**Introduction**

Alunite is a sulfates mineral that is found in argillic alteration zones of porphyry and epithermal mineralization systems. Moreover, it is possible for use as a regional proxy to locate potential economic deposits. However, a weakness of most previous studies to map alunite with multispectral remote sensing data (e.g., Clark et al., 1993; Clark and Swayne, 1996; Rowan and Mars, 2003; Mars and Rowan, 2006) has been the inability to reliably distinguish alunite from clays, iron oxides and jarosite. This new technique can differentiate alunite from above minerals that could help in rugged areas such as the Sierra Madre Occidental.

**Background**

Porphyry copper and epithermal deposits are identified to be related with hydrothermal alteration, such as alunite.

**Location:**

The area of interest is covered most of Sierra Madre Occidental. It starts from the northern border of Mexico – USA and extends 1180 km south, and the width is from 150-300 km.

**Processing**

- Importing terrain and geological map.
- Resampling AST_07 Resampling to 30 meters resolution to match ASTER data.
- Removing clouds.
- Masking for vegetation.
- Logical operators:
  - OH-FeO logical operator:
    \[ \frac{(\text{band} 3)}{(\text{band} 4)} \leq 1.35 \quad \text{and} \quad \frac{(\text{band} 4 > 260)}{(\text{band} 7 > 1.08)} \]
  - SO4²- logical operator:
    \[ \frac{(\text{band} 3)}{(\text{band} 7)} \leq 1.35 \quad \text{and} \quad \frac{(\text{band} 4 > 260)}{(\text{band} 7 > 1.08)} \]
- Identification of iron oxides and sulfates
- Identification of alunite
- Three stakeholders:
  - Cuprite Hills, Nevada
  - Chihuahuan Desert, Imperial County, California
  - Topia mine, Durango, Mexico
  - Dolores Mountains, Colorado

**Conclusions**

- Software has been developed to correctly identified alunite by remote sensing. This has been done in the Sierra Madre Occidental.
- 1140 polygons of alunite are found. Their size is vary from 1 to 8000 square meter.
- Several known mines have targeted for alunite such as Moris, Dolores, La Parrilla, La Caridad San Antoni, Topia, Cananea, and Stavo.
- There are several target could be good for future exploration.

**Literature cited**


**Further information**

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