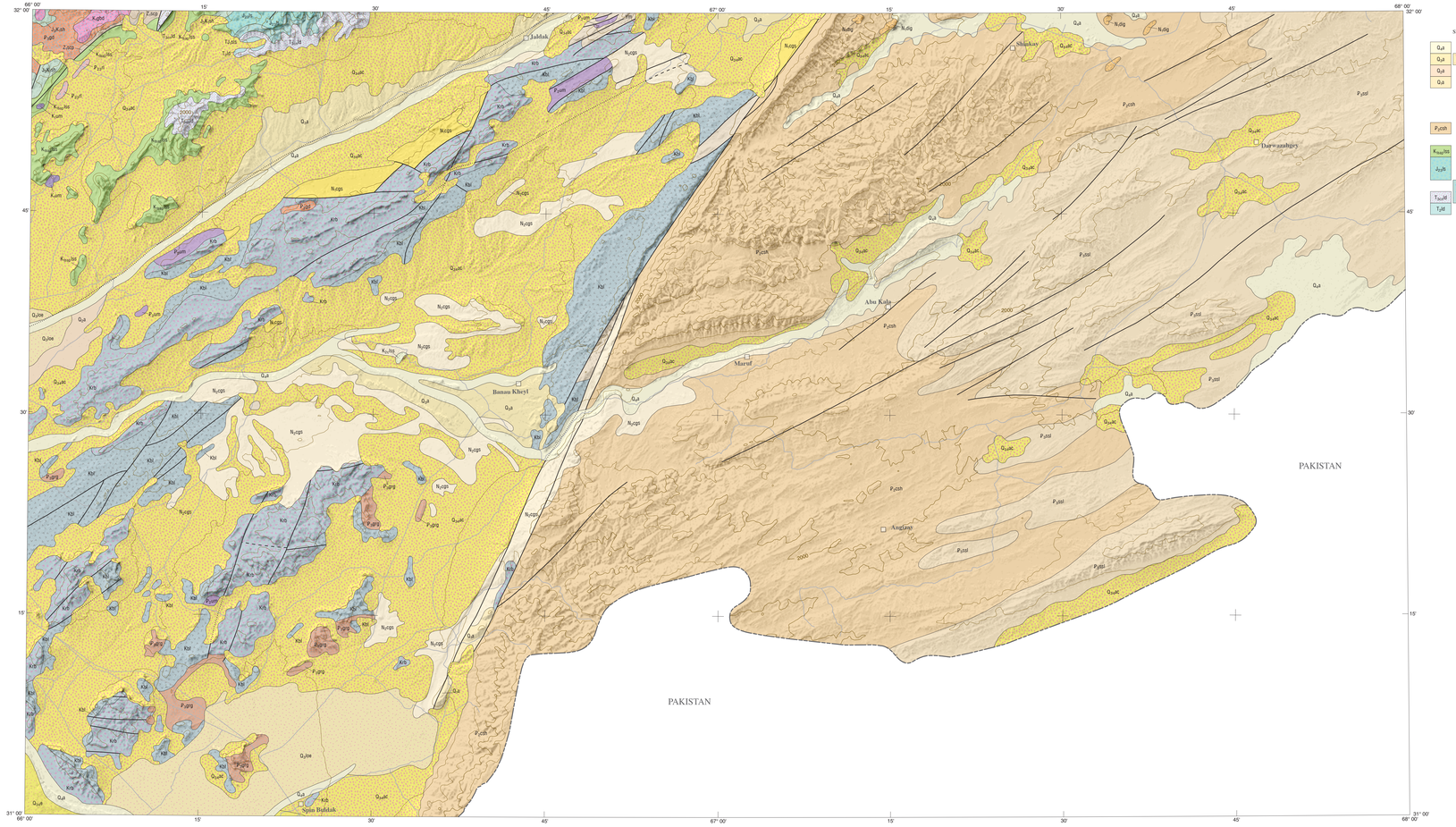
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

AFGHAN GEOLOGICAL SURVEY
Prepared in cooperation with the U.S. Geological Survey and the Afghanistan Geodesy and Cartography Head Office
Under the auspices of the U.S. Agency for International Development and the U.S. Trade and Development Agency

USGS OPEN-FILE REPORT 2005-1120-A
AGS OPEN-FILE REPORT (701/702) 2005-1120-A
USGS Afghanistan Project Product No. 033

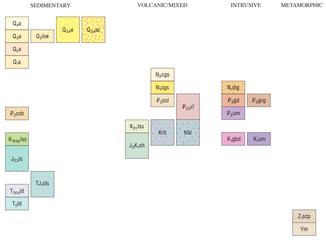


Base from Shuttle Radar Topography Mission (SRTM) 85-meter digital data
Cultural data from digital files from AIMS Web site (http://www.aims.org.af)
Projection: Universal Transverse Mercator, zone 42, WGS 84 Datum

SCALE 1:250 000
5 0 5 10 15 20 25 30 35 40 KILOMETERS
5 0 5 10 15 20 MILES
CONTOUR INTERVAL 250 METERS

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qa **Conglomerate and sandstone (Holocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

Qa,e **Eolian deposits (Holocene and late Pleistocene)**—Sand

Qa,pf **Fan alluvium and colluvium (Holocene and late Pleistocene)**—Fan alluvium and colluvium: shingly and detrital sediments, gravel, sand, clay

Qa,t **Conglomerate and sandstone (late Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

Qa,loe **Loess (late Pleistocene)**—Loess more abundant than sand, clay

Qa,t **Conglomerate and sandstone (middle Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

Qa,p **Conglomerate and sandstone (early Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

N$_2$cgs **Conglomerate and sandstone (Pliocene)**—Gray conglomerate, grit, sandstone more abundant than siltstone, clay, limestone, marl; gypsum, salt; acid to mafic volcanic rocks

N$_1$dg **Diorite and granodiorite (Miocene)**—Diorite porphyry, granodiorite porphyry, monzonite porphyry, syenite porphyry, nepheline syenite

N$_1$cgs **Conglomerate and sandstone (Miocene)**—Red conglomerate, sandstone more abundant than siltstone, clay; acid and mafic volcanic rocks; limestone, marl; olivine basalt, trachybasalt, andesitic basalt (Taywara Series)

P$_2$gd **Granodiorite (Oligocene)**—Granodiorite (Phase I)

P$_2$grg **Granite and granodiorite (Oligocene)**—Granite, granite porphyry, granodiorite more abundant than quartz syenite, granosyenite

P$_2$sl **Sandstone and siltstone (Oligocene)**—Sandstone, siltstone more abundant than clay, conglomerate, limestone, marl; acid and mafic volcanic rocks

P$_2$vl **Basaltic andesite and basalt (Oligocene and Eocene)**—Basaltic andesite, basalt more abundant than trachyte, dacite, rhyolite, ignimbrite, tuff; conglomerate, sandstone, siltstone, limestone

P$_2$um **Ultramafic intrusions (Eocene)**—Dunite, peridotite, serpentinite

P$_2$sh **Clay and shale (Eocene)**—Clay, shale, siltstone more abundant than sandstone, limestone, marl, gypsum, conglomerate

K$_2$b **Rhyolite and basalt (Cretaceous)**—Rhyolite and basalt mafic volcanic rocks more abundant than chert, fine- and coarse-grained terrigenous rocks, marl, limestone

K$_2$bl **Basalt lava (Cretaceous)**—Basalt mafic volcanic rocks more abundant than rhyolite, chert, fine- and coarse-grained terrigenous rocks, marl, limestone

K$_2$ls **Limestone and sandstone (Late Cretaceous (Campanian))**—Limestone, sandstone more abundant than siltstone, marl, gravelstone, conglomerate, andesitic basalt, tuff and tuffaceous conglomerate

K$_1$um **Ultramafic intrusions (Early Cretaceous)**—Dunite, peridotite, serpentinite

K$_1$gbd **Gabbro and diorite (Early Cretaceous)**—Gabbro, diorite more abundant than plagiogranite

K$_1$ls **Limestone and sandstone (Early Cretaceous (Aptian and Barremian))**—Limestone, marl, sandstone more abundant than conglomerate

J$_3$K$_1$sh **Shale and siltstone (Early Cretaceous (Hauterivian) and Late Jurassic (Tithonian))**—Shale more abundant than siltstone, sandstone, conglomerate, chert, limestone, greenstone, acid and mafic volcanic rocks

J$_3$ls **Limestone (Late and Middle Jurassic)**—Limestone, marl

TJ$_2$slt **Siltstone and sandstone (Early Jurassic and Late Triassic (Rhaetian))**—Siltstone, sandstone more abundant than shale, marl, limestone

T$_3$ls,M **Limestone and dolomite (Late Triassic (Norian and Carnian))**—Limestone, dolomite

T$_2$ld **Limestone and dolomite (Middle Triassic)**—Limestone, dolomite

Z,ozp **Schist and phyllite (early Neoproterozoic)**—Greenschist and phyllite derived from slate, schist, sandstone more abundant than metacarbonates (marble, dolomite, chert) and metavolcanic rocks

Ym **Metamorphic rocks, undivided (Mesoproterozoic)**—Greenschist, gneiss, quartzite, marble, amphibolite (metavolcanic lava and sedimentary rocks)

EXPLANATION OF MAP SYMBOLS

Contact

Fault—Dashed where approximately located; dotted where concealed

DATA SUMMARY

This map was produced from several larger digital datasets. Topography was derived from Shuttle Radar Topography Mission (SRTM) 85-meter digital data. Gaps in the original dataset were filled with data digitized from contours on 1:200,000-scale Soviet General Staff Sheets (1978–1997). Contours were generated by cubic convolution averaged over four pixels using TNTmips® surface-modeling capabilities. Cultural data were extracted from files downloaded from the Afghanistan Information Management Service (AIMS) Web site (http://www.aims.org.af). The AIMS files were originally derived from maps produced by the Afghanistan Geodesy and Cartography Head Office (AGCHO). Geologic data and the international boundary of Afghanistan were taken directly from Abdullah and Chmyriov (1977).

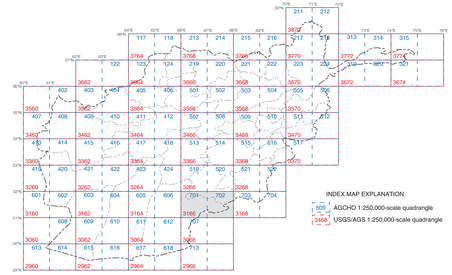
It is the primary intent of the U.S. Geological Survey (USGS) to present the geologic data in a useful format while making them publicly available. These data represent the state of geologic mapping in Afghanistan as of 2005, although the original map was released in the late 1970s (Abdullah and Chmyriov, 1977). The USGS has made no attempt to modify original geologic map-unit boundaries and faults; however, modifications to map-unit symbology, and minor modifications to map-unit descriptions, have been made to clarify lithostratigraphy and to modernize terminology. The generation of a Correlation of Map Units (CMU) diagram required interpretation of the original data, because no CMU diagram was presented by Abdullah and Chmyriov (1977).

This map is part of a series that includes a geologic map, a topographic map, a Landsat natural-color-image map, and a Landsat false-color-image map for the USGS/AGS (Afghan Geological Survey) quadrangles shown on the index map. The maps for any given quadrangle have the same open-file number but a different letter suffix, namely, -A, -B, -C, and -D for the geologic, topographic, Landsat natural-color, and Landsat false-color maps, respectively. The present map series is to be followed by a second series, in which the geology is reinterpreted on the basis of analysis of remote-sensing data, limited fieldwork, and library research. The second series is to be produced by the USGS in cooperation with the AGS and AGCHO.

REFERENCE CITED

Abdullah, Sh., and Chmyriov, V.M., eds., 1977, Map of mineral resources of Afghanistan: Kabul, Ministry of Mines and Industries of the Democratic Republic of Afghanistan, Department of Geological and Mineral Survey, V/O "Technoexport" USSR, scale 1:500,000.

[1]Geospatial analysis software developed by Microimages, Inc., Lincoln, NE 68508-2010.



GEOLOGIC MAP OF QUADRANGLE 3166, JALDAK (701) AND MARUF-NAWA (702) QUADRANGLES, AFGHANISTAN

Compiled by
Robert G. Bohannon

2005