

PREFECTURAL STONES OF JAPAN

The Geological Society of Japan has selected a rock, a mineral and a fossil that represent each of 47 Prefectures of Japan, and presented the selection list to the public on 10 May 2016, the Geology Day in Japan. Either geologically, industrially or historically important stones that occur in respective Prefectures are selected. The English version of the list is given below where Prefectures are arranged from North to South.

This is an outreach action of the Society in commemoration of its 125th Anniversary that is expected in 2018. Other anniversary-related actions of the Society include cooperation for publication of "The Geology of Japan" (published by the Geological Society of London in April, 2016), support for the 10th International Earth Science Olympiad (20-27 August 2016 at Mie, Japan), and publication of a number of timely, comprehensive reviews on various fields of geological sciences in the Society's journals; "The Journal of the Geological Society of Japan" and "Island Arc".

We hope international audience can get quick insights into geological richness of the archipelago and useful materials to make geological communication with its dwellers by the list of Prefectural Stones of Japan.

県の石

The Geological Society of Japan
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 Akira Ishiwatari (2012-2013)
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Prefecture (Capital)	Rock (Place)	Mineral (Place)	Fossil (Place)
1. Hokkaido (Sapporo)	Peridotite [very fresh alpine-type mantle lherzolite with garnet pseudomorphs (spinel-pyroxene symplectites); registered as UNESCO geopark in 2015] (Horoman, Samani)	"Placer Platinum" [In fact, iridosmine; washed out from highly refractory mantle peridotite and serpentinite of Horokanai Ophiolite] (Central Hokkaido; Sorachi, etc.)	Cretaceous ammonites [Well preserved, ammonites, up to >1 m in diameter, are abundantly found from the Cretaceous forearc deposits] (Central Hokkaido, Sorachi, etc.)
2. Aomori (Aomori)	"Nishiki Ishi" [iron-rich, red chalcedony; Miocene hydrothermal product] (Occurs widely)	Rhodocrosite [mangan spar; pink manganese carbonate; Miocene hydrothermal product] (Oda Mine)	"Aomori Mukashi Kujira Uo" [<i>Miobarbourisia aomori</i> ; Miocene whalefish] (Arakawa River, Aomori)
3. Akita (Akita)	Siliceous mudstone [Miocene Onnagawa Formation, source rock of Akita oil field] (Oga Peninsula)	Kuroko deposits [Miocene massive sulfide ore formed around sea-floor vents] (Hokuroku area)	"Naumann Yama Momo" [<i>Comptonia naumanni</i> ; fossil plant (sweetfern) of Miocene Daijima Flora] (Occurs widely in this prefecture)
4. Iwate (Morioka)	Serpentinite [Mantle section of Ordovician Ophiolite] (Mt. Hayachine, Kitakami Mts.)	Iron-rich skarn ore [provided enough iron for Japan's modernization] (Kamaishi Mine)	Silurian corals [The first discovery of Silurian deposits in Japan was based on these fossils] (Hikoroichi, Ofunato)
5. Yamagata (Yamagata)	Dacitic tuff [Basement rock of the Buddhist temple famous for Basho's haiku] (Yamadera, Yamagata)	"Soroban-dama Ishi" [Abacus-piece chalcedony] (Oguni)	"Yamagata Kaigyū" [<i>Dusisiren dewana</i> ; Miocene sea cow] (Oe Town)
6. Miyagi (Sendai)	Permian slate [inkstone] (Toyoma Fm.; Ogatsu, Ishinomaki and Tome)	Placer Gold [The oldest gold mine of Japan in the 8th Century; contributed to decorate Great Buddha in Nara] (Nonodake, Wakuya)	"Utatsu Gyoryū" [<i>Utatusaurus hataii</i> ; the earliest-known ichthyopterygian which lived in the early Triassic] (Utatsu, Minami-Sanriku)
7. Fukushima (Fukushima)	Cretaceous Gneiss [Originated in Jurassic accretionary complex] (Abukuma Mts.)	Pegmatite minerals [quartz, feldspar, mica, tourmaline, etc.] (Ishikawa)	"Futaba Suzuki Ryu" [<i>Futabasaurus suzukii</i> ; Cretaceous plesiosaurs] (Iwaki)
8. Ibaraki (Mito)	Cretaceous Granite (Mt. Tsukuba)	Elbaite [Lithium tourmaline in lithium pegmatite] (Mt. Myoken, Hitachi-Ota)	Stegolophodon [Miocene elephant] (Hitachi-Omiya)
9. Tochigi (Utsunomiya)	"Oya Ishi" [Miocene green tuff, widely used for fence blocks] (Oya, Utsunomiya)	Chalcopyrite (Ashio Copper Mine)	"Konoha Ishi" [Leaf Stone; Pleistocene plant fossils in lake deposits] (Shiobara, Nasu)
10. Gunma (Maebashi)	"Oni Oshidashi Yogan" [Andesite block lava of Asama Volcano erupted in 1783] (Tsumagoi Village)	Realgar [Arsenic sulfide; Late Miocene hydrothermal ore, an item of Shimonita Geopark] (Nishinomaki Mine, Shimonita)	"Yabe Otsuno Jika" [<i>Sinomegaceros yabei</i> ; Plio-Pleistocene giant deer] (Kamikuroiwa, Tomioka)
11. Saitama (Saitama)	Schist [Cretaceous high pressure Sanbagawa metamorphic rocks] (Nagatoro)	Stilpnomelane [Calcium-bearing mica-like mineral occurring in Sanbagawa schist] (Nagatoro)	Paleoparadoxia [Miocene sea mammal (family <i>Desmostylidae</i>)] (Hannya, Ogano; Onohara, Chichibu)
12. Chiba (Chiba)	"Boshu Ishi" [Tuffaceous sandstone and granule conglomerate used as building stones] (Nokogiriyama, Futtsu)	Chibaite [silica clathrate including methane and ethane] (Boso Peninsula; Miocene accretionary complex)	Molluscan shells in the Upper Pleistocene Kioroshi Shell Bed (Kioroshi, Inzai)

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13. Tokyo Metropolis (Tokyo)	"Munin Gan" [Boninite; Eocene highly magnesian andesite] (Chichijima Island, Ogasawara (Bonin Islands))	Clinoenstatite [highly magnesian pyroxene in boninite] (Chichijima Island, Ogasawara (Bonin Islands))	"Tokyo Hotate" [<i>Mizuhopecten tokyoensis</i> ; Plio-Pleistocene scallop] (Oji, Kita-ku and elsewhere)
14. Kanagawa (Yokohama)	Tonalite [Pliocene potash-poor granite (plagiogranite, quartz diorite)] (Tanzawa Mts.)	Yugawaralite [calcic zeolite that was first discovered from Yugawara] (Yugawara)	Miocene scleractinian corals (Tanzawa Mts.; formed on a volcanic island of the Izu-Bonin-Mariana arc that collided with Japan)
15. Niigata (Niigata)	Jadeitite [product of Cambro-Ordovician subduction metamorphism] (Omi and Kotaki, Itoigawa)	Native Gold [Miocene vein-type gold-silver ores] (Sado Gold Mine, Sado Island)	Carboniferous-Permian marine fossils [from the "Omi Limestone"] (Omi, Itoigawa)
16. Nagano (Nagano)	Obsidian [Pleistocene welded rhyolitic tuff; used as arrow heads by lithic age people] (Wadatoge Pass)	Garnet [spessartine garnet that occurs in cavities of the Wadatoge rhyolite] (Wadatoge Pass)	"Naumann Zo" [<i>Paleoloxodon naumanni</i> ; Pleistocene elephant] (Lake Nojiriko)
17. Yamanashi (Kofu)	Basalt Lava of Fuji Volcano [erupted in 864-866 A.D.] (Aokigahara Forest)	Rock Crystal [Quartz] twinned in accordance with Japan law [also known as Japanese twin] (Otome Mine)	Late Miocene molluscan shells in the Fujigawa Formation (Obarajima, Minobu)
18. Toyama (Toyama)	Onix Marble [Travertine, Miocene sea-floor hydrothermal carbonate rock] (Shimotate, Unazuki)	Staurolite [in Permian medium-pressure type Unazuki metamorphic rocks] (Uchiyama, Unazuki)	Miocene molluscan shells in the Yatsuo Group (Yatsuo, Toyama)
19. Ishikawa (Kanazawa)	Diatomite [Diatom mudstone; Miocene shallow sea and lake deposits] (Noto Peninsula)	Aragonite [Occurs in cavities of Miocene basalt lava] (Koiji beach, Noto Town)	Early Pleistocene molluscan shells in the Omma Formation (Okuwa, Kanazawa)
20. Fukui (Fukui)	"Shakudani Ishi" [Miocene lapilli tuff excavated for long time as industrial rock material]	Native arsenic [Spherical aggregate of euhedral crystals like a comfit sugar] (Akatani Mine, Fukui)	<i>Fukuiraptor kitadaniensis</i> [Dinosaur excavated from the Cretaceous Tetori Group] (Kitadani, Katsuyama)
21. Shizuoka (Shizuoka)	"Akaiwa" [Red rocks forming the Hoei crater, the site of 1707 eruption of Fuji Volcano. The rocks comprise volcanic lapilli and ash] (Hoei Kako, Gotemba)	Native tellurium [occurs with tellurite and kawazulite] (Kawazu Mine, Shimoda)	Early Pleistocene molluscan shells in the Kakegawa Group (Dainichi Formation) (Kakegawa and Fukuroi)
22. Aichi (Nagoya)	Pitchstone [Miocene rhyolitic rocks forming Shitara Cauldron] (Mt. Horaiji, Shinshiro)	Kaoline [source clay for the Seto potteries] (Seto)	Middle Miocene deep-sea fossils in the Morosaki Group [Crinoids, devilfish, sea urchins, fish, bivalves, gastropods, etc.] (Chita Peninsula)
23. Gifu (Gifu)	Chert [Bedded radiolarian chert of Triassic-Jurassic age in the Jurassic accretionary complex of Mino Belt] (Unuma, Kagamihara; Sakashuku, Kamo)	Hedenbergite [Fe-Ca Pyroxene in skarn deposits] (Kamioka Copper-Zinc Mine, Hida (Mine is closed, but is used as Kamiokande to detect neutrino))	Permian marine fossils in the "Akasaka Limestone" [Fusulinids, bivalves, gastropods, crinoids, etc.] (Akasaka Kinshozan, Ogaki)
24. Mie (Tsu)	Kumano rhyolitic volcanic rocks [Miocene caldera volcano in the forearc area] (Southeastern Kii Peninsula)	Cinnabar [Quicksilver (mercury) deposits formed in the Ryoke and Sanbagawa belts in Miocene] (Nyu Mine)	"Mie Zo" [<i>Stegodon miensis</i> ; Pliocene elephant] (Tsu, Kameyama, Iga, Suzuka, Kuwana, etc.)
25. Shiga (Otsu)	Koto Rhyolite [Late Cretaceous large-scale caldera volcanism] (Higashi-Omi and Omi-Hachiman)	Topaz [Pegmatite mineral in Cretaceous granite] (Tagamiyama, Otsu)	Footprints preserved in the Kobiwako Group [Plio-Pleistocene deer, elephant, crocodile, bird, rhinoceros, etc.] (Yasu, Konan)
26. Kyoto (Kyoto)	"Narutaki Toishi" [Whetstone made of Early Triassic siliceous claystone of Tamba belt] (Ukyo-ku, Kyoto)	"Sakura Ishi" [Cherry flower stone; cordierite pseudomorph in metapelite of Tamba belt intruded by Cretaceous granite] (Kameyama)	Miocene molluscan shells in the Tsuzuki Group (Ujitawara)
27. Hyogo (Kobe)	Alkali Basalt [Pleistocene lava with magnificent columnar joints in which Prof. Matuyama first found magnetic reversal] (Gembudo, Toyooka)	Chalcocopyrite [Akenobe and Ikuno mines provided copper, silver and tin for centuries] (Akenobe Copper Mine)	"Tamba Ryu" [<i>Tambatitanis amicitiae</i> ; Dinosaur discovered from the Lower Cretaceous Sasayama Group] (Sannan, Tamba)
28. Osaka (Osaka)	"Izumi (Ao-)Ishi" [Sandstone of Late Cretaceous Izumi Group distributed along the Median Tectonic Line; commonly used for walls and fences] (Izumi Mts.)	Dawsonite [Carbonate mineral of sodium and aluminum that occurs with fossils in the Izumi Group] (Sennan, Izumi-Sano, Kaizuka, Kishiwada, etc.)	"Machikane Wani" [<i>Toyotamaphimeia machikanensis</i> ; Middle Pleistocene crocodile, 7 m long] (Machikane Hills, Toyonaka; Osaka University Campus)

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29. Nara (Nara)	Basaltic Pillow Lava [formed in ocean floor in Triassic and Cretaceous time, and accreted to Japan later] (Mt. Tamaki, Kawakami, Yoshino)	Garnet [almandine garnet that occurs as phenocrysts of 1 mm size in andesitic to dacitic lava] (Nijoan)	Early Pleistocene terrestrial mammals [Teeth and tusks of elephants (<i>Stegodon aurorae</i>) and horn of <i>Elaphurus (elaphuroides) shikamai</i>] (Mami Hills, Koryo and Kawai)
30. Wakayama (Wakayama)	Rhyolitic igneous rocks [lavas, dikes, breccias and tuffs of rhyolite] (Shionomisaki Cape)	Sanidine [Potash-rich alkali feldspar occurring as phenocrysts in Miocene Kumano rhyolitic rocks] (Taichi)	Cretaceous marine fossils [ammonites, bivalves and Mosasaurus] (Aritagawa)
31. Tottori (Tottori)	Dune sand deposits [Tottori sand dune that extends for 24 km along the Japan Sea coast is fed by granite mountains] (Tottori)	Chromite Ore [Typical podiform chromite deposits occur among serpentinite bodies of Oeyama ophiolite] (Tari, Nichinan)	Miocene fish [Shallow-water marine fish in the Tottori Group] (Miyashita, Kokufu)
32. Shimane (Matsue)	"Kimatchi Ishi" [Miocene tuffaceous sandstone used long time for building blocks] (Shinji, Matsue)	Native silver [Worldwide major provider of silver in the 14-19th Centuries] (Iwami Silver Mine, Omori, Ota)	"Mizuho Takobune" [<i>Mizuhobaris izumoensis</i> : Paper Nautilus, a kind of octopods with shell in Miocene age] (Shibuna, Tamayu, Matsue)
33. Okayama (Okayama)	"Mannari Ishi" [Late Cretaceous pink granite used as building blocks, tombstones, etc.] (Okayama)	Uranium ore [Autunite and ningyoite ores in Late Miocene conglomerate that was mined in 1960s] (Ningyotoge Pass, Kamisaibara, Kagamino)	Fossil plants from Nariwa [Late Triassic ginkgos, cycads, pteridophytes, etc.] (Nariwa, Takahashi)
34. Hiroshima (Hiroshima)	Hiroshima granite [Late Cretaceous Granite used as bulding blocks, tombstones, etc.] (Hiroshima and vicinity)	"Roseki" [Soft rock made of pyrophyllite, talc, kaoline, etc. used as refractory bricks] (Shokozan, Shobara)	"Atsu Gaki" [Miocene oyster shells, which occurs associated with whales and sharks, in the Bihoku Group] (Shobara and Miyoshi)
35. Yamaguchi (Yamaguchi)	Limestone [Carboniferous and Permian limestone forming the largest karst plateau in Japan] (Akiyoshi)	Copper ores [Cretaceous skarn ore] (Nagato Dozan, Akiyoshi)	Fossil plants from Mine [Triassic ginkgos, sphenopsids, pteridophytes, etc., associated with insects; important component of high quality coals] (Mine)
36. Kagawa (Takamatsu)	Sanukite [Bronzite andesite, glassy high-magnesian andesite of Miocene age; its piece gives good sound when hit, and called "kankan ishi"] (Goshikidai)	Sillimanite [occurs in the Cretaceous Ryoke metamorphic rocks; mined for producing glass] (Nekoyama, Manno)	"Kodai Amamo" [This was thought to be seaweed fossil, but recently revealed to be animal trace fossil] (The Izumi Group of Cretaceous age)
37. Tokushima (Tokushima)	Blueschist [Cretaceous Sanbagawa basic schist with glaucophane (Na amphibole)] (Bizan and Kotsu, Tokushima)	Piemontite [Pink to yellow pleochroism is striking under the polarizing microscope; occurs in Sanbagawa quartz schist] (Bizan, Tokushima)	<i>Pterotrignia</i> [Marine bivalve in the family <i>Trigoniidae</i> that serves as an index fossil of Mesozoic age] (Kamikatsu and Katsuura)
38. Kochi (Kochi)	Syenite [Middle Miocene, potassium and sodium-rich, A-type granite with Rapakivi texture, only one in Japan] (Ashizuri Cape)	Stronalsite [Sr-bearing feldspar first found in serpentinite at Kochi in association with lawsonite and pectolite] (Rendai, Kochi)	Silurian marine fossils [Corals (Favosites, Halysites), trilobites, orthoceras, graptolites, etc.] (Mt. Yokokura, Ochi)
39. Ehime (Matsuyama)	Eclogite [Cretaceous Sanbagawa metamorphic rock made of omphacite (jadeitic pyroxene) and garnet; formed at >60 km depth] (Mt. Higashi Akaishi)	Stibnite [World's best crystals (>60 cm long) at the time the mine was operated] (Ichinokawa Mine)	Inoceramus [Age-diagnostic marine bivalve of Cretaceous age; common in the Uwajima and Izumi groups] (Uwajima and Matsuyama)
40. Fukuoka (Fukuoka)	Coal [Occurs in Paleogene graben-filling sediments; supported industrial modernization of Japan] (Chikuho coal field)	Lepidolite [Lithium mica in granitic pegmatite] (Nagataru, Fukuoka)	Fossil fish from Wakino [Early Cretaceous freshwater fish in the Wakino Subgroup] (Kitakyushu, Nogata and Miyawaka)
41. Saga (Saga)	Porcelain stone [Pottery stone; altered from rhyolite lava; made of quartz, sericite, kaoline, etc.] (Arita)	Beryl [Occurs in pegmatite veins in Cretaceous granite] (Sugiyama, Fuji, Saga)	Paleogene fossils from the Karatsu coal field [Eocene to Oligocene marine (molluskan shells, sharks, turtles) and terrestrial (plants, Aminodon (rhinoceras), birds) fossils] (Karatsu, Imari, etc.)
42. Nagasaki (Nagasaki)	Dacite of Unzen Volcano ["Heisei Shinzan Lava Dome" formed by 1990-1995 eruption in which a pyroclastic flow resulted in 44 deaths] (Shimabara)	Rock Crystal [Quartz] twinned in accordance with Japan law [also known as Japanese twin] (Narushima, Goto Islands)	Fossil plants from Mogi [Pliocene broad-leaved deciduous trees (Fagus, Juglans, Carpinus, Zelkova, Liquidambar, Sorbus, etc.)] (Mogi, Nagasaki)

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43. Oita (Oita)	Obsidian [Pleistocene welded rhyolitic tuff; Obsidian is light colored and contains rare garnet phenocrysts; used as arrow heads by lithic age people] (Himeshima Island)	Axinite [Boron-bearing skarn mineral formed by Miocene granite intrusion] (Obira Mine, Bungo-Ono)	Pleistocene freshwater fish [Fossil salmon and trout in diatomite beds of the Kusu basin] (Nogami, Kuju)
44. Kumamoto (Kumamoto)	Welded tuff [Locally called "Hai Ishi" (ash stone) and used as building stones by its light weight and easy processing] (Aso Volcano and vicinity)	Tridymite [Silica mineral with hexagonal platy shape of 1 cm size occurring in cavities of andesite] (Mt. Ishigami, Shimazaki, Nishi-ku, Kumamoto)	Cretaceous dinosaurs [Bones, teeth and footprints from Goshoura, Mifune and Himeura groups] (Amakusa and Mifune)
45. Miyazaki (Miyazaki)	"Oni no Sentaku Iwa" [Devil's washboard rock; inclined Late Miocene turbidites that were flat-eroded and uplifted] (Aoshima, Nichinan beach)	Danburite [Calcium-boron silicate occurring as clear crystal of square-pillar shape] (Toroku Mine, Takachiho)	Siluro-Devonian fossils [Corals (Favosites, Halysites), crinoids, trilobites, etc.] (Mt. Gion, Gokase)
46. Kagoshima (Kagoshima)	"Shirasu" [Ito Pyroclastic Flow Deposits; spread all over the prefecture from the Aira Caldera that erupted ~29,000 year ago] (Occur widely)	Gold Ore of Hishikari Mine [Formed by Pleistocene (1 Ma) hydrothermal activity; The only one operating metal mine in Japan (50 g/t quality)] (Isa)	Cretaceous marine fossils [Elasmosaurus, hadrosaurus, pterosaur, theropods, etc. in the Goshoura and Himeshima groups] (Shishi Jima and Koshiki Islands)
47. Okinawa (Naha)	"Ryukyu Limestone" [Uplifted Pleistocene coral reef complex that is used as building blocks and monuments] (Occurs widely)	Phosphorus ore [Guano, a phosphorus deposit in limestone, originated from organic excrement of seabirds] (Oki Daito and Kita Daito Islands)	"Minatogawa Man" [Late Pleistocene (16-18 ka) Homo sapiens excavated from a fissure in the "Ryukyu Limestone"] (Nagamo, Yaese)

