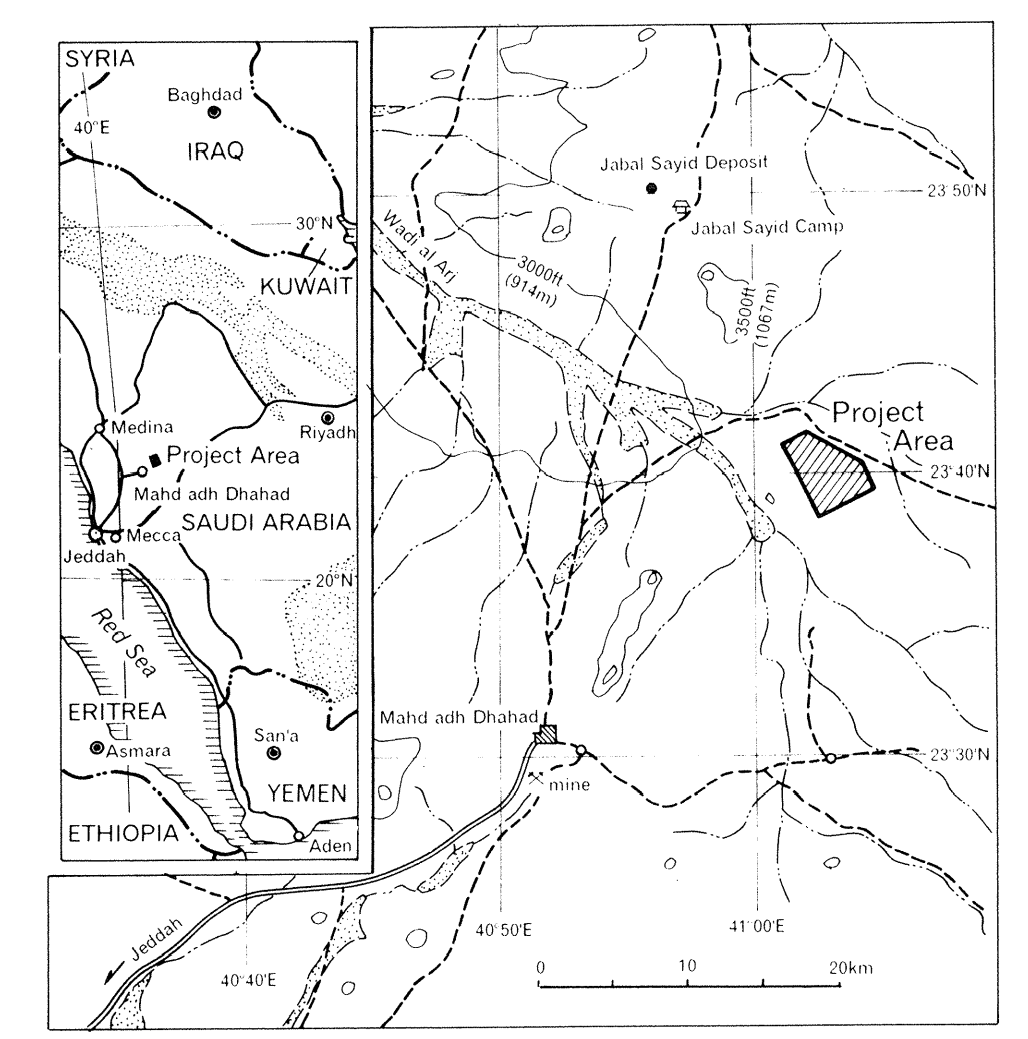


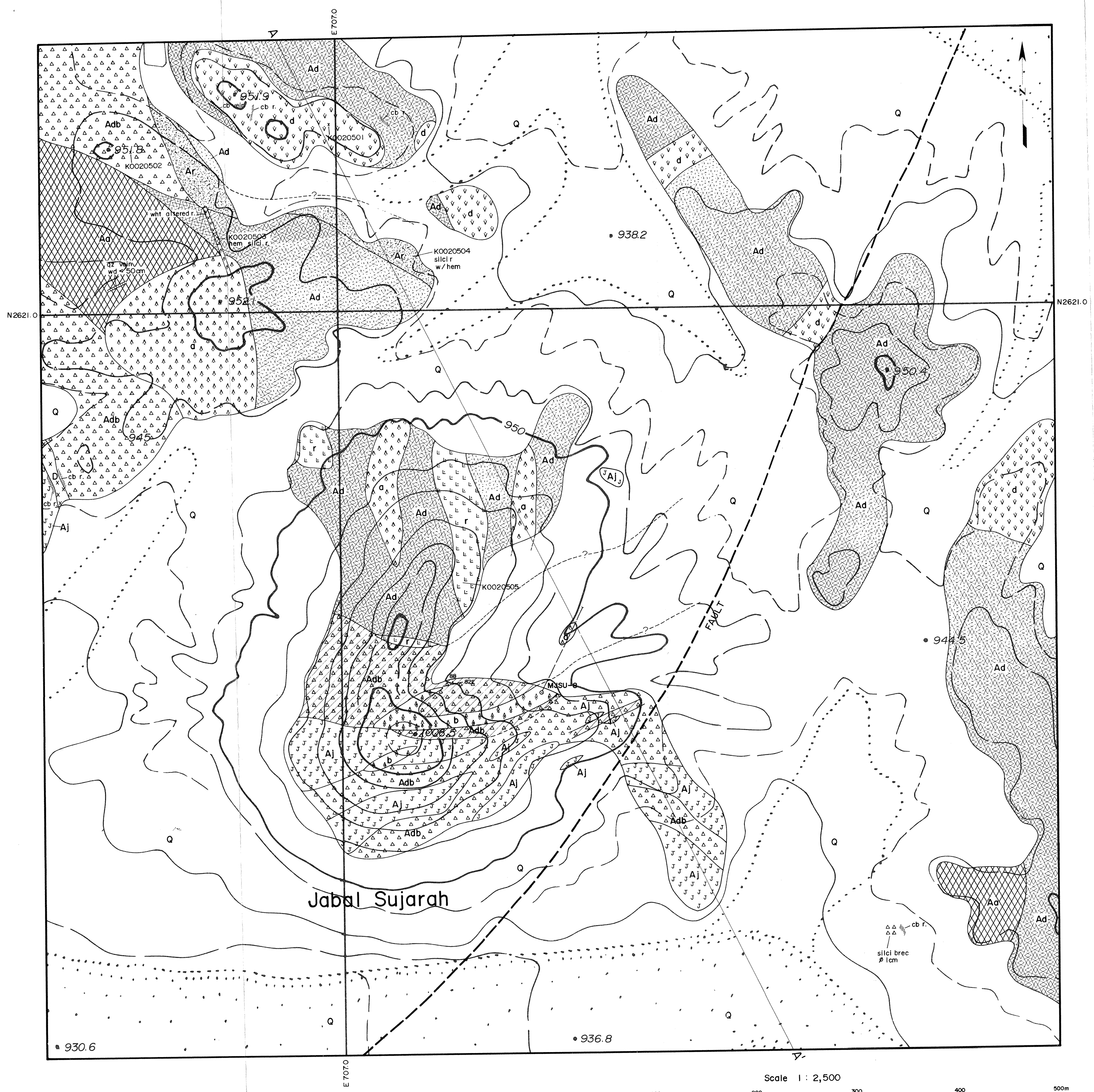
REPORT ON THE COOPERATIVE MINERAL EXPLORATION  
IN THE UMM AD DAMAR AREA  
THE KINGDOM OF SAUDI ARABIA  
PHASE II

DETAILED GEOLOGICAL MAP AND GEOLOGICAL SECTION  
OF AREA A (JABAL SUJARAH)



MARCH 2000

JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN

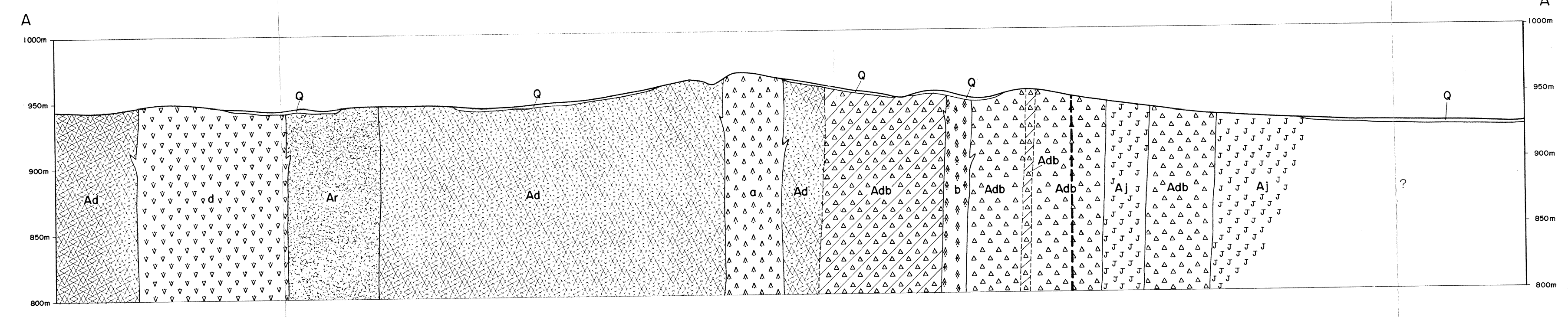


AGE	SEDIMENTARY AND VOLCANIC ROCKS	INTRUSIVE ROCKS
CEENOZOIC QUATERNARY	Q Sand, Gravel	
LATE PROTEROZOIC		x D x Diorite
		b a Porphyritic basalt
		a a a Porphyritic andesite
		v d v Porphyritic dacite
		r r r Rhyodacite
		Aa Andesite, Andesitic pyroclastic rocks
	ARJ GROUP (Jabal Azlam & Sayid Formations)	Ad Dacite, Dacitic pyroclastic rocks (Adb: Breccia)
	Ar Rhyodacite, Rhyodacitic	
	Aj Jasper	

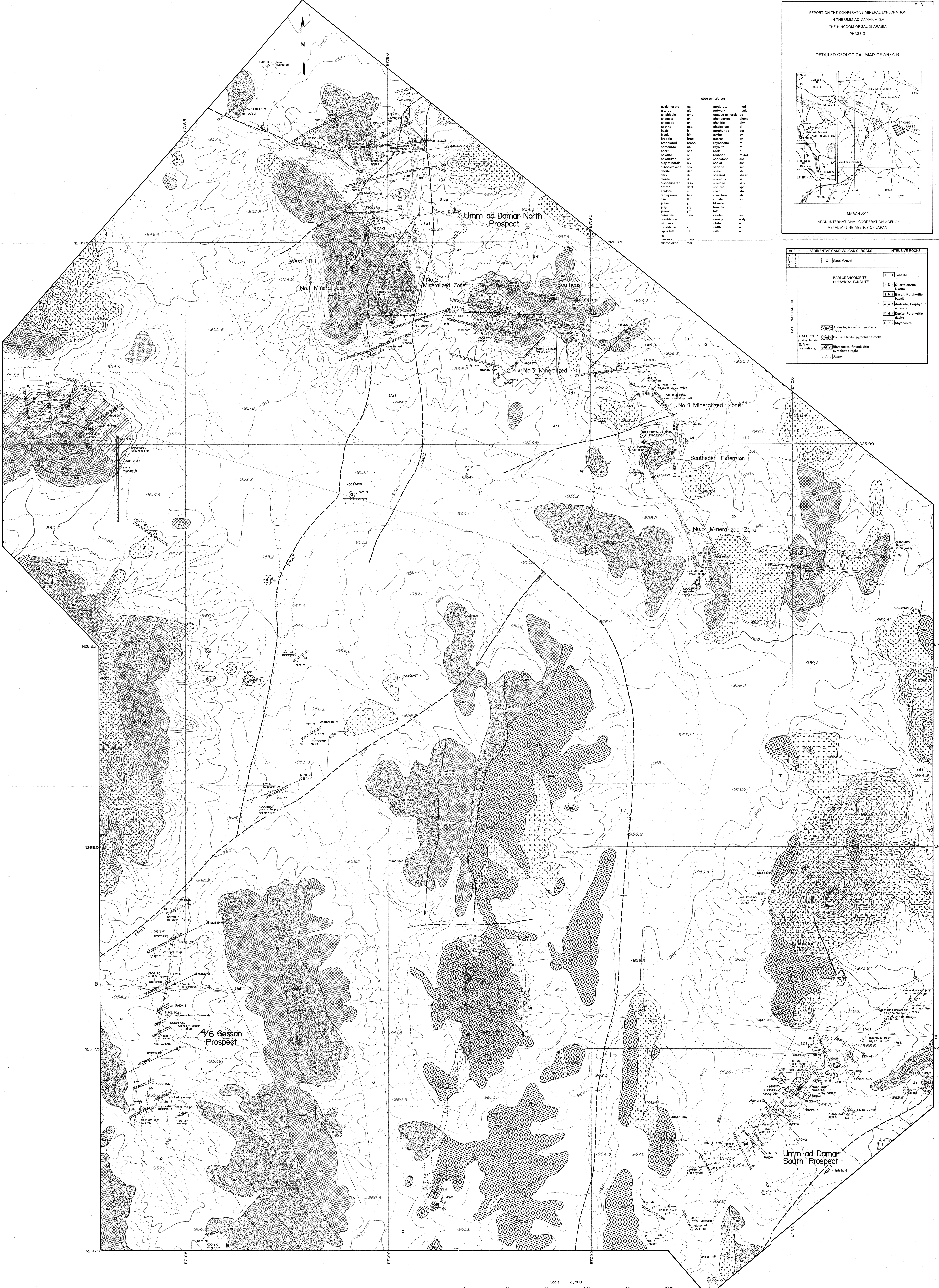
Carbonatized breccia distribution zone

Abbreviation

agglomerate	agl	moderate	mod
altered	alt	network	ntwk
amphibole	amp	opaque minerals	op
andesite	an	phenocryst	pheno
andesitic	an	phyllitic	phy
apatite	apa	plagioclase	pl
basic	b	porphyritic	por
black	blk	pyrite	py
breccia	brec	quartz	qz
brecciated	brecd	rhyodacite	rd
carbonate	cb	rhyolite	rh
chart	cht	rock	r
chlorite	chl	rounded	round
chloritized	chl	sandstone	sst
clay minerals	cly	schist	sch
clinopyroxene	cpx	sericite	ser
dacite	dac	shale	sh
dark	dk	sheared	shear
diorite	dr	siliceous	sil
disseminated	diss	silicified	silci
dotted	dott	spotted	spot
epidote	epi	stain	stn
ferruginous	ferr	structure	str
film	film	sulfide	sul
gravel	gr	titania	tit
gray	grn	tonalite	to
green	grn	tuff	tf
hematite	hem	veinlet	vnl
hornblende	hb	weakly	wkly
intrusive	int	white	wh
K-feldspar	kf	width	wd
lapilli tuff	lft	with	w/
light	lt		
massive	mass		
microdiorite	mdr		







Abbreviation

agglomerate	agl	moderate	mod
altered	alt	network	net
amphibole	amp	opaque mineral	om
andesite	an	phenocryst	phc
androsite	and	phyllite	phy
apophyllite	ap	plagioclase	pl
back	bk	porphyritic	por
basalt	bs	pyrite	py
brachiopod	br	quartz	qtz
breccia	brcc	mylonite	mln
brecciated	brcc	rhyncholite	rh
carbonate	cb	rock	r
chert	cht	rounded	rou
chlorite	chl	schist	sch
chromite	chr	sericite	ser
clay mineral	clm	shale	sh
clinopyroxene	cpx	shaded	shd
dark	dk	siliceous	sil
diabase	db	spotted	sp
diorite	di	stam	stm
disseminated	dis	structure	str
dotted	dot	subtle	sub
epidote	ep	titanite	tit
ferrous	fer	tonalite	ton
fine	fn	trill	tr
green	gr	veinlet	ve
gray	gr	weakly	wkly
gran	grn	white	wh
homotaxite	hb	width	wid
inclusion	inc	with	w
K-feldspar	kf	without	w/o
light	lt	with	w/
massive	mas		
monodiorite	mdr		

AGE	SEDIMENTARY AND VOLCANIC ROCKS	INTRUSIVE ROCKS
QUATERNARY	Q Sand, Gravel	
EARLY PROTEROZOIC	BARI GRANODIORITE, HUYARIYA TONALITE	T Tonalite
		D Diabase, Diorite
		B Basalt, Porphyritic basalt
		A Andesite, Porphyritic andesite
		Dc Diabase, Porphyritic diabase
LATE PROTEROZOIC	Andesite, Andesite pyroclastic rocks	P Pyroclastic
	ARJ GROUP (Jabal Arjan & Sayid Formation)	Dc Diabase, Diabtic pyroclastic rocks
	Hydrothermal, Sphaleritic pyroclastic rocks	H Hydrothermal
	Basalt	B Basalt