U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

AFGHAN GEOLOGICAL SURVEY
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GEOLOGIC AND MINERAL RESOURCE MAP OF AFGHANISTAN

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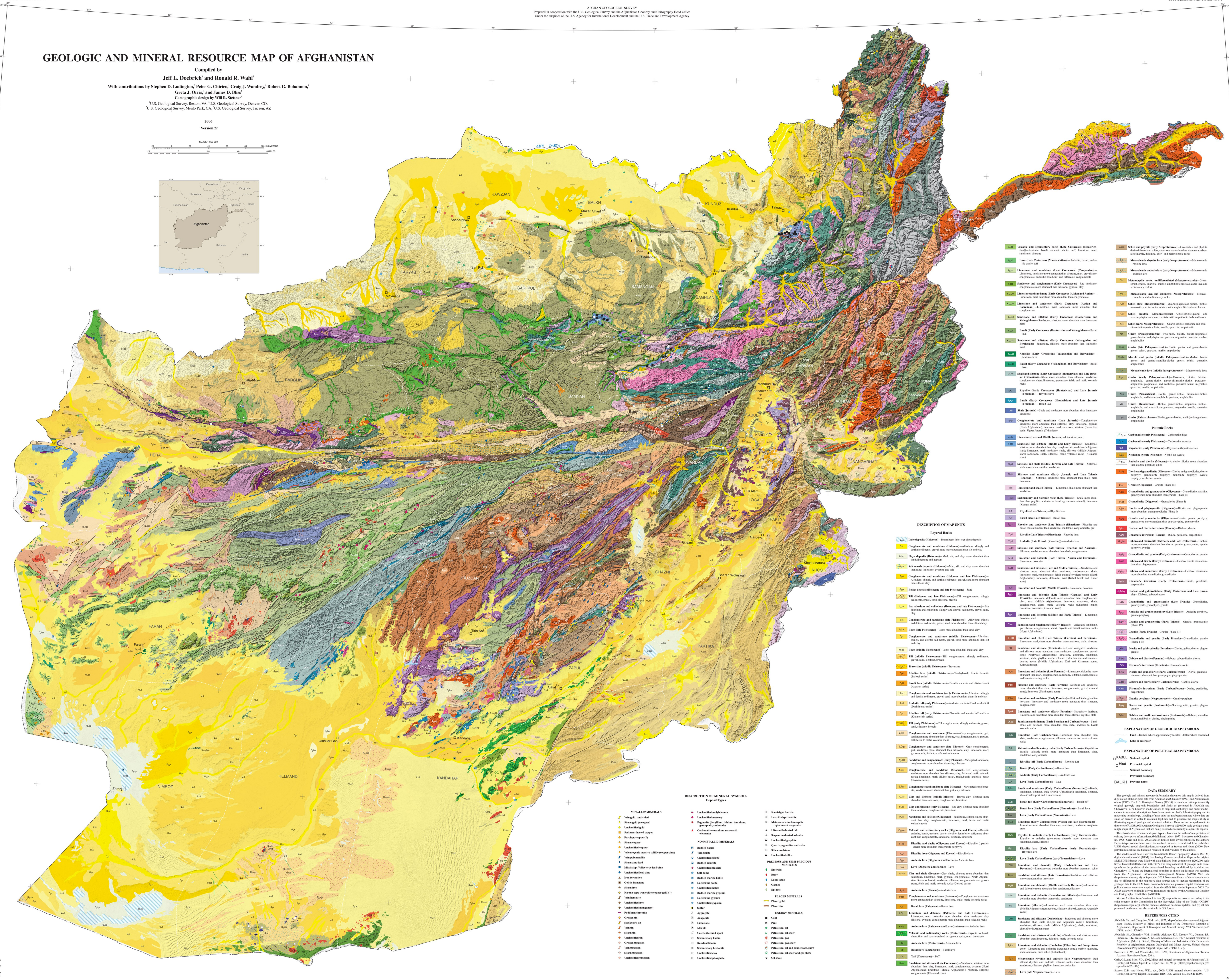
Version 2r

SCALE 1:850 000
20 0 20 40 60 80 100 KILOMETERS
20 0 20 40 60 MILES



DESCRIPTION OF MAP UNITS

Layered Rocks

- Q_4lac **Lake deposits (Holocene)**—Intermittent lake; wet playa deposits
- Q_4a **Conglomerate and sandstone (Holocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay
- Q_4lap **Playa deposits (Holocene)**—Mud, silt, and clay more abundant than sand; limestone and gypsum
- Q_4sm **Salt marsh deposits (Holocene)**—Mud, silt, and clay more abundant than sand; limestone, gypsum, and salt
- Q_{34}a **Conglomerate and sandstone (Holocene and late Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay
- Q_{34}e **Eolian deposits (Holocene and late Pleistocene)**—Sand
- Q_{34}t **Till (Holocene and late Pleistocene)**—Till: conglomerate, shingly sediments, gravel, sand, siltstone, breccia
- Q_{34}ac **Fan alluvium and colluvium (Holocene and late Pleistocene)**—Fan alluvium and colluvium: shingly and detrital sediments, gravel, sand, clay
- Q_3a **Conglomerate and sandstone (late Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay
- Q_3loe **Loess (late Pleistocene)**—Loess more abundant than sand, clay
- Q_2a **Conglomerate and sandstone (middle Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay
- Q_2loe **Loess (middle Pleistocene)**—Loess more abundant than sand, clay
- Q_2t **Till (middle Pleistocene)**—Till: conglomerate, shingly sediments, gravel, sand, siltstone, breccia
- Q_2tr **Travertine (middle Pleistocene)**—Travertine
- Q_2kl **Alkaline lava (middle Pleistocene)**—Trachybasalt, leucite basanite (Sarlogh series)
- Q_2bl **Basalt lava (middle Pleistocene)**—Basaltic andesite and olivine basalt (Asparan series)
- Q_1a **Conglomerate and sandstone (early Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay
- Q_1at **Andesite tuff (early Pleistocene)**—Andesite, dacite tuff and welded tuff (Dashtinovar series)
- Q_1kt **Alkaline tuff (early Pleistocene)**—Phonolite and soevite tuff and lava (Khanneshin series)
- Q_1t **Till (early Pleistocene)**—Till: conglomerate, shingly sediments, gravel, sand, siltstone, breccia
- N_2cgs **Conglomerate and sandstone (Pliocene)**—Gray conglomerate, grit, sandstone more abundant than siltstone, clay, limestone, marl; gypsum, salt; felsic to mafic volcanic rocks
- N_{2b}cgs **Conglomerate and sandstone (late Pliocene)**—Gray conglomerate, grit, sandstone more abundant than siltstone, clay, limestone, marl; gypsum, salt; felsic to mafic volcanic rocks
- N_{2a}ssc **Sandstone and conglomerate (early Pliocene)**—Variegated sandstone, conglomerate more abundant than clay, siltstone
- N_1cgs **Conglomerate and sandstone (Miocene)**—Red conglomerate, sandstone more abundant than siltstone, clay; felsic and mafic volcanic rocks; limestone, marl; olivine basalt, trachybasalt, andesitic basalt (Taywara series)
- N_{1c}cgs **Conglomerate and sandstone (late Miocene)**—Variegated conglomerate, sandstone more abundant than grit, clay, siltstone
- N_{1b}csl **Clay and siltstone (middle Miocene)**—Brown clay, siltstone more abundant than sandstone, conglomerate, limestone
- N_{1a}csl **Clay and siltstone (early Miocene)**—Red clay, siltstone more abundant than sandstone, conglomerate, limestone
- P_3ssl **Sandstone and siltstone (Oligocene)**—Sandstone, siltstone more abundant than clay, conglomerate, limestone, marl; felsic and mafic volcanic rocks
- P_{23}bab **Volcanic and sedimentary rocks (Oligocene and Eocene)**—Basaltic andesite, basalt, trachyte, dacite, rhyolite, ignimbrite, tuff; more abundant than conglomerate, sandstone, siltstone, limestone
- P_{23}rd **Rhyolite and dacite (Oligocene and Eocene)**—Rhyolite (liparite), dacite more abundant than granite porphyry
- P_{23}rl **Rhyolite lava (Oligocene and Eocene)**—Rhyolite lava
- P_{23}al **Andesite lava (Oligocene and Eocene)**—Andesite lava
- P_{23}vl **Lava (Oligocene and Eocene)**—Lava
- P_2csh **Clay and shale (Eocene)**—Clay, shale, siltstone more abundant than sandstone, limestone, marl, gypsum, conglomerate (North Afghanistan: Katawaz basin); sandstone, siltstone, conglomerate and gravelstone, felsic and mafic volcanic rocks (Gerirud basin)
- P_2al **Andesite lava (Eocene)**—Andesite lava
- P_1cgs **Conglomerate and sandstone (Paleocene)**—Conglomerate, sandstone more abundant than siltstone, limestone, shale; mafic volcanic rocks
- P_1bl **Basalt lava (Paleocene)**—Basalt lava
- KPld **Limestone and dolomite (Paleocene and Late Cretaceous)**—Limestone, marl, dolomite more abundant than sandstone, clay, siltstone, gypsum, conglomerate more abundant than volcanic rocks
- KPal **Andesite lava (Paleocene and Late Cretaceous)**—Andesite lava
- Krb **Volcanic and sedimentary rocks (Cretaceous)**—Rhyolite to basalt; chert, fine- and coarse-grained terrigenous rocks, marl, limestone
- Kal **Andesite lava (Cretaceous)**—Andesite lava
- Kbl **Basalt lava (Cretaceous)**—Basalt lava
- Kvt **Tuff (Cretaceous)**—Tuff
- K_2ssl **Sandstone and siltstone (Late Cretaceous)**—Sandstone, siltstone more abundant than clay, limestone, marl, conglomerate, gypsum (North Afghanistan); limestone (Middle Afghanistan); redstone, siltstone, conglomerate (Khashrud zone)
- K_{2m}ab **Volcanic and sedimentary rocks (Late Cretaceous (Maastrichtian))**—Andesite, basalt, andesitic dacite, tuff, limestone, marl, sandstone, siltstone
- K_{2m}vl **Lava (Late Cretaceous (Maastrichtian))**—Andesite, basalt, andesitic dacite, tuff
- K_{2c}lss **Limestone and sandstone (Late Cretaceous (Campanian))**—Limestone, sandstone more abundant than siltstone, marl, gravelstone, conglomerate, andesitic basalt, tuff and tuffaceous conglomerate
- K_1ssc **Sandstone and conglomerate (Early Cretaceous)**—Red sandstone, conglomerate more abundant than siltstone, gypsum, clay
- K_{1alap}lss **Limestone and sandstone (Early Cretaceous (Albian and Aptian))**—Limestone, marl, sandstone more abundant than conglomerate
- K_{1apbr}lss **Limestone and sandstone (Early Cretaceous (Aptian and Barremian))**—Limestone, marl, sandstone more abundant than conglomerate
- K_{1hv}ssl **Sandstone and siltstone (Early Cretaceous (Hauterivian and Valanginian))**—Sandstone, siltstone more abundant than limestone, marl
- K_{1hv}bl **Basalt (Early Cretaceous (Hauterivian and Valanginian))**—Basalt lava
- K_{1vb}ssl **Sandstone and siltstone (Early Cretaceous (Valanginian and Berriasian))**—Sandstone, siltstone more abundant than limestone, marl
- K_{1vb}al **Andesite (Early Cretaceous (Valanginian and Berriasian))**—Andesite lava
- K_{1vb}bl **Basalt (Early Cretaceous (Valanginian and Berriasian))**—Basalt lava
- J_3K_1sh **Shale and siltstone (Early Cretaceous (Hauterivian) and Late Jurassic (Tithonian))**—Shale more abundant than siltstone, sandstone, conglomerate, chert, limestone, greenstone, felsic and mafic volcanic rocks
- J_3K_1rl **Rhyolite (Early Cretaceous (Hauterivian) and Late Jurassic (Tithonian))**—Rhyolite lava
- J_3K_1bl **Basalt (Early Cretaceous (Hauterivian) and Late Jurassic (Tithonian))**—Basalt lava
- Jsh **Shale (Jurassic)**—Shale and mudstone more abundant than limestone, sandstone
- J_3cgs **Conglomerate and sandstone (Late Jurassic)**—Conglomerate, sandstone more abundant than siltstone, clay, limestone, gypsum (North Afghanistan); limestone, marl, sandstone, siltstone (Farah Rod basin; Upper Jurassic (Tithonian))
- J_{23}ls **Limestone (Late and Middle Jurassic)**—Limestone, marl
- J_{12}ssl **Sandstone and siltstone (Middle and Early Jurassic)**—Sandstone, siltstone more abundant than clay, conglomerate, coal (North Afghanistan); limestone, marl, sandstone, shale, siltstone (Middle Afghanistan); sandstone, shale, siltstone, felsic volcanic rocks (Kismaran zone)
- TJ_2slh **Siltstone and shale (Middle Jurassic and Late Triassic)**—Siltstone, shale more abundant than sandstone
- TJ_1sls **Siltstone and sandstone (Early Jurassic and Late Triassic (Rhaetian))**—Siltstone, sandstone more abundant than shale, marl, limestone
- Tlsh **Limestone and shale (Triassic)**—Limestone, shale more abundant than sandstone
- T_3sab **Sedimentary and volcanic rocks (Late Triassic)**—Shale more abundant than phyllite, andesite to basalt (greenstone altered), limestone (Kotagai series)
- T_3rl **Rhyolite (Late Triassic)**—Rhyolite lava
- T_3bl **Basalt lava (Late Triassic)**—Basalt lava
- T_{3r}rs **Rhyolite and sandstone (Late Triassic (Rhaetian))**—Rhyolite and basalt more abundant than sandstone, mudstone, conglomerate, grit
- T_{3r}rl **Rhyolite (Late Triassic (Rhaetian))**—Rhyolite lava
- T_{3r}al **Andesite (Late Triassic (Rhaetian))**—Andesite lava
- T_{3rn}sls **Siltstone and sandstone (Late Triassic (Rhaetian and Norian))**—Siltstone, sandstone more abundant than shale, conglomerate
- T_{3nc}ld **Limestone and dolomite (Late Triassic (Norian and Carnian))**—Limestone, dolomite
- T_{23}ssl **Sandstone and siltstone (Late and Middle Triassic)**—Sandstone and siltstone more abundant than mudstone, carbonaceous shale, limestone, marl, conglomerate, felsic and mafic volcanic rocks (North Afghanistan); limestone, dolomite, marl (Kabul block and Kunar zone)
- T_2ld **Limestone and dolomite (Middle Triassic)**—Limestone, dolomite
- T_{13c}ld **Limestone and dolomite (Late Triassic (Carnian) and Early Triassic)**—Limestone, dolomite more abundant than conglomerate, chert, marl (Middle Afghanistan); limestone, dolomite, shale, conglomerate, chert, mafic volcanic rocks (Khashrud zone); limestone, dolomite (Kismaran zone)
- T_{12}ld **Limestone and dolomite (Middle and Early Triassic)**—Limestone, dolomite, marl
- T_1ssc **Sandstone and conglomerate (Early Triassic)**—Variegated sandstone, gravelstone, conglomerate, chert, rhyolite and basalt volcanic rocks (North Afghanistan)
- PT_3lsc **Limestone and chert (Late Triassic (Carnian) and Permian)**—Limestone, marl, chert more abundant than sandstone, shale, siltstone
- Pssl **Sandstone and siltstone (Permian)**—Red and variegated sandstone and siltstone more abundant than mudstone, conglomerate, gravelstone (Northwest Afghanistan); limestone, dolomite, sandstone, siltstone, shale, phyllite, mafic volcanic rocks, bauxite and bauxite-bearing rocks (Middle Afghanistan: Zuri and Kismaran zones, Katawaz trough)
- P_2ld **Limestone and dolomite (Late Permian)**—Limestone, dolomite more abundant than marl, conglomerate, sandstone, siltstone, shale, bauxite and bauxite-bearing rocks
- P_1sls **Siltstone and sandstone (Early Permian)**—Siltstone and sandstone more abundant than slate, limestone, conglomerate, grit (Helmand zone); limestone (Tashkupruk zone)
- P_1lss **Limestone and sandstone (Early Permian)**—Uluk and Kuberghandian horizons; limestone and sandstone more abundant than siltstone, conglomerate
- P_1lssk **Limestone and sandstone (Early Permian)**—Karachatyr horizon; limestone and sandstone more abundant than siltstone, argillite, slate
- CP_1ssl **Sandstone and siltstone (Early Permian and Carboniferous)**—Sandstone and siltstone more abundant than slate, andesite to basalt volcanic rocks
- C_2ls **Limestone (Late Carboniferous)**—Limestone more abundant than slate, sandstone, conglomerate, siltstone, andesite to basalt volcanic rocks
- C_1rb **Volcanic and sedimentary rocks (Early Carboniferous)**—Rhyolitic to basaltic volcanic rocks more abundant than limestone, slate, sandstone, conglomerate
- C_1rt **Rhyolite tuff (Early Carboniferous)**—Rhyolite tuff
- C_1bl **Basalt (Early Carboniferous)**—Basalt lava
- C_1al **Andesite (Early Carboniferous)**—Andesite lava
- C_1vl **Lava (Early Carboniferous)**—Lava
- C_{1n}bss **Basalt and sandstone (Early Carboniferous (Namurian))**—Basalt, sandstone, siltstone, shale (North Afghanistan); sandstone, siltstone, shale (Tashkupruk and Kunar zones)
- C_{1n}bt **Basalt tuff (Early Carboniferous (Namurian))**—Basalt tuff
- C_{1n}bl **Basalt lava (Early Carboniferous (Namurian))**—Basalt lava
- C_{1n}vl **Lava (Early Carboniferous (Namurian))**—Lava
- C_{1vt}ls **Limestone (Early Carboniferous (Visean and late Tournaisian))**—Limestone more abundant than slate, sandstone, mudstone, conglomerate
- C_{1t}ra **Rhyolite to andesite (Early Carboniferous (early Tournaisian))**—Rhyolite to andesite (greenstone altered) more abundant than sandstone, shale, siltstone
- C_{1t}rl **Rhyolite lava (Early Carboniferous (early Tournaisian))**—Rhyolite lava
- C_{1t}vl **Lava (Early Carboniferous (early Tournaisian))**—Lava
- DCld **Limestone and dolomite (Early Carboniferous and Late Devonian)**—Limestone and dolomite more abundant than marl, schist
- D_3ssl **Sandstone and siltstone (Late Devonian)**—Sandstone and siltstone more abundant than limestone
- D_{12}ld **Limestone and dolomite (Middle and Early Devonian)**—Limestone and dolomite more abundant than sandstone, siltstone
- SDld **Limestone and dolomite (Devonian and Silurian)**—Limestone and dolomite more abundant than schist, sandstone
- Sls **Limestone (Silurian)**—Limestone, marl more abundant than slate (Middle Afghanistan); sandstone, siltstone, shale (Logar and Argandab zones)
- Ossl **Sandstone and siltstone (Ordovician)**—Sandstone and siltstone more abundant than shale (Logar and Argandab zones); limestone, sandstone, siltstone, shale (Middle Afghanistan); shale, sandstone, chert (North Afghanistan)
- €ssl **Sandstone and siltstone (Cambrian)**—Sandstone and siltstone more abundant than limestone, dolomite, mafic volcanic rocks
- Z_3€ld **Limestone and dolomite (Cambrian (Edicarian) and Neoproterozoic)**—Limestone and dolomite (Argandab zone); marble, quartzite, metasandstone, mica schist (Kabul block)
- Z_3ra **Metavolcanic rhyolite and andesite (late Neoproterozoic)**—Red altered rhyolite and andesite volcanic rocks more abundant than sandstone, siltstone, phyllite, limestone, dolomite
- Z_3vl **Lava (late Neoproterozoic)**—Lava
- Z_1scp **Schist and phyllite (early Neoproterozoic)**—Greenschist and phyllite derived from slate, schist, sandstone more abundant than metacarbonates (marble, dolomite, chert) and metavolcanic rocks
- Z_1rl **Metavolcanic rhyolite lava (early Neoproterozoic)**—Metavolcanic rhyolite lava
- Z_1al **Metavolcanic andesite lava (early Neoproterozoic)**—Metavolcanic andesite lava
- Ym **Metamorphic rocks, undifferentiated (Mesoproterozoic)**—Greenschist, gneiss, quartzite, marble, amphibolite (metavolcanic lava and sedimentary rocks)
- Yvl **Metavolcanic lava and sediments (Mesoproterozoic)**—Metavolcanic lava and sedimentary rocks
- Y_3sc **Schist (late Mesoproterozoic)**—Quartz-plagioclase-biotite, biotite, muscovite, and two-mica schists, with amphibolite beds and lenses
- Y_2sc **Schist (middle Mesoproterozoic)**—Albite-sericite-quartz and sericite-plagioclase-quartz schists, with amphibolite beds and lenses
- Y_1sc **Schist (early Mesoproterozoic)**—Quartz-sericite-carbonate and chlorite-sericite-quartz schists; marble, quartzite, amphibolite
- Xgn **Gneiss (Paleoproterozoic)**—Two-mica, biotite, biotite-amphibole, garnet-biotite, and plagioclase gneisses; migmatite, quartzite, marble, amphibolite
- X_3gn **Gneiss (late Paleoproterozoic)**—Biotite gneiss and garnet-biotite gneiss; schist, quartzite, marble, amphibolite
- X_2mbg **Marble and gneiss (middle Paleoproterozoic)**—Marble, biotite gneiss, and garnet-staurolite-biotite gneiss; schist, quartzite, amphibolite
- X_2vl **Metavolcanic lava (middle Paleoproterozoic)**—Metavolcanic lava
- X_1gn **Gneiss (early Paleoproterozoic)**—Two-mica, biotite, biotite-amphibole, garnet-biotite, garnet-sillimanite-biotite, pyroxene-amphibole, plagioclase, and cordierite gneisses; schist, migmatite, quartzite, marble, amphibolite
- Wgn **Gneiss (Neoarchean)**—Biotite, garnet-biotite, sillimanite-biotite, amphibole, and biotite-amphibole gneisses; amphibolite
- Vgn **Gneiss (Mesoarchean)**—Biotite, garnet-biotite, amphibole, biotite-amphibole, and calc-silicate gneisses; magnesian marble, quartzite, amphibolite
- Ugn **Gneiss (Paleoarchean)**—Biotite, garnet-biotite, and injection gneisses; amphibolite

Plutonic Rocks

- Q_1cab **Carbonatite (early Pleistocene)**—Carbonatite dikes
- Q_1cab **Carbonatite (early Pleistocene)**—Carbonatite intrusion
- Q_1rd **Rhyodacite (early Pleistocene)**—Rhyodacite (liparite-dacite)
- N_1syn **Nepheline syenite (Miocene)**—Nepheline syenite
- N_1ad **Andesite and diorite (Miocene)**—Andesite, diorite more abundant than diabase porphyry dikes
- N_1dig **Diorite and granodiorite (Miocene)**—Diorite and granodiorite, diorite porphyry, granodiorite porphyry, monzonite porphyry, syenite porphyry, nepheline syenite
- P_3gr **Granite (Oligocene)**—Granite (Phase III)
- P_3gdy **Granodiorite and granosyenite (Oligocene)**—Granodiorite, alaskite, granosyenite more abundant than granite (Phase II)
- P_3gd **Granodiorite (Oligocene)**—Granodiorite (Phase I)
- P_3dip **Diorite and plagiogranite (Oligocene)**—Diorite and plagiogranite more abundant than granodiorite (Phase I)
- P_3grg **Granite and granodiorite (Oligocene)**—Granite, granite porphyry, granodiorite more abundant than quartz syenite, granosyenite
- P_2dbd **Diabase and diorite intrusions (Eocene)**—Diabase, diorite
- P_2um **Ultramafic intrusions (Eocene)**—Dunite, peridotite, serpentinite
- KP_1gbm **Gabbro and monzonite (Paleocene and Late Cretaceous)**—Gabbro, monzonite more abundant than diorite, granite, granosyenite, syenite porphyry, syenite
- K_1gdg **Granodiorite and granite (Early Cretaceous)**—Granodiorite, granite
- K_1gbd **Gabbro and diorite (Early Cretaceous)**—Gabbro, diorite more abundant than plagiogranite
- K_1gbm **Gabbro and monzonite (Early Cretaceous)**—Gabbro, monzonite more abundant than diorite, granodiorite
- K_1um **Ultramafic intrusions (Early Cretaceous)**—Dunite, peridotite, serpentinite
- J_3K_1dbg **Diabase and gabbrodiabase (Early Cretaceous and Late Jurassic)**—Diabase, gabbrodiabase
- T_3gdy **Granodiorite and granosyenite (Late Triassic)**—Granodiorite, granosyenite, granophyre, granite
- T_3agp **Andesite and granite porphyry (Late Triassic)**—Andesite porphyry, granite porphyry
- T_1gry **Granite and granosyenite (Early Triassic)**—Granite, granosyenite (Phase IV)
- T_1gr **Granite (Early Triassic)**—Granite (Phase III)
- T_1gdg **Granodiorite and granite (Early Triassic)**—Granodiorite, granite (Phase I-II)
- Pdi **Diorite and gabbrodiorite (Permian)**—Diorite, gabbrodiorite, plagiogranite
- Pgbd **Gabbro and diorite (Permian)**—Gabbro, gabbrodiorite, diorite
- Pum **Ultramafic intrusions (Permian)**—Ultramafic rocks
- C_1dig **Diorite and granodiorite (Early Carboniferous)**—Diorite, granodiorite more abundant than granophyre, plagiogranite
- C_1gbd **Gabbro and diorite (Early Carboniferous)**—Gabbro, diorite
- C_1um **Ultramafic intrusions (Early Carboniferous)**—Dunite, peridotite, serpentinite
- Zgp **Granite porphyry (Neoproterozoic)**—Granite porphyry
- Pgng **Gneiss and granite (Proterozoic)**—Gneiss-granite, granite, plagiogranite
- Pgbm **Gabbro and mafic metavolcanics (Proterozoic)**—Gabbro, metadiabase, amphibolite, diorite, plagiogranite

DESCRIPTION OF MINERAL SYMBOLS
Deposit Types

METALLIC MINERALS
- Vein gold, undivided
- Skarn gold (± copper)
- Unclassified gold
- Sediment-hosted copper
- Porphyry copper(?)
- Skarn copper
- Unclassified copper
- Volcanogenic massive sulfide (copper-zinc)
- Vein polymetallic
- Skarn zinc-lead
- Mississippi Valley-type lead-zinc
- Unclassified lead-zinc
- Iron formation
- Oolitic ironstone
- Skarn iron
- Kiruna-type iron oxide (copper-gold)(?)
- Vein hematite
- Unclassified iron
- Unclassified manganese
- Podiform chromite
- Greisen tin
- Stockwork tin
- Vein tin
- Skarn tin
- Unclassified tin
- Greisen tungsten
- Vein tungsten
- Skarn tungsten
- Unclassified tungsten
- Unclassified molybdenum
- Unclassified mercury
- Pegmatite (beryllium, lithium, tantalum; gem-quality minerals)
- Carbonatite (uranium, rare-earth elements)

NONMETALLIC MINERALS
- Bedded barite
- Vein barite
- Unclassified barite
- Bedded celestite
- Unclassified fluorite
- Salt dome
- Bedded marine halite
- Lacustrine halite
- Unclassified halite
- Bedded marine gypsum
- Lacustrine gypsum
- Unclassified gypsum
- Sulfur
- Aggregate
- Aragonite
- Limestone
- Marble
- Calcite (Iceland spar)
- Sedimentary kaolin
- Residual kaolin
- Sedimentary bentonite
- Unclassified clay
- Unclassified phosphate
- Karst-type bauxite
- Laterite-type bauxite
- Metasomatic/metamorphic replacement magnesite
- Ultramafic-hosted talc
- Serpentine-hosted asbestos
- Unclassified graphite
- Quartz pegmatites and veins
- Silica sandstone
- Unclassified silica

PRECIOUS AND SEMI-PRECIOUS MINERALS
- Emerald
- Ruby
- Lapis lazuli
- Garnet
- Epidote

PLACER MINERALS
- Placer gold
- Placer tin

ENERGY MINERALS
- Coal
- Peat
- Petroleum, oil
- Petroleum, oil show
- Petroleum, gas
- Petroleum, gas show
- Petroleum, oil and condensate, show
- Petroleum, oil show and gas show
- Oil shale

EXPLANATION OF GEOLOGIC MAP SYMBOLS

- **Fault**—Dashed where approximately located; dotted where concealed
- **Lake or reservoir**

EXPLANATION OF POLITICAL MAP SYMBOLS

- KABUL **National capital**
- Hirat **Provincial capital**
- **National boundary**
- **Provincial boundary**
- BALKH **Province name**

DATA SUMMARY

The geologic and mineral resource information shown on this map is derived from digitization of the original data from Abdullah and Chmyriov (1977) and Abdullah and others (1977). The U.S. Geological Survey (USGS) has made no attempt to modify original geologic map-unit boundaries and faults as presented in Abdullah and Chmyriov (1977); however, modifications to map-unit symbology, and minor modifications to map-unit descriptions, have been made to clarify lithostratigraphy and to modernize terminology. Labeling of map units has not been attempted where they are small or narrow, in order to maintain legibility and to preserve the map's utility in illustrating regional geologic and structural relations. Users are encouraged to refer to the series of USGS/AGS (Afghan Geological Survey) 1:250,000-scale geologic quadrangle maps of Afghanistan that are being released concurrently as open-file reports.

The classification of mineral deposit types is based on the authors' interpretation of existing descriptive information (Abdullah and others, 1977; Bowersox and Chamberlin, 1995; Orris and Bliss, 2002) and on limited field investigations by the authors. Deposit-type nomenclature used for nonfuel minerals is modified from published USGS deposit-model classifications, as compiled in Stoeser and Heran (2000). New petroleum localities are based on research of archival data by the authors.

The shaded-relief base is derived from Shuttle Radar Topography Mission (SRTM) digital elevation model (DEM) data having 85-meter resolution. Gaps in the original SRTM DEM dataset were filled with data digitized from contours on 1:200,000-scale Soviet General Staff Sheets (1978–1997). The marginal extent of geologic units corresponds to the position of the international boundary as defined by Abdullah and Chmyriov (1977), and the international boundary as shown on this map was acquired from the Afghanistan Information Management Service (AIMS) Web site (http://www.aims.org.af) in September 2005. Non-coincidence of these boundaries is due to differences in the respective data sources and to inexact registration of the geologic data to the DEM base. Province boundaries, province capital locations, and political names were also acquired from the AIMS Web site in September 2005. The AIMS data were originally derived from maps produced by the Afghanistan Geodesy and Cartography Head Office (AGCHO).

Version 2 differs from Version 1 in that (1) map units are colored according to the color scheme of the Commission for the Geological Map of the World (CGMW) (http://www.ccgm.org), (2) the minerals database has been updated, and (3) all data presented on the map are also available in GIS format.

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Base from Shuttle Radar Topography Mission (SRTM) 85-meter digital data
Cultural data from digital files from AIMS Web site (http://www.aims.org.af), acquired in September 2005
Transverse Mercator projection, WGS 84 Datum; scale factor 0.9996; longitude of central meridian 66°00′ E.; latitude of origin 34°00′ N.

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