



OTHER SYMBOLS

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[Not all symbols shown may be present on this map]

 Not classified (2,365,077)  3725 Peak; elevation in meters
 No data City, town, or village
 Road, improved or unimproved International boundary

DATA SUMMARY

This map shows the spatial distribution of selected inorganic materials and other materials derived from analysis of airborne HyMap™ (hyperspectral remote sensing) data of Afghanistan collected in late 2007 and early 2008. The map is a composite of 1000 10-m resolution HyMap images. The HyMap data are a quadrangle map covering Afghanistan and is a subset of the entire 2-m map of the entire country showing inorganic materials and other materials (Kokaly and others, 2013). This version 2 map improved mineral identification and discrimination by using a new mineral identification algorithm that is more robust, especially in areas having wet soils. The version 2 map more accurately represents the mineral distributions and boundaries of the map. The map is a composite of 1000 10-m resolution HyMap images.

Flows at an altitude of 50,000 feet (15,240 meters), the HyMap™ (hyperspectral) measured reflected signal in 128 channels, covering wavelengths between 0.4 and 2.5 μm . The data were georectified, atmospheric corrected, and then processed using a series of algorithms to produce the final map. The data were measured, and combined into a mosaic with 2.5-m pixel spacing. Variations in water vapor and dust content of the atmosphere, in solar angle, and in surface elevation compensated contrast, therefore, some classification of the map was required.

The reflectance spectrum of each pixel (HyMap™ hyperspectral) data was compared to the reference materials in a spectral library of minerals, vegetation, water, and other materials (Clark and others, 2007; Mineral Spectral Library, 2007). The map was then processed to produce a final map of the mineral distribution. Minerals having slightly different compositions but similar spectral features were less easily discriminated, and were grouped together. The map was then processed to produce a final map of the mineral distribution. The designation of "Not classified" was assigned to the pixel when there was no match with reference spectra. Further processing using the processing procedure is presented in King and others (2013) and Kokaly and others (2013).

REFERENCES

Clark, R.N., Swaney, G.A., Wise, R.A., Livo, K.E., Horfen, T.M., Kofsky, R.F., and Saitley, S.J., 2007. USGS digital spectral library *aviris2000*. U.S. Geological Survey Data Series 231.

King, T.V.V., Kofsky, R.F., Horfen, T.M., Dudek, K.B., and Livo, K.E., 2011. Surface materials map of Afghanistan: iron-bearing minerals and other materials: U.S. Geological Survey Scientific Investigations Map 3152-B, 1 sheet, scale 1:1,100,000.

Kofsky, R.F., King, T.V.V., and Horfen, T.M., 2013. Surface mineral maps of Afghanistan derived from *HyperMap™* imaging spectroscopic data, version 2. U.S. Geological Survey Data Series 787.

Kofsky, R.F., King, T.V.V., and Livo, K.E., 2008. Airborne hyperspectral survey of Afghanistan 2007: flight line planning and *HyperMap™* data collection: U.S. Geological Survey Open-File Report 2008-1235, 14 p.

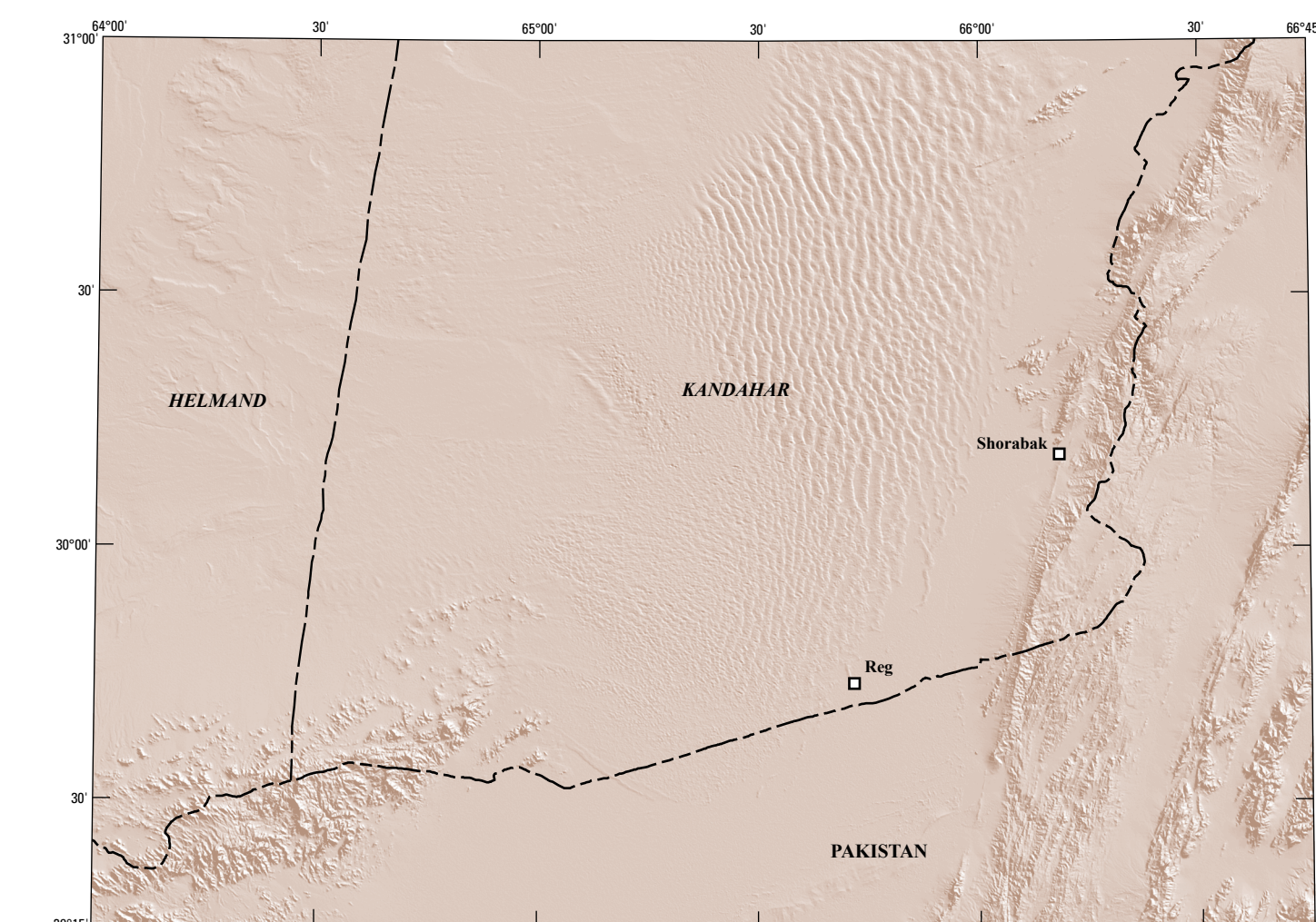
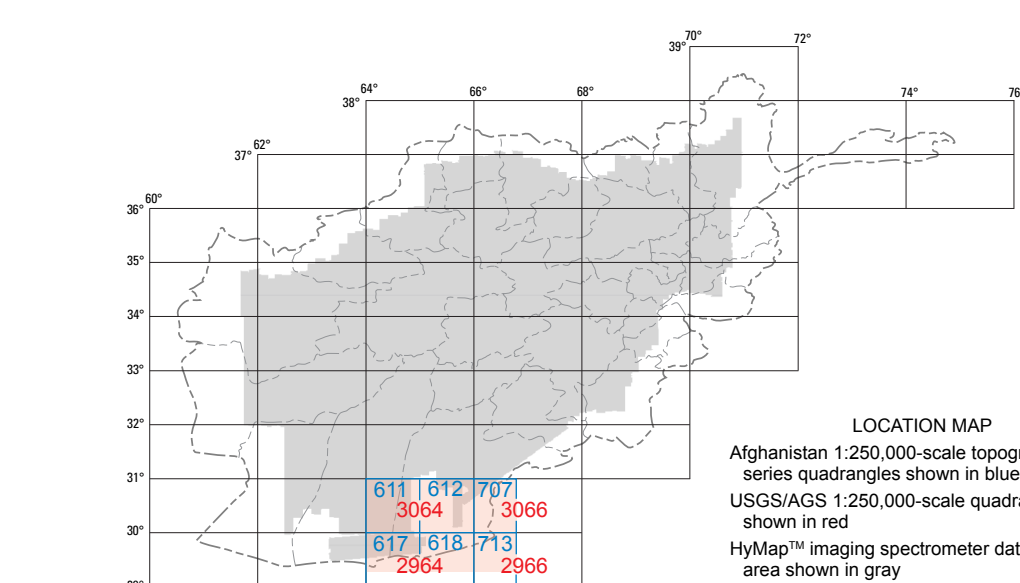
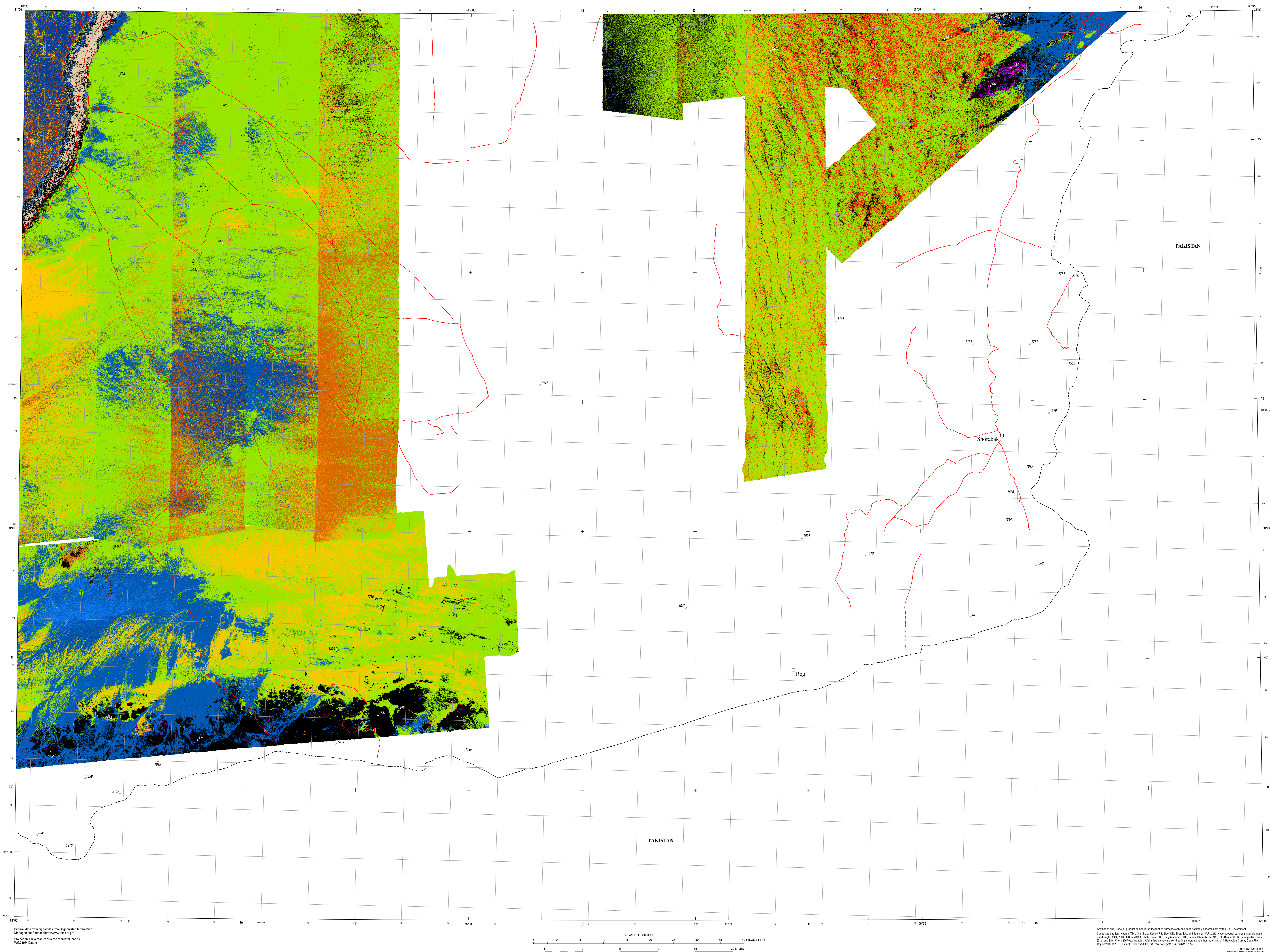


Figure 1.—Provinces and selected cities, towns, and villages in the map area. Topography is shown as shaded relief.



LOCATION MAP
Afghanistan 1:250,000-scale topographic
series quadrangles shown in blue
USGS/IGS 1:250,000-scale quadrangles
shown in red
HyMap™ imaging spectrometer data-cover
area shown in gray



Projection: Universal Transverse Mercator, Zone 41,
WGS 1984 Datum

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