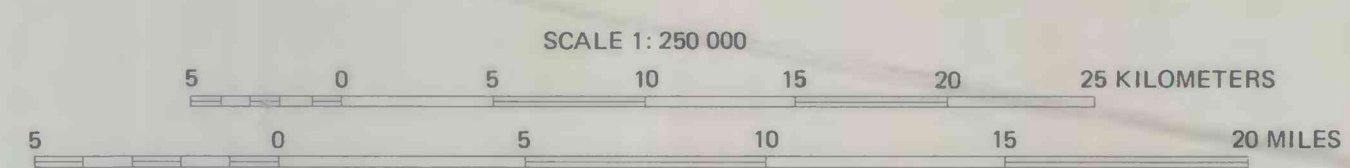




This report has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.



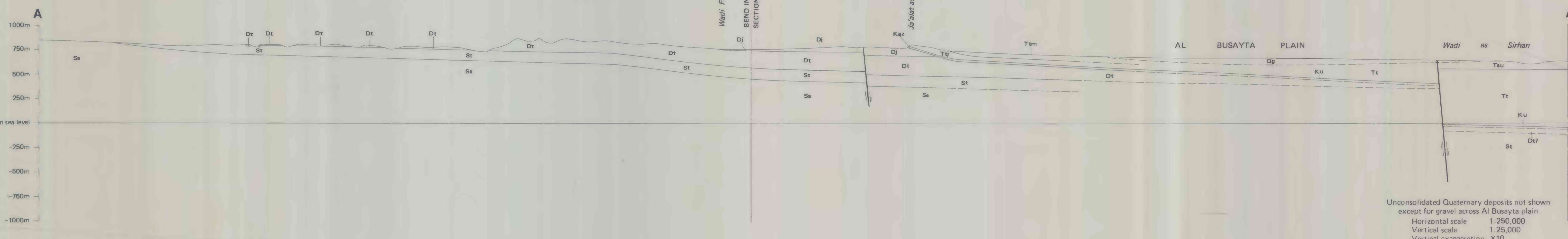
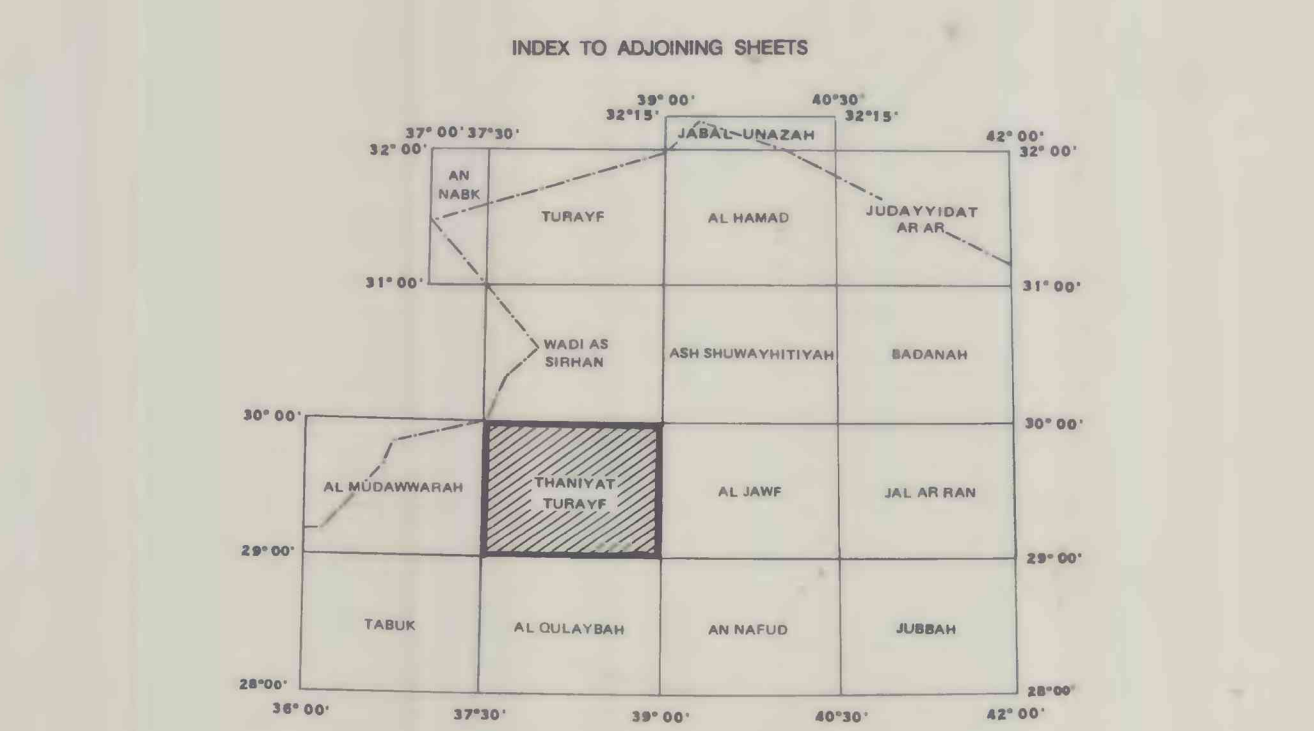
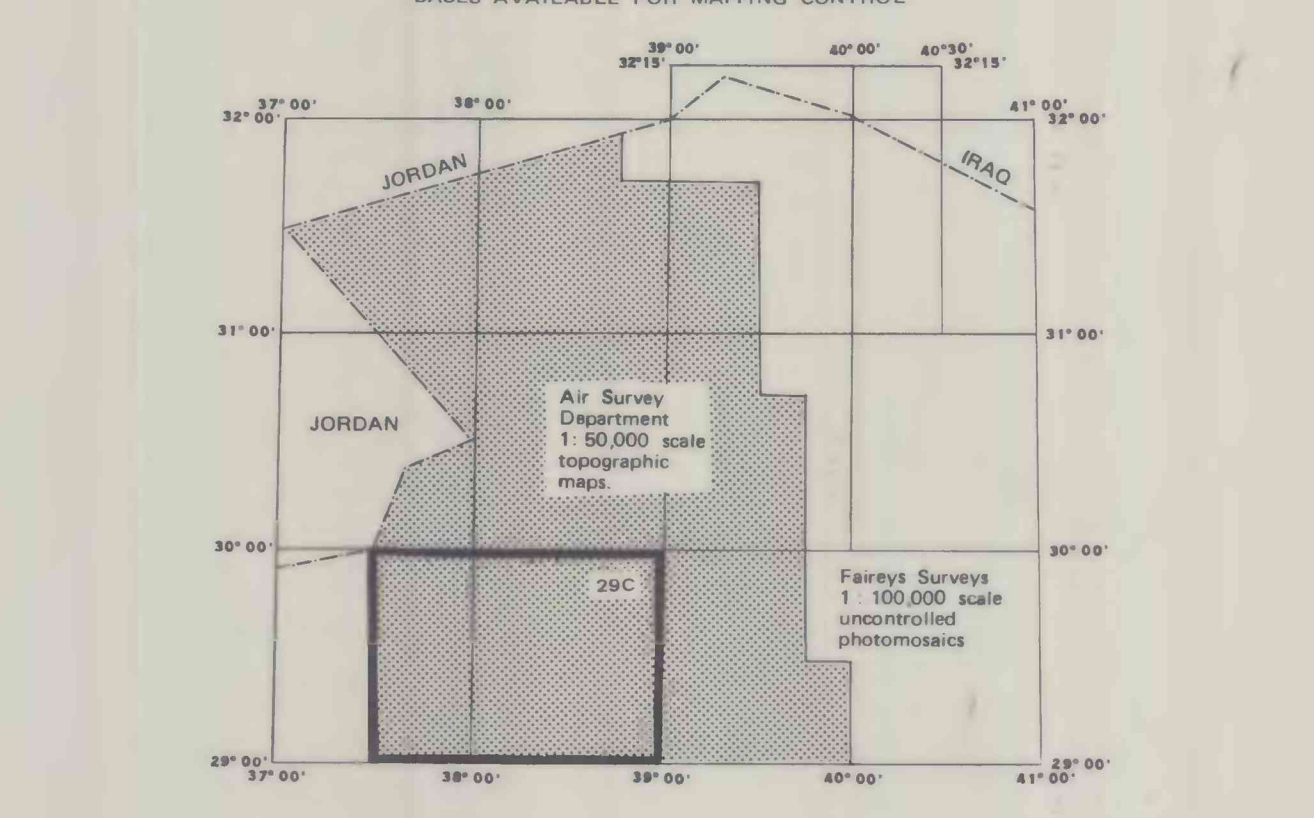
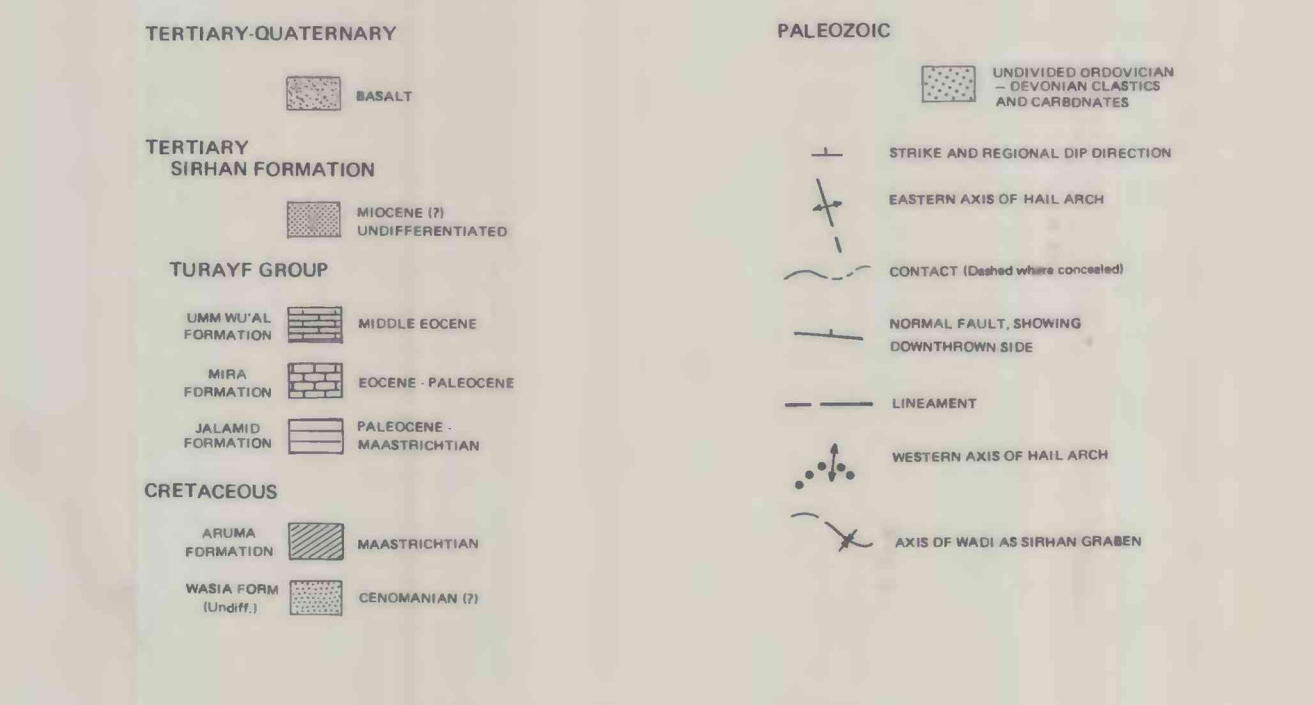
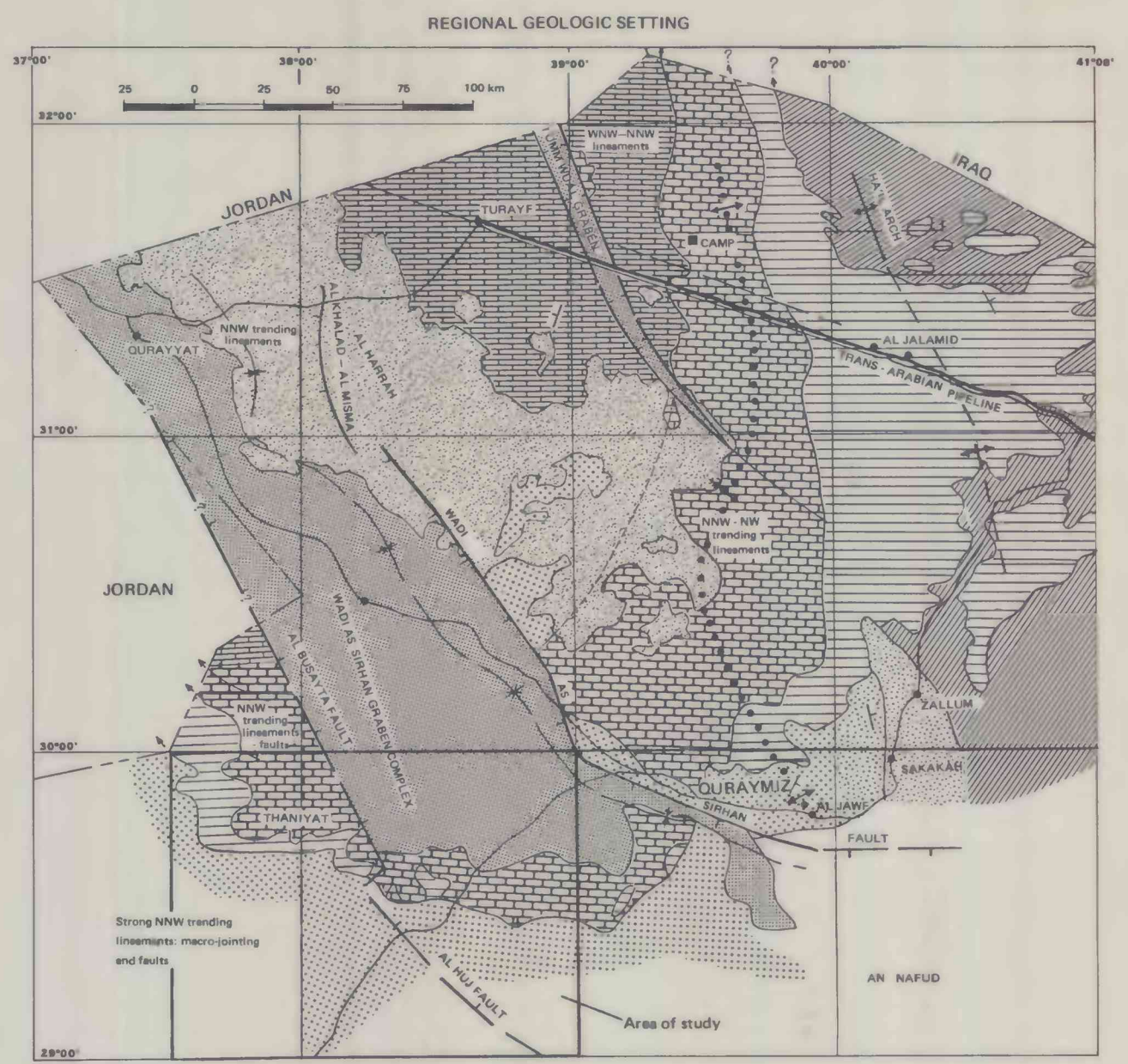
Magnetic declination for 1983 is 2°39' E over entire area. Annual rate of change 3' E.

EXPLANATION OF MAP UNITS

- Qu ALLUVIUM—Unconsolidated silt, sand, and gravel
- Qs SILT AND CLAY—Firmly packed deposit in undrained depressions
- Qcs EOLIAN SAND—Stabilized dunes
- Qgr REGOLITH DURICRUST
- Qg GRAVEL—Gravel plain consisting primarily of dark colored chert clasts and local deposits of "beach" pebbles; gravel also found in drainage channels
- Qg/Qdc GRAVEL AND DURICRUST
- Qdc CALCAREOUS AND GYPSIFEROUS DURICRUST
- UNCONFORMITY
- Tu SIRHAN FORMATION—Calcareous sandstone and sandy limestone
- UNCONFORMITY
- TURAYF GROUP
- Ti TURAYF GROUP UNDIVIDED—Limestone, chert, and subordinate amounts of marl, shale, and sandy limestone (Cross-section only)
- Tim MIRA FORMATION—Hawas, Mandasah, and Sib members, undivided—Interbedded limestone, locally silicified or bioclastic, chert containing thin phosphatic beds, and claystone
- Timg Ghinah Phosphoric member—Limestone, fissile shale, and thin phosphatic beds
- Tijk JALAMID FORMATION—Kuwaykabah member—Interbedded micritic, bioclastic, and argillaceous limestone, containing chert lenses and nodules, locally phosphatic
- Tjt Thaniyat Phosphoric member—Phosphoric, limestone, and chert
- ARUMA FORMATION—Undifferentiated Cretaceous rocks—Sandy limestone (Cross section only)
- Kaz Zallum member—Unconsolidated, friable, sandstone. Local quartzite bed near top, and cobble conglomerate at base
- UNCONFORMITY
- Da AL JUBAH FORMATION—Sandstone with interbeds of silty shale; calcareous
- Dj JAUF FORMATION: Upper member (Dju)—Limestone, shale, and sandstone; limestone contains algal, biohermal, and stromatolitic intervals. Lower member (Djl)—Shale and sandstone with thin limestone interbeds, gypsiferous. Basal sandstone unit, partly oolitic
- Dt TAWIL FORMATION—Sandstone with quartz pebbles, ferruginous
- UNCONFORMITY
- St TAYYARAT FORMATION—Sandstone, siltstone, and shale. Several intervals of abundant *Scotinus*-like vertical burrows
- Ss SARAH FORMATION—Sandstone with layers of grit and pebble conglomerate; convolute bedding locally. *Crinoids* trace fossils

EXPLANATION OF MAP SYMBOLS

- CONTACT
- STRIKE AND DIP OF BEDS
- FAULT—Probable, bar-and-ball or downthrown side
- AXIS OF WADI SIRHAN GRABEN—Based on gravity-survey data and surface indications
- LINEAMENT—Trend line observed from aerial photographs or landsat imagery
- OUTWARD-DIPPING CIRCULAR STRUCTURE—"Pingo" or trace of buried igneous plug
- LINE OF CROSS SECTION
- PHOSPHATE EXPLORATION DRILL HOLE
- MEASURED OUTCROP SECTION
- MODS - GENERAL LOCALITY—Area around which phosphate rock drilled or traced
- TOWN OR VILLAGE
- PAVED ROAD



Unconsolidated Quaternary deposits not shown except for gravel across Al Busayta plain  
 Horizontal scale 1:250,000  
 Vertical scale 1:25,000  
 Vertical exaggeration X10

Age	Group	Formation	Member	Bed	Stratigraphic thickness (meters)
QUATERNARY	Quaternary	Quaternary	Quaternary	Quaternary	0-50
			Quaternary	Quaternary	0-50
			Quaternary	Quaternary	0-50
			Quaternary	Quaternary	0-50
			Quaternary	Quaternary	0-50
	Tertiary	Turayf Group	Sirhan (Tu)	Sirhan (Tu)	80
			Mira (Tim)	Sib (Tms)	20-80
			Mira (Tim)	Mandasah (Tms)	25
			Mira (Tim)	Hawas (Tms)	30-70
			Mira (Tim)	Ghinah Phosphoric (Timg)	30-35
Mesozoic	Cretaceous	Jalamid (Tijk)	Kuwaykabah (Tijk)	15-40	
		Jalamid (Tijk)	Ghawayyah (Tijk)	30-40	
		Jalamid (Tijk)	Thaniyat Phos. (Tjt)	3-20	
		Aruma (Ku)	Zallum (Kaz)	10-60	
		Al Jubah (Da)	Al Jubah (Da)	0-80	
	Devonian	Jauf Formation	Jauf (Dj)	Upper (Dju)	70
			Jauf (Dj)	Lower (Djl)	85
			Tawil (Dt)	Tawil (Dt)	60
			Tawil (Dt)	Tawil (Dt)	200
			Tayyarat (St)	Tayyarat (St)	100
Paleozoic	Sarhad Formation	Sarhad (Ss)	Sarhad (Ss)	>135	

PRELIMINARY GEOLOGIC MAP OF THE THANIYAT TURAYF QUADRANGLE, SHEET 29 C, KINGDOM OF SAUDI ARABIA

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