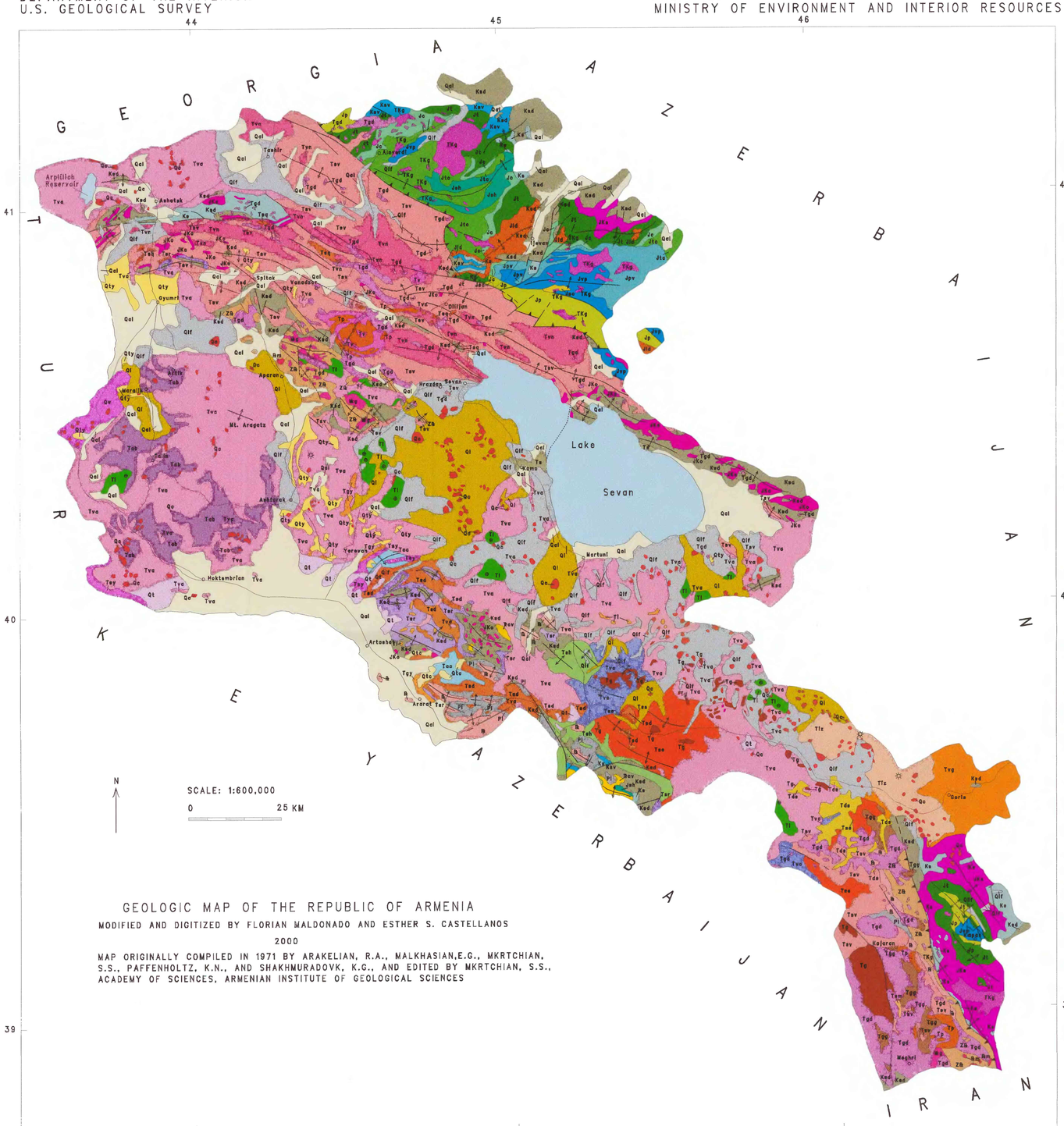
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE ARMENIAN
MINISTRY OF ENVIRONMENT AND INTERIOR RESOURCES

OPEN-FILE REPORT 98-479



GEOLOGIC MAP OF THE REPUBLIC OF ARMENIA

MODIFIED AND DIGITIZED BY FLORIAN MALDONADO AND ESTHER S. CASTELLANOS

2000

MAP ORIGINALLY COMPILED IN 1971 BY ARAKELIAN, R.A., MALKHASIAN,E.G., MKRTCHIAN, S.S., PAFFENHOLTZ, K.N., AND SHAKHMURADOVK, K.G., AND EDITED BY MKRTCHIAN, S.S., ACADEMY OF SCIENCES, ARMENIAN INSTITUTE OF GEOLOGICAL SCIENCES

This map is not the authority on the delineation of country boundaries. Latitude and longitude tics are approximately located.

This map is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade, product or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

INTRODUCTION

This map is a product that resulted from a project supported by the U.S. Agency for International Development (Participating Agency Service Agreement No. CCN-0002-P-ID-3097-00) to conduct an evaluation of coal and other fossil fuels in the Republic of Armenia. The original map has been translated to English from Russian (Marlen Satian, Academy of Sciences, Armenian Institute of Geological Sciences, written commun., 1994), digitized, and slightly modified in some areas. The original format has been modified to follow the U.S. Geological Survey's format. The map projection is not known. Latitude and longitude tics are approximately located.

CORRELATION OF MAP UNITS

Qal	Quaternary	QUATERNARY
Qtc		
Qty		
Qc		
Ql		
Qlf		
Qt		
Qv		
Tlz	Pliocene	TERTIARY
Tsm		
Tds		
Tvg	Miocene?–Pliocene	
Ts		
Tl	Miocene	
Tvc		
Tab	Tertiary	
Tr		
Tgy	Oligocene–Miocene	
Tg	late Oligocene	
Tcc	early–middle Oligocene	
Tgq	late Eocene–Miocene	
Tv	late Eocene–early Oligocene	
Tgd		
Tqq		
Tp	late Eocene–early Oligocene	
Tsq		
Tvn		
Tsd	middle–late Eocene	
Tse	Eocene	
Tsv	early–middle Eocene	
Tsh	Paleocene–early Eocene	
Tsr	Paleocene	
TKg	Late Cretaceous–Eocene	CRETACEOUS–TERTIARY
Ksd	Late Cretaceous	CRETACEOUS
Ksv		
Ks	Early Cretaceous	
Jks	Jurassic–Cretaceous?	JURASSIC–CRETACEOUS?
Mg	Mesozoic?	MESOZOIC?
JKa	Late Jurassic–Early Cretaceous	
Jid	Late Jurassic	JURASSIC
Jt		
Jtc		
Jsh		
Jc		
Jp	Middle Jurassic	
Jpv		
Jvp		
Jsc	Early–Middle Jurassic	
Trcv	Triassic	TRIASSIC
Pl	Permian	PERMIAN
R	Early–Middle Devonian and Pennsylvanian Paleozoic?	DEVONIAN AND PENNSYLVANIAN
Rm		PALEOZOIC?
ZR	Proterozoic–Early Paleozoic	PROTEROZOIC–PALEOZOIC

MAP UNITS

Qal	Alluvial deposits undivided (Quaternary)--Alluvium, proluvium, diluvial, glacial moraine and lake deposits. Deposits contain clay, sand, and gravel
Qtc	Travertine and travertine conglomerate (Quaternary)
Qty	Tuff and ash-flow tuff of Yerevan-Gyumri (Quaternary)
Qc	Monogenic cinder cones and deposit (Quaternary)
Ql	Lava flows of intermediate composition (Quaternary)--Andesite and andesitic-dacitic lava flows
Qlf	Lava flows, (Quaternary)--Basalt, andesite, andesitic-basaltic, and andesitic-dacitic lava flows
Qt	Terrace deposit (Quaternary)--Comprised of clay, sand, and gravel
Qv	Volcanic rocks (lower Quaternary)--Volcaniclastic deposits, basalt, andesite-basalt, andesite, and andesite-dacite lava flows. Deposits composed of tuffaceous sandstone and tuffaceous conglomerate
Tlz	Volcanic deposits of Ichkhansar and lava flows of Zangezur plateau (Pliocene)
Tsm	Carbonaceous shaly sandstone in Meghri region (Pliocene)
Tds	Clay-diatomite deposit of Sisian (Miocene?–Pliocene)
Tvg	Volcanic and volcaniclastic rocks of Goris (Miocene?–Pliocene)
Ts	Sandstone, conglomerate, and clay (Miocene?–Pliocene)
Tvc	Volcanic rocks of Armenian Highland (Tertiary)–Andesite, trachyandesite, andesite–dacite, dolerite–basalt lava flows, tuffs, tuffaceous conglomerate, and tuffaceous sandstone
Tub	Tuffs and ash-flow tuffs of Artik and Burakan (Tertiary)
Tl	Rhyolite, dacite, pumice, obsidian, and perlite (Tertiary)
Tgy	Gypsium–halite–bearing rocks near Yerevan region (Oligocene–Miocene)
Tcc	Rocks of Chagalu–Chorakchpur (early–middle Oligocene)--Sandstone, and gypsiferous–bearing–clay
Tsq	Sedimentary rocks near Yerevan and Hoktemberian (late Eocene–Miocene)--Composed of variegated units of sandstone, clay, and conglomerate
Tv	Volcanic rocks (late Eocene–Oligocene)--Leucitic prophyry, trachyte, and optophyre trachyandesite lava flows and tuff
Tvn	Volcanic rocks of north Armenia (middle–late Eocene)--Porphyry, andesite, basalt, and dacite lava flows and ash–flow tuff of rhyolite–dacite composition
Tvc	Volcaniclastic and sedimentary rocks (middle–late Eocene)--Tuffaceous sandstone, tuff, sandstone, clay, and marl
Tsd	Sedimentary rocks (Eocene)--Limestone, marl, and sandstone
Tse	Sedimentary and volcanic rocks of east Hayadzor–Zangezur (early–middle Eocene)
Tsv	Sedimentary and volcanic rocks (Paleocene–early Eocene)--Tuffaceous sandstone, sandstone, marl, porphyry, and tuff; locally contains coal beds
Tsh	Sedimentary rocks of Hayadzor (Paleocene–early Eocene)--Sandstone, slate, marl limestone, and basaltic conglomerate
Tsr	Sedimentary rocks (Paleocene)--Sandstone, siltstone, marl, limestone, and conglomerate
Ksd	Sedimentary rocks (Late Cretaceous (Turonian–Cenomanian))--Carbonate and terrigenic deposited limestone, marl, sandstone siltstone, and conglomerate
Ksv	Sedimentary and volcaniclastic rocks (Late Cretaceous (Cenomanian))--Sandstone, limestone, and tuffaceous sandstone
Ks	Sedimentary and minor volcanic rocks (Early Cretaceous (Valanginian–Aptian))--Limestone, marl, sandstone, tuffaceous conglomerate, and porphyry
Jks	Volcaniclastic and sedimentary rocks (Late Jurassic–Early Cretaceous (Oxfordian–Valanginian))--Porphyry, ash–flow tuff, tuffaceous conglomerate and sandstone, with minor limestone
Jid	Sedimentary rocks (Late Jurassic (Late Oxfordian–Early Kimmeridgian))--Limestone, dolomite, and quartzite
Jt	Sedimentary and volcaniclastic rocks (Late Jurassic (Oxfordian))--Tuffaceous conglomerate and limestone lenses
Jtc	Tuffaceous sandstone, shale, breccia, and porphyry (Middle Jurassic (Callovian))
Jsh	Sedimentary deposit of South Halodzor (Middle Jurassic (Bathonian))--Limestone, marl, and conglomerate
Jc	Volcanic and volcaniclastic rocks (Middle Jurassic (Upper Bathonian))--Trachyte, ash–flow tuff, prophyry, and tuffaceous sandstone and conglomerate
Jp	Plagioclase, quartz, and quartz–plagioclase porphyry (Middle Jurassic (Middle–Upper Bajocian))
Jpv	Porphyry, volcanic and volcaniclastic rocks (Middle Jurassic (Middle–Upper Bajocian))--Quartz–plagioclase porphyry, ash–flow tuff, and tuffaceous sandstone; locally contains coal beds
Jvp	Volcanic and plagioclase–epidote porphyry rocks (Middle Jurassic (Upper Aalenian–Lower Bajocian))
Jsc	Schist and conglomerate (Early–Middle Jurassic (Toarcian–Lower Aalenian))
Trcv	Terrigenic–carboniferous rocks of Vedi and dolomitic limestone of Halodzor (Triassic)
Pl	Limestone and bituminous schist (Permian)
R	Upper Paleozoic rocks (Early–Middle Devonian and Pennsylvanian (Early Carboniferous))--Limestone, sandstone, schist, and quartzite
ZR	Proterozoic to Early Paleozoic rocks (Proterozoic–Early Paleozoic)--Schist, limestone, and marble. Volcanic rocks found locally at Zangezur

PREDOMINATELY INTRUSIVE ROCKS

Tl	Intrusive and extrusive rocks of acid and middle composition (Miocene)--Dacite, andesite–dacite, trachyrhyolite
Tg	Porphyritic granite, granodiorite, and monzonite (late Oligocene)
Tgd	Granodiorite, monzonite, granite, and diorite (late Eocene–early Oligocene)
Tgq	Gabbro, gabbro–diorite, and pyroxenite (late Eocene–early Oligocene)
Tp	Pseudoleucite, nepheline, and alkalic syenide (late Eocene–early Oligocene)
Tqq	Subvolcanic quartz prophyry, albitite, and rhyolite–dacite (late Eocene)
TKg	Granite, granodiorite, diorite, gabbro, and albitite (Late Cretaceous–Eocene)
JKa	Ophiolite complex (Jurassic–Cretaceous?)--Gabbroic–pyroxenite, peridotite, dunite, and serpentinite
Mg	Leucogratic granite, migmatite, microcline granite,diorite, gabbro–diorite of Tsachkuniats region and granite–gneiss of south Zangezur region (Mesozoic?)
Rm	Metamorphic complex (Paleozoic?)--Gabbro and pyroxenite

MAP SYMBOLS

- Contact
- Thrust fault, sawteeth on upper plate, queried where uncertain
- Principal line of fault, dashed where approximately located,dotted where concealed
- Principal axis of anticline, dotted where concealed
- Polygenic volcanic vents
- Monogenic rhyolite lava dome
- City
- Road