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

Prepared in cooperation with the
Afghan Geological Survey
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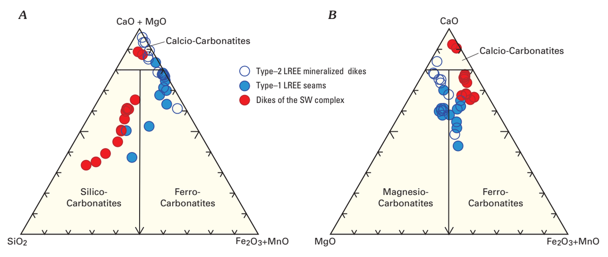
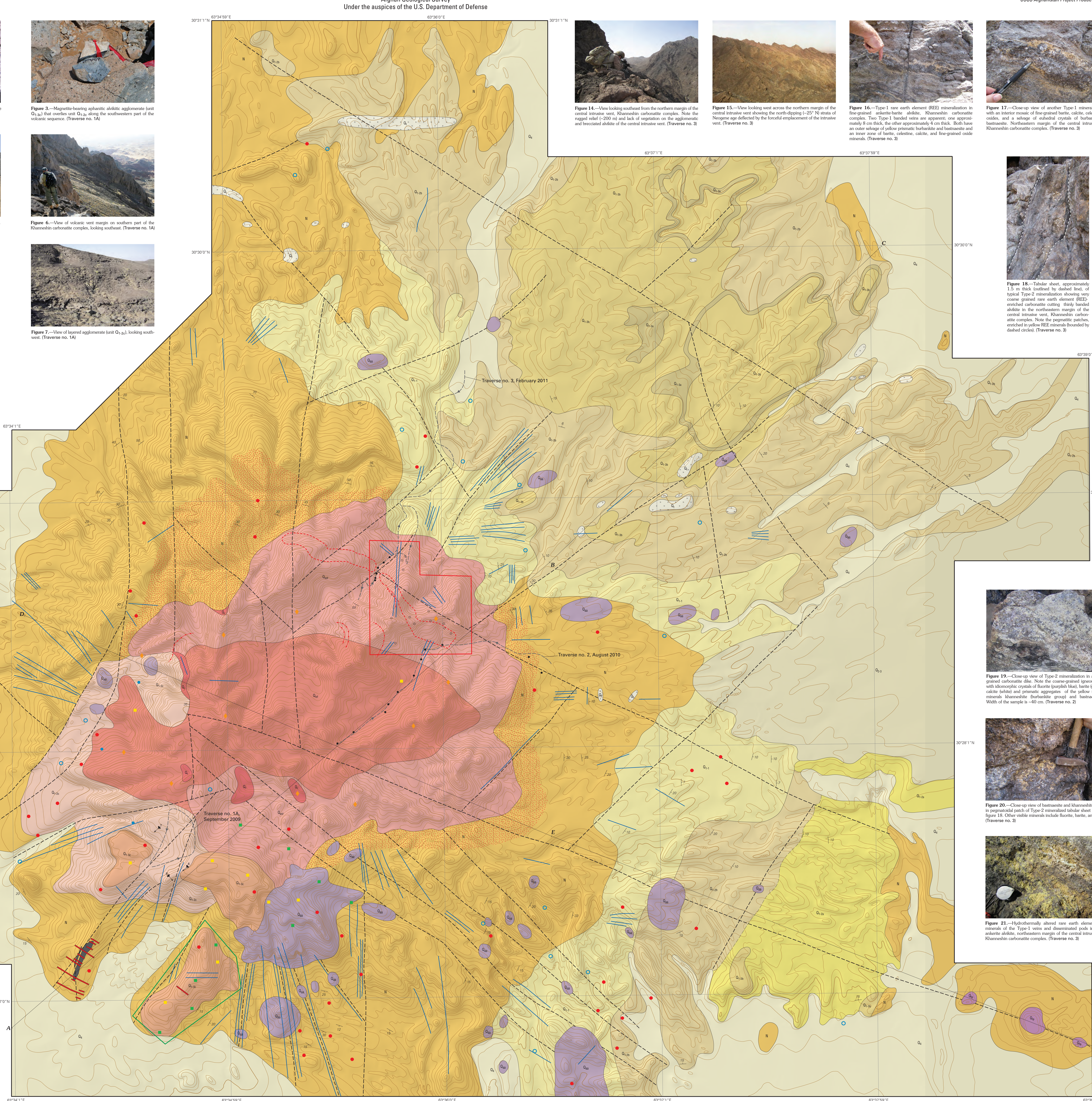
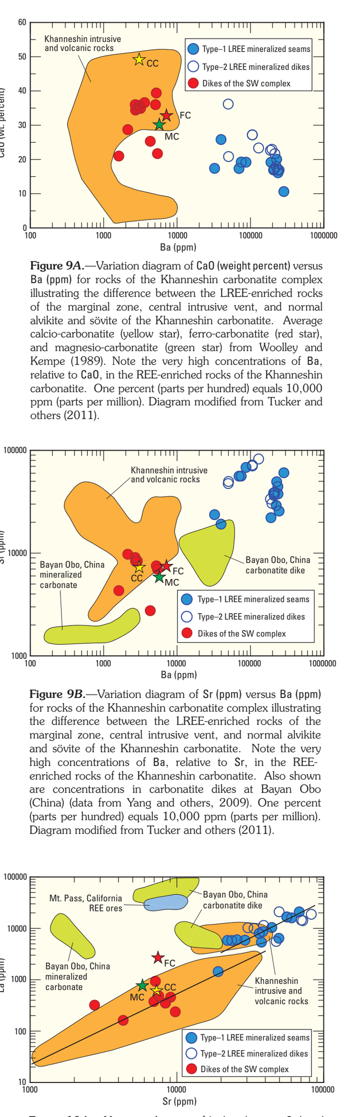
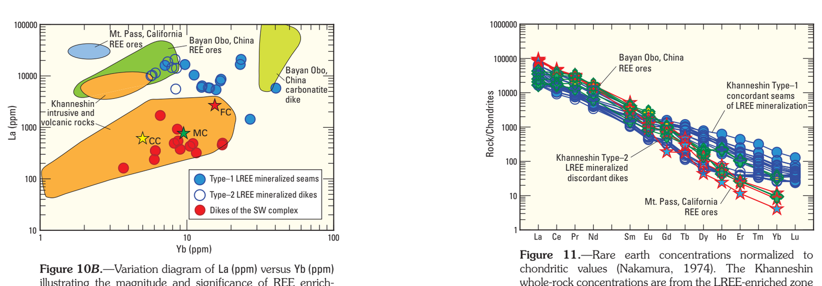
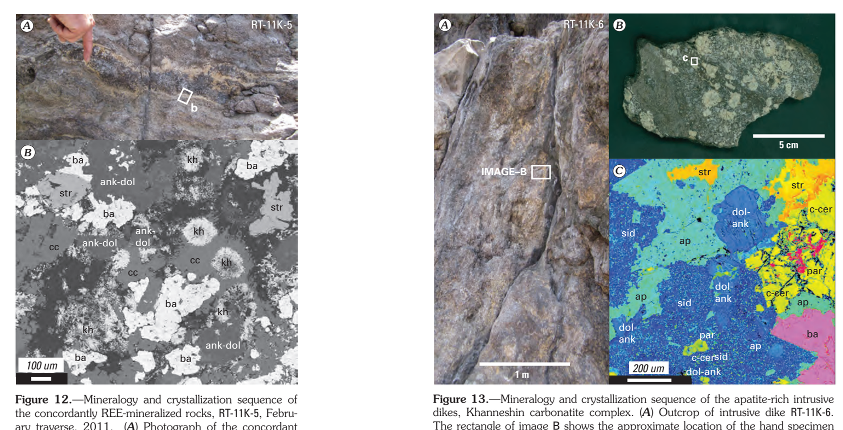
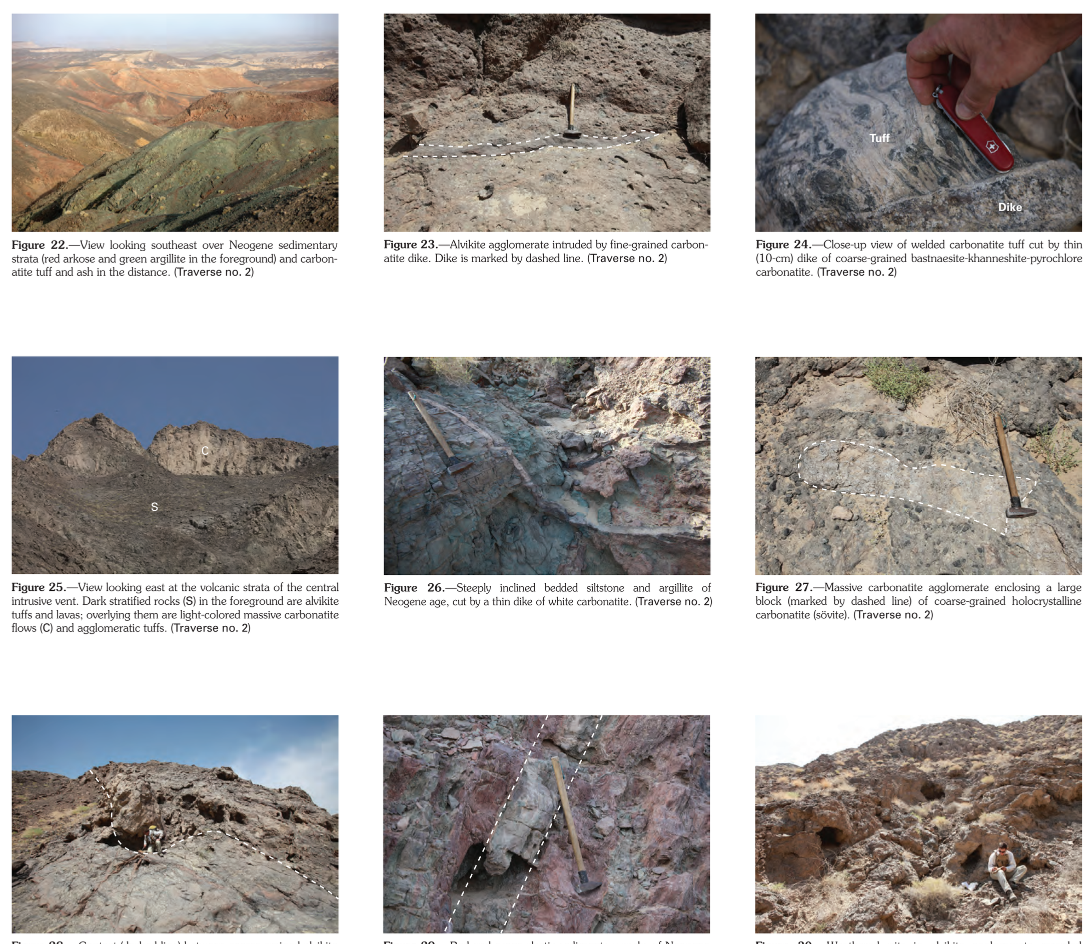












INTRODUCTION

This map is a modified version of the *Geological map of the Khanneshin carbonatite complex*, scale 1:10,000 (Cheremytsin, 1976). The original map and cross sections are contained in Soviet report no. R1142 (Cheremytsin and Yeremenko, 1976), which was prepared in cooperation with the Ministry of Mines and Industries of the Republic of Afghanistan in Kabul in 1976 under contract number 55-184/17500. This modified map illustrates the geological structure of the Khanneshin carbonatite complex and includes cross sections of the same area.

The unit colors on the map and cross sections differ from the colors shown on the original version. The units are colored according to the color and pattern scheme of the Commission for the Geological Map of the World (CGMW) (http://www.ccgm.org).

This map reproduces the topology (contacts, faults, and so forth) of the original Soviet map and cross sections, and includes modifications based on our examination of these documents and on observations made during brief field visits in September 2009, August 2010, and February 2011. Elevations on the cross sections are derived from the original Soviet topography and may not match the Global Digital Elevation Model (GDEM) topography used on the current map. We have attempted to translate the original Russian terminology and rock classification into modern English geologic usage as literally as possible without changing any genetic or process-oriented implications in the original descriptions. We also use the age designations from the original map.

Some field photograph sites are shown on the map by symbols keyed by number to the figures. The photographs were taken by U.S. Geological Survey scientists (Robert Tucker, Stephen Peters, Mike Chornack, Said Mirzad, and Daniel Hayba) and personnel with the Task Force for Business and Stability Operations (TFBSO) during the field visits mentioned above.

We acknowledge Forrest Horton, under contract to TFBSO, for field and logistical assistance given during Traverse 2.

DESCRIPTION OF MAP UNITS

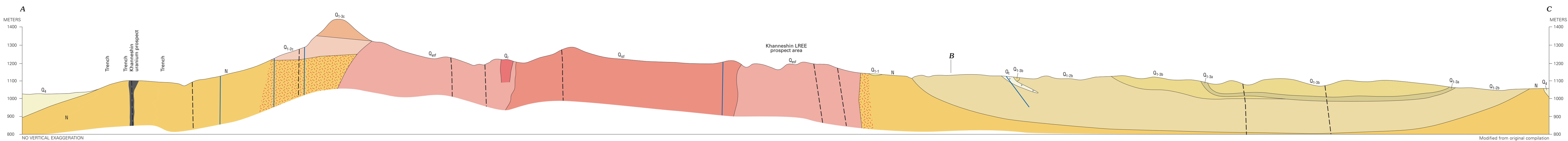
ROCKS OF GEOTHERMAL ORIGIN

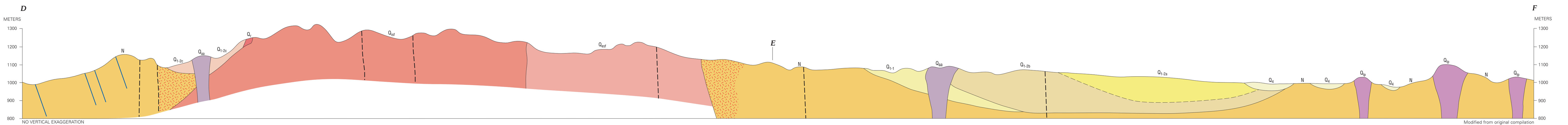
Q_t — **Travertine (Pleistocene)**—White to yellowish-white, fine-grained botryoidal calcite and aragonite limestone

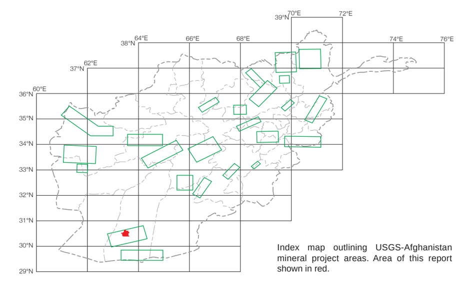
VOLCANIC AND SEDIMENTARY STRATIFIED ROCKS OF THE EASTERN AND NORTHEASTERN PART OF THE CARBONATITE COMPLEX

Q_4 — **Eolian sand (Holocene)**—Surrounds the Khanneshin structure; 3 to 5 m thick

$Q_{2\text{-}3}$ — **Proluvial fan (Holocene and Pleistocene?)**—Unconsolidated, very coarse grained, poorly sorted and poorly graded conglomerate and breccia; debris flow (lahar?)







Geologic Map of the Khanneshin Carbonatite Complex, Helmand Province, Afghanistan, Modified From the 1976 Original Map Compilation of V.G. Cheremytsin

Compiled by
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2011