, M., 2013, Zircon and REE-rich alkaline plutonic rocks intruded into the accretionary prism at the Cape Ashizuri, Shikoku Island, Japan. *Bull. Geol. Surv. Japan*, **64**, 1–24.

- Ishihara, S. and Murakami, H., 2006a, Characteristics of REE distribution in granitoids of SW Japan: Miocene plutonic rocks at Ashizuri-misaki and late Cretaceous granitoids of the Sanyo Belt of SW Japan. *Bull. Geol. Surv. Japan*, **57**, 89–103.**
- Ishihara, S. and Murakami, H., 2006b, Fractionated Ilmenite-series Granites in Southwest Japan: Source Magma for REE-Sn-W Mineralizations. *Resour. Geol.*, **56**, 245–256.
- Ishihara, S., Nakano, S. and Terashima, S., 2005, Chemical characteristics of the Tanakami Granite, Kinki district –particularly important role of the radioactive and REE components–. *Bull. Geol. Surv. Japan*, **56**, 93–98.**
- Ishihara, S. and Ohno, T., 2016, Geochemical variation of the Late Cretaceous-Paleogene granitoids across the Ehime-Hiroshima-Shimane transect, Japan. *Bull. Geol. Surv. Japan*, **67**, 41–58.
- Ishihara, S. and Tani, K., 2004, Magma Mingling/mixing vs. Magmatic Fractionation: Geneses of the Shirakawa Mo-mineralized Granitoids, Central Japan. *Resour. Geol.*, **54**, 373–382.
- Ishihara, S., Terashima, S. and Tsukimura, K., 1987, Spatial Distribution of Magnetic Susceptibility and Ore Elements, and Cause of Local Reduction on Magnetite-series Granitoids and Related Ore Deposits at Chichibu, Central Japan. *Mining Geol.*, **37**, 15–28.
- Ishihara, S. and Wu, C., 2001, Genesis of Late Cretaceous-Paleogene Granitoids with Contrasting Chemical Trends in the Chubu District, Central Japan. *Bull. Geol. Surv. Japan*, **52**, 471–491.
- Ishiwatari, A. and Imasaka, M., 2002, Picritic basalt from the Miocene Yoka Formation in the Tango Peninsula, Kyoto Prefecture, southwestern Japan. *Jour. Geol. Soc. Japan*, **108**, 671–684.**
- Ishiwatari, A. and Ohama, H., 1997, Clinopyroxene basalt dikes in the Miocene Iwaine Formation, Hokuriku Province, Japan: various continental arc magmas including shoshonite series and origin of the clinopyroxene phenocrysts. *Jour. Geol. Soc. Japan*, **103**, 565–578.**
- Ishizuka, H., Miyake, M. and Takeda, N., 2003, Origin and metamorphism of greenstones from the Sanbosan unit of the southern Chichibu belt, west to central east Shikoku. *Jour. Geol. Soc. Japan*, **109**, 267–279.**
- Ito, H., Yuhara, M., Ishihara, Y., Furukawa, N. and Shoji, Y., 2007, Geochemical map of 26 elements in the Muromi River and Naka River basins in the western part of Fukuoka Prefecture, southwest Japan. *Fukuoka Univ. Sci. Rep.*, **37**, 37–56.**
- Iwata, C., Kamei, A., Iwata, K., Shibata, T. and Mitani, A., 2013, Igneous activity and fractional crystallization of the Abire granodiorite in the Okuizumo area, San'in zone, Southwest Japan. *Jour. Geol. Soc. Japan*, **119**, 190–204.**
- Jin, F. and Ishiwatari, A., 1997, Petrological and geochemical study on Hida gneisses in the upper reach area of Tetori river: Comparative study on the pelitic metamorphic rocks with the other areas of Hida belt, Sino-Korean block and Yangtze block. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **92**, 213–230.**
- Kagami, H. and Genbudo Research Group, 1990, Sr and Nd isotopic ratios of volcanic rocks from Genbudo area, Southwest Japan. *Jour. Geol. Soc. Japan*, **96**, 471–474.**
- Kagashima, S. and Shimura, T., 2001, Two stage fractional crystallization of the porphyritic biotite

- granite from the Iwafune granitoids in the Budo Mountains, Niigata Prefecture, Japan. *Jour. Geol. Soc. Japan*, **107**, 515–530.**
- Kamei, A. and Takagi, T., 2003, Geology and petrography of the Abukuma granites in the Funehiki area, Fukushima Prefecture, NE Japan. *Jour. Geol. Soc. Japan*, **109**, 234–251.**
- Kamei, A., Takagi, T. and Kubo, S., 2003, Geology and petrography of the Abukuma granites in the Hiyama district, Fukushima Prefecture, NE Japan. *Bull. Geol. Surv. Japan*, **54**, 395–409.**
- Kamitomo, I., Owada, M. and Kano T., 2011, Magma processes and tectonic setting of metamorphosed gabbroic complex in the Hida Belt, Southwest Japan: A case study of the Kumanogawa–Nagatogawa gabbroic complex. *Jour. Geol. Soc. Japan*, **117**, 637–647.**
- Kanaya, H., 1996, Some chemical and magnetic properties of rock samples from Matsukawa-ura drillhole, Soma city, Fukushima Prefecture, north-east Japan –Granitic rocks of Matsukawa-ura drillhole–. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **91**, 364–372.**
- Kanisawa, S., Doi, N., Kato, O. and Ishikawa, K., 1994, Quaternary Kakkonda granite underlying the Kakkonda geothermal field, northeast Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **89**, 390–407.**
- Kanisawa, S. and Ehiro, M., 1997, Pre-Devonian Shoboji Diorite distributed in the western border of the south Kitakami Belt: its bearing on the characteristics of petrology and K-Ar age. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **92**, 195–204.**
- Kanisawa, S., Yoshida, T., Ishikawa, K., Nagahiro, M. and Aoki, K., 1989, Geochemistry of the paleogene felsic volcanic rocks, Kitakami mountains. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **22**, 76–85.***
- Katada, M., Kanaya, H. and Onuki, H., 1991, Magmatic differentiation of the Himekami pluton in the northwest Kitakami Mountains. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **86**, 100–111.**
- Kato, N., Hirono, T., Ishikawa, T. and Ohtani, T., 2015, Mineralogical and geochemical characteristics of the fault gouge at the Tase outcrop, the Atera Fault. *Active Fault Res.*, **43**, 1–16.**
- Katoh T., 1995, The Chichibu Belt of Watarai-cho and Omiya-cho, Mie Prefecture in the eastern Kii Peninsula, Southwest Japan. *Jour. Geol. Soc. Japan.*, **101**, 211–227.**
- Kawajiri, K., 2005, Petrology of gabbroic rocks in the Hida Gaaien belt in the northern part of Takayama City, Gifu Prefecture, central Japan. *Jour. Geol. Soc. Japan*, **111**, 332–349.**
- Kawano, Y., 2013, Whole Rock Geochemistry of the Kitahata Body in the Fukae Granite, Saga Prefecture, Japan. *Bull. Geo-Enviro. Sci. Risho Univ.*, **15**, 1–9.**
- Kawano, Y., Ohira, H. and Shimazu, M., 1992, Petrology of the Tanigawadake Pliocene plutonic body, North Fossa Magna, central Japan. *Jour. Geol. Soc. Japan*, **98**, 497–508.**
- Kawano, Y., Okamura, S., Kubo K. and Kagami, H., 1993, Trace element, Sr and Nd isotopic compositions of the Okushiri granodioritic body, southwest Hokkaido. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **88**, 447–456.**
- Kawano, Y. and Yuhara, M., 2008, Chronological and isotope geological study of Cretaceous granitic rocks, upper reach of the Nakagawa river, Fukuoka Prefecture. *Jour. Geol. Soc. Japan*, **114**, 218–

230.**

- Kiji, M. and Collaborative Research Group for the Granites around Lake Biwa (CRGGLB), 2014, K-Ar dating of the mafic dyke associated with the Hiei Granite Pluton, Kyoto Prefecture, SW Japan. *Earth Sci. (Chikyu Kagaku)*, **68**, 149–150.**
- Kiji, M. and Kitani, K., 2009, K-Ar dating of the mafic dike exposed in the Katano Mountains, Osaka prefecture, Southwest Japan. *Earth Sci. (Chikyu Kagaku)*, **63**, 339–340.**
- Kiji, M., Ozawa, H. and Murata, M., 2000, Cretaceous adakitic Tamba granitoids in northern Kyoto, San'yo belt, Southwest Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **20**, 136–149.**
- Kiminami, K., Kashiwagi, N. and Miyashita, S., 1992, Occurrence and significance of in-situ greenstones from the Mugi Formation in the Upper Cretaceous Shimanto Supergroup, eastern Shikoku, Japan. *Jour. Geol. Soc. Japan*, **98**, 867–883.**
- Kiminami, K., Kishita, S. and Imaoka T., 2009, Marked change in sandstone composition during the Middle Jurassic in Jurassic accretionary complexes of SW Japan, and geologic significance. *Jour. Geol. Soc. Japan*, **115**, 578–596.**
- Kiminami, K., Kubota, M. and Sawai, O., 1995, Origin of red shale accompanied with in-situ greenstones: an example from the Mugi Formation, northern Shimanto Belt, east Shikoku, Japan. *Earth Sci. (Chikyu Kagaku)*, **49**, 143–156.**
- Kiminami, K. and Miyashita, S., 1992, Occurrence and geochemistry of greenstones from the Makimine Formation in the Upper Cretaceous Shimanto Supergroup in Kyushu, Japan. *Jour. Geol. Soc. Japan*, **98**, 391–400.**
- Kiminami, K., Saito, K., Mukai, T. and Takeda, K., 2008, Tectonostratigraphy of the northern part of the Chichibu Composite Belt, western Shikoku, SW Japan. *Jour. Geol. Soc. Japan*, **114**, 31–42.**
- Kimura, S., Shikazono, N. and Nohara, M., 2003, Paleoceanographic environment of Japan Sea deduced from chemical and isotopic features of Miocene-Pliocene sedimentary rocks. *Jour. Tokyo Geogr. Soc.*, **112**, 586–607.**
- Kimura, S., Shikazono, N., Nohara, M. and Iwai, S., 1999, Behavior of trace and rare earth elements with chemical weathered sedimentary rocks, Miocene Onnagawa Formation, Oga Peninsula. *Jour. Japan Soc. Eng. Geol.*, **40**, 281–294.**
- Kobayashi, S. and Sawada, Y., 1998, Origin of the latest Miocene alkaline rocks from Oki-Dogo Island, SW-Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **93**, 162–181.**
- Kobayashi, S., Sawada, Y. and Yoshida, T., 2002, Magma plumbing systems of the latest Miocene Oki alkaline volcanic group, Oki-Dogo Island, SW Japan, based on geology and petrology. *Japan. Mag. Mineral. Petrol. Sci.*, **31**, 137–161.**
- Koizumi, K., Nakae, S. and Ishiwatari, A., 2006, Chemical analysis of dolerites and a gabbro at the Daigo district in Ibaraki Prefecture, central Japan. *Bull. Geol. Surv. Japan*, **57**, 191–195.**
- Kojima, M., Shimura, T., 2014, Origin of the I- and S-type tonalite magma in the Satsunai-gawa Shichino-sawa river region of the Hidaka metamorphic belt, Hokkaido, northern Japan: Inferences from Sr and Nd isotopic compositions. *Jour. Geol. Soc. Japan*, **120**, 393–412.**

- Kuramoto, Y., Yoshino, A. and Maeda, J., 2011, Rb–Sr whole-rock isochron age of the Nissho Toge granite complex, northern Hidaka Mountains, central Hokkaido, Japan. *Jour. Geol. Soc. Japan*, **117**, 57–60.**
- Kurasawa, H., Imanaga, I., Matsumoto, A. and Shibata, K., 1989, K–Ar age and chemical and strontium isotopic compositions of the Yagura-dake quartz diorite, Ashigara, central Japan. *Jour. Geol. Soc. Japan*, **95**, 331–334.**
- Kusano, Y., Miyashita, S. and Ikeda, K., 2010, Petrology of metabasalts from the Ashio belt in the Gosen area, Niigata Prefecture, Central Japan. *Jour. Geol. Soc. Japan*, **116**, 270–282.**
- Kusunoki, T., Kiji, M., Mikami, T. and Murata, M., 2011, In-situ greenstones from the basal part of the Takatsuki Formation in the Ultra-Tamba Zone –occurrence and geochemistry–. *Earth Sci. (Chikyu Kagaku)*, **65**, 49–61.**
- Kutsukake, T., 1997, Petrology and geochemistry of a calcic and ferrous granitoid pluton: the Mitsuhashi Granite in the Ryoke Belt, southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **92**, 231–244.**
- Kutsukake, T., Nakano, S., Kokubun, K., Takashima, R. and Collaborative Research Group for the Granites around Lake Biwa (CRGGLB), 1991, Granitic masses around Lake Biwa, Southwest Japan –Part 3: Trace element geochemistry of the granites. *Earth Sci. (Chikyu Kagaku)*, **45**, 363–367.**
- Matsuura, H. and Seno, M., 2017, Eocene Banda and Kushinoyama basalts from southern Okayama district, southwest Japan. *Jour. Geol. Soc. Japan*, **123**, 93–99.**
- Mikoshiba (Ujii), M., 2002, K–Ar ages of the igneous rocks in the Senmaya-Kesenuma area, southern Kitakami Mountains. *Japan. Mag. Mineral. Petrol. Sci.*, **31**, 318–329.**
- Mikoshiba (Ujii), M. and Kanisawa, S., 2008, Petrochemical characteristics of the Tono Plutonic Complex, Kitakami Mountains. *Earth Sci. (Chikyu Kagaku)*, **62**, 183–201.**
- Miura, R. and Ishiwatari, A., 2001, Petrology of the oceanic island tholeiite-origin greenstones in the Shimamori Formation, North Kitakami belt, northeastern Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **30**, 1–16.**
- Miyashita, A., Tsutsumi, Y. and Sano, T., 2016, Geochronology of the early Paleozoic Kiroko amphibolite in the Kanto Mountains, central Japan. *Jour. Geol. Soc. Japan*, **122**, 511–522.**
- Miyashita, S., Adachi, Y., Tanaka, S., Nakagawa, M. and Kimura, J.-I., 2007, Genesis of the Poroshiri ophiolite, Hokkaido, Japan; Inference from geochemical evidence. *Jour. Geol. Soc. Japan*, **113**, 212–221.**
- Miyashita, S. and Katsushima, T., 1986, The Tomuraushi greenstone complex of the central Hidaka zone: contemporaneous occurrence of abyssal tholeiite and terrigenous sediments. *Jour. Geol. Soc. Japan*, **92**, 535–557.
- Miyoshi M., Yuguchi T., Shinmura, T., Mori, Y., Arakawa, Y. and Toyohara, F., 2011, Petrological characteristics and K–Ar age of borehole core samples of basement rocks from the northwestern caldera floor of Aso, central Kyushu. *Jour. Geol. Soc. Japan*, **117**, 585–590.**

- Mizoguchi, S., Kiminami, K., Imaoka, T. and Kamei, A., 2009, Miocene near-trench magmatism in the Cape Muroto area, Shikoku, SW Japan. *Jour. Geol. Soc. Japan*, **115**, 17–30.**
- Moriyama, T., Kamitani, M., Teraoka, Y., Okumura, K., Hirano, H., Murakami, H. and Watanabe, Y., 2007, UMBER and manganese deposits in the Northern Shimanto Belt, west Kii Peninsula, Japan, with special reference to sedimentary environment and rare earth resources. *Bull. Geol. Surv. Japan*, **58**, 389–410.**
- Murakami, N., 1994, Sporadically distributed granitoids and related gneissose metamorphic rocks in the southeastern area of Fukuoka Prefecture and Kunisaki Peninsula, Southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **89**, 335–347.**
- Murakami, T., Sasamoto, H. and Mizuno, T., 2016, Retention of rare earth elements, thorium and uranium in sedimentary rocks: a case study in the Horonobe area of Hokkaido, Japan. *Chikyukagaku (Geochem.)*, **50**, 299–317.**
- Muraoka, H., 2008, K-Ar ages and chemistry of the Miocene intrusive rocks in the Hongu hot spring area, Wakayama Prefecture, Japan. *Bull. Geol. Surv. Japan*, **59**, 27–43.**
- Nagao, T., Fujibayashi, N., Kagami, H., Tazaki, K. and Takata, S., 1990, Origin of the Sr-rich Cenozoic alkali basalts in Yokota area, Chugoku Mountains, Southwest Japan. *Jour. Geol. Soc. Japan*, **96**, 795–803.**
- Nakamura, K., Fujinaga, K. and Kato, Y., 2000, Rare earth element geochemistry of in-situ basalts from the Upper Cretaceous Shimanto Belt and its implication for their origin. *Japan. Mag. Mineral. Petrol. Sci.*, **29**, 175–190.**
- Nakamura, Y., Ugagami, T., Ishikawa, K., Yoshida, T. and Aoki, K., 1989, Trace element abundances of the Miocene basaltic rocks from the eastern Ashio mountains. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **22**, 86–103.***
- Nakano, S., Ohashi, Y., Ishihara, S. and Kohno, T., 2013, Microgranular dark-colored enclaves in the Tanakami Granite pluton, south to Lake Biwa, central Japan. *Bull. Geol. Surv. Japan*, **64**, 25–49.**
- Nishida, K., Imaoka, T., Kiminami, K., Nagamatsu, Y. and Iizumi, S., 2013, Marked change of Sr–Nd isotopic compositions of granitoids in Sanin Belt of SW Japan and Gyeongsang Basin of Korea during the latest Cretaceous, and geologic significance. *Jour. Geol. Soc. Japan*, **119**, 229–248.**
- Nishioka, Y., 1997, Petrology and bulk chemical composition of the Miyako zoned pluton, Kitakami Mountains. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **92**, 291–301.**
- Nishioka, Y., 2007, Geological and petrological characteristics of adakitic rocks found out from the Goyosan pluton Kitakami mountains. *Earth Sci. (Chikyu Kagaku)*, **61**, 21–31.**
- Nishioka, Y., 2008, Petrological characteristics of an adakitic small pluton, the Takkon Pluton, Kitakami Mountains. *Earth Sci. (Chikyu Kagaku)*, **62**, 203–210.**
- Nishiwaki, H. and Okudaira, T., 2005, Formation processes of the fine-grained mafic rocks of the Ryoke metamorphic belt in the Asuka area, central Kinki district, SW Japan. *Jour. Geol. Soc. Japan*, **111**, 141–155.**
- Nishiwaki, H. and Okudaira, T., 2007, Emplacement process of the Hatsuse plutonic complex, central

- Kinki Province, SW Japan. *Jour. Geol. Soc. Japan*, **113**, 249–265.**
- Ogasawara, M., 1997, K-Ar age and geochemical characteristics of the quartz-porphyry at Shimama, southern Tanegashima, and K-Ar age of a lamprophyre from northern Tanegashima: implications for Miocene igneous activities in the Outer Zone of Southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **92**, 454–464.**
- Ogasawara, M., Seki, Y., Murao, S., Kodama, T., Tsukimura, K. and Nakajima, T., 1993, Petrological and geochemical characteristics of aplite found near the Takatori tin-tungsten deposit, Japan and its relationship to mineralization. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **88**, 239–246.**
- Ohashi, M., 1984, Geochemical study of alternating beds of chert and limestone in the Sambosan terrain, western Shikoku. *Jour. Geol. Soc. Japan*, **90**, 733–753.**
- Okamoto, K., Kinoshita, O., Nonaka, K. and Yagi, S., 1987, Magma mixing model of the Tertiary granitic rocks of the southern Kyushu. *Jour. Japan. Assoc. Mineral. Petrol. Econ. Geol.*, **82**, 257–268.**
- Omae, A., Kusachi, I. and Kobayashi, S., 2002, Petrology of the igneous rocks forming high-temperature skarns at Fuka, Okayama Prefecture. *Japan. Mag. Mineral. Petrol. Sci.*, **31**, 1–14.**
- Osanai, Y., Yoshimoto, A., Nakano, N., Adachi, T., Kitano, I., Yonemura, K.,... Ishizuka, H., 2014, LA-ICP-MS zircon U-Pb geochronology of Paleozoic granitic rocks and related igneous rocks from the Kurosegawa tectonic belt in Kyushu, Southwest Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **43**, 71–99.**
- Otani, H., Shikazono, N. and Kubota, R., 2005, Migration behavior of minor and rare earth elements in acidic soils and its controlling factors. *Resour. Geol.*, **55**, 169–180.**
- Owada, M., Yamasaki, T., Osanai, Y., Yoshimoto, K., Hamamoto, T. and Kagami, H., 2006, Polymetamorphism, anatexis and formation of granitic magma due to intrusion of the Niobetsu complex during Miocene, the Nozuka-dake area, Hidaka metamorphic belt, northern Japan. *Jour. Geol. Soc. Japan*, **112**, 666–683.**
- Saito, S., Yoshida, T. and Aoki, K., 1992, Geochemistry and Tectonic Significance of Volcanic and Volcaniclastic Rocks in the Boso Peninsula, Central Japan. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **25**, 241–255.***
- Saka, Y., Saruwatari, F. and Ohtake, N., 2005, Greenstone melange in the Ogawa-machi – Kamiizumimura area, northern margin of Kanto Mountains. *Sci. Res. (Bio. Geosci.)*, **53**, 1–26.**
- Sakakibara, M., Hori, R., Ikeda, M. and Umeki, M., 1997, Petrologic characteristics and geologic age of green rocks including chert xenoliths in the Pippu area, central Hokkaido, Japan. *Jour. Geol. Soc. Japan*, **103**, 953–961.**
- Sakamoto, T., Ogawa, Y. and Nakada, S., 1993, Origin of the greenstones in the Setogawea accretionary complex and their tectonic significance. *Jour. Geol. Soc. Japan*, **99**, 9–28.**
- Sakayori, A., Kawamura, J., Yamagishi, T., Sugimoto, M. and Yoshida, T., 1997, Petrological characteristics of basalts from the Miocene Nanamagari Formation in Ishikawa Prefecture –Low K basalts from the back arc side of central Japan–. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **92**,

410–424.**

- Sato, D., Matsumoto, I. and Kamei, A., 2011, Petrography and bulk rock composition of the Wakurayama Dacite from Matsue City, Shimane Prefecture, Southwest Japan. *Jour. Geol. Soc. Japan*, **117**, 439–450.**
- Sato, K., 2011, Mitosan pluton in the central Kanto Mountains: a preliminary study on the chemistry and age. *Bull. Gunma Mus. Nat. Hist.*, **15**, 93–100.**
- Sawada, K., Yoshida, G. and Fujii, R., 1997, Granitic masses around Lake Biwa, southwest Japan: the Koujyaku granite pluton. *Earth Sci. (Chikyu Kagaku)*, **51**, 401–412.**
- Seki, Y., 2001, Hydrothermal alteration of the Miocene Takizawagawa Formation in the Okuaizu geothermal area, Japan –Alteration mineralogy and geochemistry of the reservoir bedrock–. *Bull. Geol. Surv. Japan*, **52**, 493–571.**
- Shikazono, N., Iwai, S., Ishihara, Y., Nakano, T. and Igarashi, C., 2006, Paleooceanic environment deduced from geochemistry of turbidite-sequence in Anno Formation, Awa Group, Boso Peninsula, Chiba Prefecture, Japan. *Jour. Tokyo Geogr. Soc.*, **115**, 669–690.**
- Shimura, T., 1999, Genesis of the pyroxene-bearing I-type tonalite and melting degree of the source rock, in the Hidaka Metamorphic Belt, northern Japan. *Jour. Geol. Soc. Japan*, **105**, 536–551.**
- Shinjoe, H., 1995, Whole rock chemistry of shale and sandstone from the Northern Shimanto belt in southwestern Shikoku. *Jour. Sed. Soc. Japan.*, **41**, 33–38.**
- Shinjoe, H., 2015, Boron content of the sedimentary rocks in the Outer Zone of southwest Japan. *Jour. Hum. Nat. Sci.*, **136**, 117–126.**
- Shinjoe, H., Iwano, H., Wada, Y., Orihashi, Y., Sumii, T. and Danhara, T., 2010, Chemical composition of whole-rocks samples and volcanic glasses of the Miocene Tamateyama and Sekibutsu Tuffs in the area surrounding the Nara Basin. *Jour. Geol. Soc. Japan*, **116**, 447–452.**
- Shinjoe, H., Kurokawa, T. and Hokanishi, N., 2011, Whole rock composition of tuff and granite porphyry in the Kozagawa arcuate dike, southern Kii Peninsula. *Jour. Hum. Nat. Sci.*, **131**, 35–43.**
- Shinjoe, H., Orihashi, Y. and Hokanishi, N., 2016, Whole rock composition of the Ohno volcanic rocks in Eastern Kyushu (supplement). *Jour. Hum. Nat. Sci.*, **138**, 91–98.**
- Shinjoe, H., Orihashi, Y. and Sumii, T., 2016, Whole rock composition of felsic member of the Setouchi Volcanic Rocks in Sanuki plain. *Jour. Hum. Nat. Sci.*, **139**, 21–31.**
- Shinjoe, H., Orihashi, Y., Sumii, T. and Nakai, S., 2002, Bulk rock chemistry of the Muro pyroclastic flow deposit: a clue to its source region. *Japan. Mag. Mineral. Petrol. Sci.*, **31**, 307–317.**
- Shinjoe, H., Orihashi, Y., Wada, Y., Sumii, T. and Nakai, S., 2007, Regional variation of whole rock chemistry of the Miocene felsic igneous rocks in the Kii Peninsula, southwest Japan. *Jour. Geol. Soc. Japan*, **113**, 310–325.**
- Shinjoe, H., Shimoda, G., Fukuoka, T. and Sumii, T., 2005, Magnesian igneous enclave in the Ohmine Granitic Rocks of Kii Peninsula. *Japan. Mag. Mineral. Petrol. Sci.*, **34**, 15–23.**
- Shinjoe, H. and Sumii, T., 2004, Whole rock composition of the Yanagino dacite in central part of Shikoku. *Jour. Hum. Nat. Sci.*, **118**, 45–52.**

- Shinjoe, H. and Sumii, T., 2006, Whole rock composition of the Miocene granitic rocks in the Satsuma Peninsula, Kagoshima prefecture. *Jour. Hum. Nat. Sci.*, **121**, 13–21.**
- Shinjoe, H. and Sumii, T., 2012, Whole rock composition of Shibisan Granodiorites, northwestern Kagoshima prefecture. *Jour. Hum. Nat. Sci.*, **133**, 59–68.**
- Shinjoe, H. and Sumii, T., 2014, Whole rock composition of the Ohno volcanic rocks in Eastern Kyushu. *Jour. Hum. Nat. Sci.*, **135**, 145–155.**
- Shinjoe, H., Sumii, T., Orihashi, Y. and Shimoda, G., 2007, X-ray fluorescence analysis of whole rock composition of the Kumano Acidic Rocks. *Jour. Hum. Nat. Sci.*, **124**, 31–40.**
- Shinjoe, H., Wada, Y., Orihashi, Y., Sumii, T. and Nakai, S., 2003, Possible presence of the concealed Miocene granitic body to the south of Median Tectonic Line, Yoshino district, Nara Prefecture, inferred from zircon U-Pb age of the granitic enclave in dike. *Jour. Geol. Soc. Japan*, **109**, 689–696.**
- Shinjoe, H., Yamashita, K., Shimizu, K. and Sumii, T., 2009, Whole rock chemistry of the Kose and Shirakawa-haccho plutons in central Kii Peninsula. *Jour. Hum. Nat. Sci.*, **127**, 143–152.**
- Shinozuka, M., Furuno, M. and Mariko, T., 1999, Host rock geochemistry and tectonic setting of volcanogenic massive sulfide Cu deposits: Example of the Minamidani deposit, Hyogo prefecture. *Resour. Geol.*, **49**, 29–41.**
- Shiraki, K., Nagao, K., Nagao, T., Kakubuchi, S. and Matsumoto, Y., 1991, Trace element characteristics of the Setouchi volcanic rocks from western Setonaikai. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **86**, 459–472.**
- Shiraki, K., Yoshioka, K. and Matsumoto, Y., 1995, Magnesian andesites in the Ooho volcanic rocks, central Kyushu: westward continuation of the Setouchi volcanic belt. *Jour. Geol. Soc. Japan*, **101**, 387–392.**
- Shuto, K., Kato, S., Ohki, J., Kagami, H., Arato, H. and Rezanov, A. I., 1997, Miocene bimodal volcanism in the Niigata oil and gas fields, northeast Japan –with special reference to the spreading of the back-arc basin–. *Jour. Japan. Assoc. Pet. Technol.*, **62**, 45–58.**
- Sugitani, K., 1989, Geochemistry of manganese bands hosted by sedimentary rocks in the Mino Terrane, central Japan: Its comparison with marine sediments and the geological significance. *Jour. Geol. Soc. Japan*, **95**, 255–275.**
- Sugiuchi, Y., 2012, Geochemical compositions of granodiorite in the Sanchu belt and Chichibu tonalite. *Bull. River Mus.*, **12**, 45–48.***
- Taga, M., Murata, M. and Kusachi, I., 2004, Petrography and whole-rock chemistry of the Hijikai granodioritic complex in the northwestern part of Okayama City, Southwest Japan. *Japan. Mag. Mineral. Petrol. Sci.*, **33**, 33–45.**
- Tagiri, M. and Aoi, A., 2005, Occurrences, rock facies and K-Ar age data of Tertiary Tochibara rhyolites in the Tochibara district, Daigo Town, Ibaraki Prefecture. *Bull. Ibaraki Nat. Mus.*, **8**, 1–11.**
- Tagiri, M., Aoi, A., Kasai, K. and Amano, K., 2008, Stratigraphic comparisons of the chemical characteristics and K-Ar ages of Miocene volcanic rocks from the Daigo and the Motegi districts.

- Jour. Geol. Soc. Japan*, **114**, 300–313.**
- Takahashi, M., Kanamaru, T. and Nihira, S., 2004, Whole-rock chemistry of Tanzawa Tonalite: summary of 171 samples. *Proc. Inst. Nat. Sci. Nihon Univ.*, **39**, 259–284.**
- Takahashi, T. and Shuto, K., 1999, Genesis of adakitic andesite, high-magnesian andesite, calc-alkaline andesite and tholeiitic andesite in the Miocene Iwaine Formation, southern part of Toyama Prefecture, Japan. *Jour. Geol. Soc. Japan*, **105**, 789–809.**
- Takamoto, N., Yuhara, M. and Furukawa, N., 2005, Areal distribution of 26 elements in the Ima River and Harai River basins in the eastern part of Fukuoka Prefecture, Southwest Japan. *Fukuoka Univ. Sci. Rep.*, **35**, 41–66.**
- Takashima, S., Wada, Y. and Shinjoe, H., 2010, Miyanotani composite dike in central Kii Peninsula, southwest Japan: Implications for magma mixing and caldera volcanism. *Jour. Geol. Soc. Japan*, **116**, 496–509.**
- Takayanagi, Y., Yamamoto, K., Yogo, S. and Adachi, M., 2000, Depositional environment of the Cretaceous Shimanto bedded cherts from the Fukura area, Kochi Prefecture, inferred from major element, rare earth element and normal paraffin compositions. *Jour. Geol. Soc. Japan*, **106**, 632–645.**
- Tanaka, H., Huang, C.-H., Nakamura, Y., Kurokawa, E. and Nobusaka, M., 1987, Petrology of an epizonal gabbroic suite: the Batow pluton, Yamizo Mountains, Central Japan. *Jour. Japan. Assoc. Mineral. Petrol. Econ. Geol.*, **82**, 419–432.
- Tanaka, H., Yoshida, T. and Aoki, K., 1987, Geochemistry of Tabito composite mass in the Abukuma plateau. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **20**, 85–98.***
- Tanaka, R., Ishiyama, D., Satoh, H. and Mizuta, T., 2012, Geology and mineralization of the Shimpō-Taiyō tungsten deposit, Tenryū Village, Nagano Prefecture. *Resour. Geol.*, **62**, 125–138.**
- Tanaka, S. and Otsubo, T., 1987, Trace element in the Funatsu Granitic Rocks –with special reference to high Sr contents in the Hayatsukigawa intrusion–. *Earth Sci. (Chikyu Kagaku)*, **41**, 101–113.**
- Taniguchi, H. and Ogawa, Y., 1990, Occurrence, chemistry and tectonic significance of alkali basaltic rocks in the Miura Peninsula, central Japan. *Jour. Geol. Soc. Japan*, **96**, 101–116.**
- Tasaka, K., Imaoka, T. and Itaya, T., 2007, Geology, petrography and K-Ar ages of the Taimasan plutonic complex, western part of Shimane Prefecture, Southwest Japan. *Earth Sci. (Chikyu Kagaku)*, **61**, 433–452.**
- Tazaki, K., Sano, S., Nagao, T. and Kashima, N., 1994, Greenstones from Shikoku Karst: Comparative petrochemical study with basal greenstones of limestone plateau at Akiyoshi and Taishaku, Chugoku belt, southwest Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **89**, 373–389.**
- Terashima, S., Imai, N., Tachibana, Y., Okai, T., Mikoshiba (Ujiiie), M., Ohta, A. and Kubota, R., 2007, Chemical composition and background evaluation of soils and stream sediments from Kanto district, and marine sediments from Tokyo Bay. *Bull. Geol. Surv. Japan*, **58**, 69–91.**
- Tomioka, N., Ishiwatari, A., Tanase, A., Shimizu, S. and Kagami, H., 2000, Geology and petrology of the early Miocene Arashimadake cauldron in Ono City, Fukui Prefecture, central Japan. *Jour. Geol.*

- Soc. Japan*, **106**, 313–329.**
- Uchino, T. and Kawamura, M., 2009, Chemical composition of the green rocks in the Nedamo Terrane, Northeast Japan. *Jour. Geol. Soc. Japan*, **115**, 242–247.**
- Ueki, T. and Harayama, S., 2012, Late Cretaceous hot and dry felsic magmatism in the Nishina Mountains, Northern Japan Alps. *Jour. Geol. Soc. Japan*, **118**, 207–219.**
- Ujiie, M., 1989, Zonal structure of the Orikabe plutonic complex, Kitakami Mountains. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **84**, 226–242.**
- Umehara, N., Itaya, T. and Yoshikura, S., 1991, K-Ar dating on felsic igneous rocks along the Kamiyakawa-Ikegawa tectonic line. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **86**, 299–304.**
- Umeki, M. and Sakakibara, M., 1998, Biotite-bearing basic semishists from the northern Chichibu belt in the Hijikawa district, western Shikoku, Japan. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **93**, 291–306.**
- Uno, M., Iwamori, H., Nakamura, H., Yokoyama, T., Ishikawa, T. and Tanimizu, M., 2014, Elemental transport upon hydration of basic schists during regional metamorphism: Geochemical evidence from the Sanbagawa metamorphic belt, Japan. *Chikyukagaku (Geochem.)*, **48**, 29–49.**
- Wada, Y., Fujita, C. and Shinjoe, H., 2007, The Middle Miocene Miyataki dike, central Kii Peninsula, southwest Japan: magma mingling observed in dike conduit and its implications. *Jour. Geol. Soc. Japan*, **113**, 353–365.**
- Watanabe, Y., Fujibayashi, N., Nakagawa, M. and Kagami, H., 1993, K-Ar age, stratigraphic correlation and chemical composition of early Miocene volcanic rocks at Umaoi Hill and Yubari Coal Field in central Hokkaido. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **88**, 295–306.**
- Watanabe, Y., Katayama, H. and Imai, N., 1995, Geochemical discrimination of independent detrital origins in the argillaceous marine sediments: an example from the nearshore bottom sediments of the Toyama Bay, Japan Sea. *Jour. Geol. Soc. Japan*, **101**, 633–647.**
- Watanabe, Y. and Miyashita, S., 1988, Formation of the mudstone under the influence of the hydrothermal activity accompanied by the eruption of basaltic rocks –an example of the Nupun-Tomuraushi area, Hidaka Belt, central Hokkaido–. *Mining Geol.*, **38**, 1–13.**
- Yada, J. and Owada, M., 2003, Genetic relationship between the Cretaceous high-Sr tonalite (Itoshima mass) and trondhjemite (Fukae mass) in the central part of Saga Prefecture, northwest Kyushu: Implications for magmatic differentiation. *Jour. Geol. Soc. Japan*, **109**, 518–532.**
- Yagi, M., Haseawa, T., Oguchi, T., Baba, K., Sato, H., Ishiyama, D., Mizuta, T. and Yoshida, T., 2001, Transition of magmatic composition reflecting an evolution of rifting activity –a case study of the Akita-Yamagata basin in Early to Middle Miocene, Northeast Honshu, Japan–. *Japan. Mag. Mineral. Petrol. Sci.*, **30**, 265–287.**
- Yakushiji, A., Kamei, A. and Shibata, T., 2012, Igneous activity forming hybrid rocks and leucogranites in the Obara area, San'in zone, Southwest Japan. *Jour. Geol. Soc. Japan*, **118**, 20–38.**
- Yamamoto, G. and Shimazu, M., 1994, Geochemical study of alkali rocks in the Takakusayama area, Shizuoka Prefecture. *Petrol. Econ. Geol. / Ganko*, **89**, 245–258.**

- Yamamoto, G. and Shimazu, M., 1998, Petrochemistry of volcanic rocks of the Nishiyatsushiro Group in the South Fossa Magna. *Earth Sci. (Chikyu Kagaku)*, **52**, 171–187.**
- Yamamoto, K., 1983, Geochemical study of Triassic bedded cherts from Kamiasso, Gifu Prefecture. *Jour. Geol. Soc. Japan*, **89**, 143–162.**
- Yamamoto, K., 1984, Geochemical study of acidic tuffs and siliceous shales from the Setogawa Terrane in the western part of Shizuoka City. *Jour. Geol. Soc. Japan*, **90**, 479–496.**
- Yamamoto, K., Shuto, K., Watanabe, N., Itaya, T. and Kagami, H., 1991, K-Ar ages of the Tertiary volcanic rocks from Okushiri Island and the petrological characters of the Oligocene to Early Miocene volcanic rocks from the Northeast Japan arc and the surrounding areas., *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **86**, 507–521.**
- Yamamoto, K., Tanaka, T., Kawabe, I., Iwamori, H., Hirahara, Y., Asahara, Y.,... Inayoshi, M., 1998, Geochemical map of the Ryoke granitic area in the northeastern part of Toyota City, Aichi Prefecture. *Jour. Geol. Soc. Japan*, **104**, 688–704.**
- Yokose, H., Momoshima, N., Matsuoka, K., Hase, Y. and Honza, E., 2005, Environmental assessments of Ariake Bay during the past 100 years based on marine sediments. *Jour. Tokyo Geogr. Soc.* **114**, 1–20.**
- Yonejima, M., Okamura, S., Yatsuka, S., Maeda, T., Imayama, T. and Maeda, J., 2011, Petrology of Late Oligocene volcanic rocks from southern part of central Hokkaido, Japan –Implication for incipient volcanism of back-arc rift–. *Japan. Mag. Mineral. Petrol. Sci.*, **40**, 153–173.**
- Yoshida, T., Abe, T. and Aoki, K., 1985, A geochemical study of Neogene Ryozen volcanic rocks. *Res. Rep. Lab. Nuc. Sci. Tohoku Univ.*, **18**, 203–216.***
- Yoshida, T. and Murata, M., 1985, Trace elements behavior in Miocene I-type and S-type granitic rocks in the Ohmine district, central Kii peninsula. *Jour. Japan. Assoc. Mineral. Petrol. Econ. Geol.*, **80**, 227–245.**
- Yoshida, T., Murata, M. and Yamaji, A., 1993, Fomation of Ishizuchi cauldron and Mionene tectonics in southwest Japan. *Mem. Geol. Soc. Japan*, **42**, 297–349.**
- Yuge, T., Imaoka, T. and Iizumi, S., 1998, Whole-rock chemistry and Sr and Nd isotope ratios of Cretaceous rhyolites and granitoids in Abu district, Yamaguchi Prefecture, Southwest Japan. *Jour. Geol. Soc. Japan*, **104**, 159–170.**
- Yuhara, M., 1994, Timing of intrusion of the Otagiri granite with respect to the deformation and metamorphism in Ryoke belt in the Ina district, central Japan: exaction by Rb-Sr whole rock isochron ages. *Jour. Mineral. Petrol. Econ. Geol. / Ganko*, **89**, 269–284.**
- Yuhara, M., 2008a, Petrochemical characteristics of the Hissori Granite in the Ina district of the Ryoke Metamorphic Belt, Southwest Japan Arc: adakitic granite in the Ryoke Metamorphic Belt. *Earth Sci. (Chikyu Kagaku)*, **62**, 221–232.**
- Yuhara, M., 2008b, Trace and rare earth elements compositions of the Aji Granite in the Sanuki District of the Ryoke Metamorphic Belt, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **38**, 45–51.**
- Yuhara, M., 2011, Trace and rare earth elements compositions of Metamorphic Rocks from the Ina

- District of the Ryoke Metamorphic Belt, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **41**, 39–50.**
- Yuhara, M., Aizawa, J., Uto, C., Yoshizuka, M., Fukushima, C., Eto, C.,... Taguchi, S., 2005, Fracture system in the plutonic rocks at the southern margin of the Shikanoshima Island, Fukuoka Prefecture, Southwest Japan. *Fukuoka Univ. Sci. Rep.*, **35**, 67–84.**
- Yuhara, M., Goto, H. and Tachibana, S., 2009, Field occurrence and chemical compositions of the Shikanoshima Basic Rocks and Quartz Dioritic Dyke in the Shikanoshima Island, Northern Kyushu, Southwest Japan. *Fukuoka Univ. Sci. Rep.*, **39**, 123–140.**
- Yuhara, M. and Kagami, H., 1995, Cooling history of the Katsuma quartz diorite in the Ina district of the Ryoke belt, Southwest Japan Arc. *Jour. Geol. Soc. Japan*, **101**, 434–442.**
- Yuhara, M. and Kagami, H., 1999, Chronological and isotope geological study of the Takato granite in the Ina district of the Ryoke belt, Southwest Japan Arc. *Jour. Geol. Soc. Japan*, **105**, 181–192.**
- Yuhara, M. and Kagami, H., 2006, Geochronological and isotope geological study of the Kisokoma Granodiorite and Ichida Granite in the Ina District of the Ryoke Metamorphic Belt, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **36**, 37–61.**
- Yuhara, M. and Kagami, H., 2007, Geochronological and isotope geological study of mafic igneous rocks in the Ina District of the Ryoke Metamorphic Belt, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **37**, 57–78.**
- Yuhara, M. and Kagami, H., 2008, Geochronological and isotope geological study of the Suisyozan Mafic Mass in the Miho Area of the Ryoke Metamorphic Belt, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **38**, 75–88.**
- Yuhara, M. and Kagami, H., 2012, Geochronological and Rb-Sr and Sm-Nd isotopic study of mafic rocks in the Ryoke Metamorphic Belt of the Mikawa District, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **42**, 37–55.**
- Yuhara, M., Kamei, A., Okano, O., Kawano, Y. and Kagami, H., 2013, Rb-Sr whole-rock and biotite isochron ages of the Soeda Granodiorite, eastern North Kyushu. *Japan. Mag. Mineral. Petrol. Sci.*, **42**, 185–189.**
- Yuhara, M. and Masaki, K., 2013, Field occurrence and chemical composition of synplutonic intrusive rocks in the Soeda Granodiorite, northern Kyushu, Southwest Japan. *Earth Sci. (Chikyu Kagaku)*, **67**, 21–36.**
- Yuhara, M., Mitsui, Y., Uto, C., Uchida, T., Kusamoto, K. Sannodo, N.,... Sugiyama, T., 2004, Fracture system in the Kitazaki tonalite at Tsuyazaki, Fukuoka Prefecture (Part 2). *Fukuoka Univ. Sci. Rep.*, **34**, 73–88.**
- Yuhara, M., Miyazaki, K., Aizawa, J., Miyazaki, T., Goto, H., Tachibana, S.,... Taguchi, S., 2007, Fracture system in the Kitazaki Tonalite at the Yara Cape, northern part of Noko Island, Fukuoka City, Northern Kyushu. *Fukuoka Univ. Sci. Rep.*, **37**, 61–76.**
- Yuhara, M., Miyazaki, S., Aizawa, J., Nishi, E., Kiyoura, K. and Teramoto, K., 2015, Fracture system in the Sawara Granite along the Hinatotoge – Okasagitoge Fault, northern Kyushu. *Fukuoka Univ. Sci.*

Rep., **45**, 43–61.**

Yuhara, M., Miyazaki, T. and Kagami, H., 2004, Geochronological and isotope geological study of the Kise Granodiorite in the Ina district of the Ryoke Belt, Southwest Japan Arc. *Fukuoka Univ. Sci. Rep.*, **34**, 51–65.**

Yuhara, M., Miyazaki, T., Takahashi, T. and Kagami, H., 2004, The change of chemical and Sr, Nd isotopic compositions of Cretaceous granitic rocks during weathering process. *Japan. Mag. Mineral. Petrol. Sci.*, **33**, 185–196.**

Yuhara, M., Okano, O. and Kawano, Y., 2016, Sr and Nd isotopic compositions of the Shikanoshima basic rocks at the Shikanoshima Island, northern Kyushu, southwest Japan. *Jour. Geol. Soc. Japan*, **122**, 505–508.**

Yuhara, M., Shoji, Y., Ishihara, Y. and Uto, C., 2010, Geochemical map of 26 elements in the Gokayama Area, upper reach of the Naka River, Fukuoka Prefecture. *Fukuoka Univ. Sci. Rep.*, **40**, 45–70.**

Yuhara, M. and Uto, C., 2007, Relationship between the Shikanoshima Granodiorite and Shikanoshima basic rocks at the Shikanoshima Island, northern Kyushu, Southwest Japan: coexistence of high Mg dioritic magma and granodioritic magma. *Jour. Geol. Soc. Japan*, **113**, 519–531.**

Yuhara, M. and Yutoku, S., 2005, Alteration of the Sawara Granite around the gold prospects in the Gokayama area, upper reach of the Naka River. *Fukuoka Univ. Sci. Rep.*, **35**, 49–73.**

Yuhara, M., Yutoku, S., Uto, C. and Shoji, Y., 2006, Arsenic content of the hydrothermally altered Sawara Granite around the Gold Prospects in the Gokayama Area, upper reach of the Naka River, Fukuoka Prefecture. *Fukuoka Univ. Sci. Rep.*, **36**, 43–53.**

*English translation from the original written in Japanese

**in Japanese with English abstract

***in Japanese