

**LEGEND**

- QUATERNARY**
- Surficial Deposits:
    - Sand Dunes.
    - Sabkha.
  - Undifferentiated Quaternary: Includes older Nile deposits, playa deposits, raised beaches and corals of Red Sea Coast.
- NEOGENE**
- Tn - Undifferentiated Neogene:
    - Tp1 - Pliocene: Includes marine beds of the Nile Valley, Red Sea and Mediterranean Coasts, fresh water and spring deposits of Nile Valley and Western Desert Oases, and non-marine scree deposits outside the Nile Valley.
    - Te - Miocene: Covers most of Western Desert north of latitude 29°N, represented by a basal clastic section overlain by a carbonate unit; along Gulf of Suez and Red Sea Coast where clastics, gypsum and carbonates are dominant especially in the north.
- TERTIARY**
- Extrusive Rocks: Mostly of Tertiary age, some of the occurrences in Gulf of Suez are of Mesozoic age whereas some in Bahariya Desert are of Quaternary age.
- OLIGO-MIOCENE**
- Oligo-Miocene: Includes gravel spreads west of Nile between Minia-Faiyum and Bahariya Oases.
- OLIGOCENE**
- Oligocene: Includes fluvial and lacustrine clastics and gravel sheets in Cairo-Suez stretch, around Cairo, Faiyum and Bahariya Oases; conglomerate of Nakhel Formation in Quesir-Safage stretch and further north; marl section at foot of Sallum escarp may be Oligocene or younger in age.
- Eocene**
- Eocene: Includes thick marine limestone with chert and minor clay beds forming higher cliffs and plateaus overlooking Nile between Esmā and Cairo, partly exposed along Sin El Kaddab escarp and further west covering most of the limestone plateau to Darb El Arban, Kharga escarp and plateau, in Farafra and Bahariya areas; covers most of central parts of Western Desert, high cliffs and plateau of Bahariya, Dakhla, Bahariya, El Galala and Ataka in Eastern Desert and El 7th and Egm in Sinai; clastics predominate in the Upper Eocene of Cairo and Faiyum areas.
- PALEOCENE**
- Paleocene: Includes in northern Egypt, lower part of Esna Shale and Sudr Chalk; in middle and south latitudes of Egypt Upper Dakhla, Tarawan, Kurkur and lower Garra beds or their equivalent formations.
- Wadi Natash Volcanics.
  - Ring Complex: Essentially alkaline syenites.
- MESOZOIC**
- K - Undifferentiated Cretaceous: Includes in south west Egypt top-most sandstone beds exposed at Gif Kebir plateau and covering desert surface to the east; in west Wadi Araba sandstone above Paleozoic section; in south Sinai clastic beds above Basement or Paleozoic rocks.
  - Ku - Upper Cretaceous: Includes clastics, phosphate and carbonate rocks above Nubia sandstone in Western Desert; Nile Valley, Red Sea Coast and Wadi Qena, mainly represented by Dakhla Phosphate and lower part of Dakhla Formation; in north Egypt, Abu Rawash, El Galala and Sinai the Upper Cretaceous is mostly represented by carbonate beds.
  - Kn - Nubia Sandstone: Represented in south and central Egypt by a magnafacies coeval to Upper Cretaceous marine beds in northern Egypt, defined by a suite of litho-biostratigraphic units, Dakhla or Dakhla at top and Basement at base; in extreme south of Egypt, top part of Nubia, Shab Clastic Member, belongs to Lower Paleocene; in central latitudes Dakhla-Sharga-Nile Valley stretch, Nubia; Quesir Clastic and Raref Sandstone Member, overlies a subsurface sandstone section which belongs to uncertain and variable periods within the Mesozoic and Paleozoic Eras.
  - Km - Commanian and Turonian: Represented by clastics with thin carbonates at Bahariya; Abu Rawash, El Galala, Wadi Qena and north and central Sinai; clastic dominates at base and carbonate at top.
  - Kl - Lower Cretaceous: Includes, in northern Sinai, west coast of Gulf of Suez and in Wadi Qena, marine fossiliferous beds intercalated within a continental clastic section.
- JURASSIC**
- J - Jurassic: Includes the marine and associated fluvio-marine beds of northern and central Sinai, west coast of Gulf of Suez and thick clastic section forming the Gif Kebir in south west Egypt - the upper part of latter section is of Cretaceous age; thick vertical sandstone cliffs at Wadi Qena, north of latitude 27°N, may be Jurassic or older in age.
- TRIASSIC**
- T - Triassic: Represented at Arif El Naga by a carbonate/clastic section.
- U. PAL. (Post-Carboniferous)**
- Pzu - Upper Paleozoic (Post-Carboniferous): Includes, on west side of Gulf of Suez, clastic section overlying Carboniferous beds which may be of Permian and/or of Triassic age, and probably tilted sandstone beds unconformably overlying Basement in northern reaches of Wadi Qena.
- PALEOZOIC**
- C - Carboniferous: Includes topmost (40m thick) dolomites and clastics of Um Bogma Formation in central and western Sinai, clastics of west coast of Gulf of Suez and of Uweinat area.
  - Pz - Undifferentiated Paleozoic (Pre-Carboniferous): Includes clastics below Carboniferous rocks in Gulf of Suez area, including probable Cambrian beds above Basement in west and central Sinai, Devonian clastics west of Gif Kebir and Cambro-Ordovician clastics below the Carboniferous section in Gebel Uweinat.
- PRECAMBRIAN**
- Gy - Younger Granitoids: Gattarian granite and all post-tectonic granite, granodiorite and adamellite.
  - H - Hammamat Group: Slightly metamorphosed conglomerate (Breccia Verde Antica), greywacke, arenite and siltstones.
  - Dokhan Volcanics: Slightly metamorphosed andesite, porphyrite and pyroclastic rocks.
  - G - Older Granitoids: Syntectonic to late tectonic plutonites essentially of granodioritic composition previously referred to as grey granite, shaitan granite or older granite.
  - Metagabbro-Diorite Complex: Gabbro and doleritic masses, tectonized, unaltered and affected by older granitoids.
  - Sp - Serpentinites: Serpentinite, talc carbonate, and related rocks.
  - mv - Geosynclinal Shadli Metavolcanics: Fissure eruptions of surface or submarine effusives represented by regionally metamorphosed rhyolite, dacite, andesite, basalt and pyroclastic rocks.
  - ms - Geosynclinal Metasediments: A wide range of lithological types including hornblende, biotite and chlorite schists, metagreywacke, metaconglomerate, phyllite, slate and occasional conglomerate.
  - Gn - Migif-Hafafit Gneisses and Migmatites: Psammitic, hornblende and biotite gneisses and migmatites.
- © Sample locality

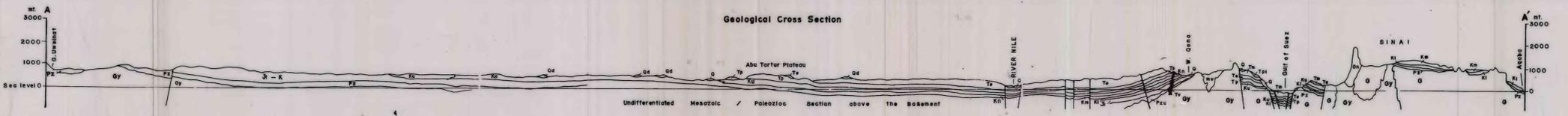
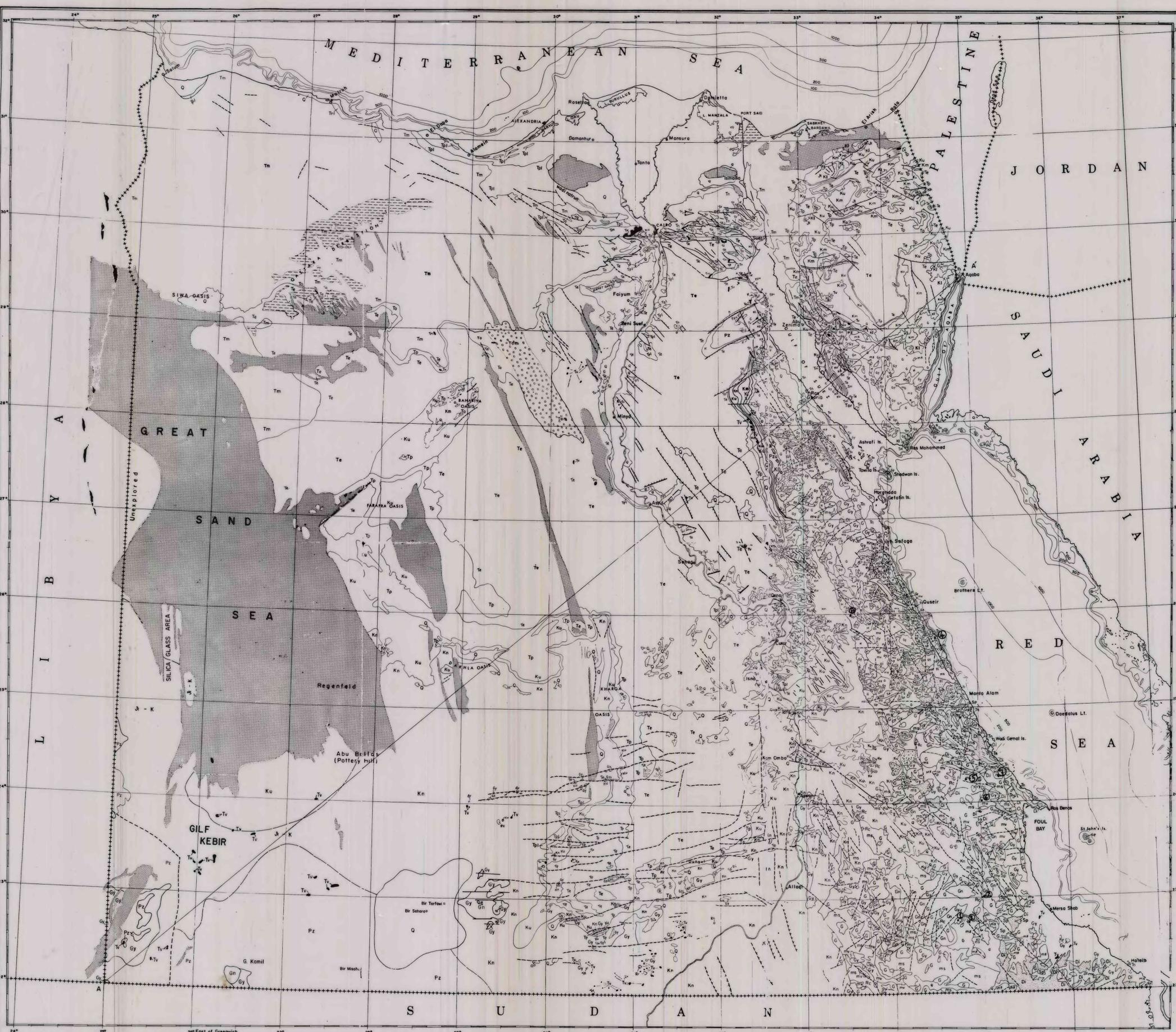


Figure 1.--Sample locations plotted on geological map of Egypt from Egypt Geological Survey (1979).

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

scale 1:2,000,000

