mineral

October 8, 2023

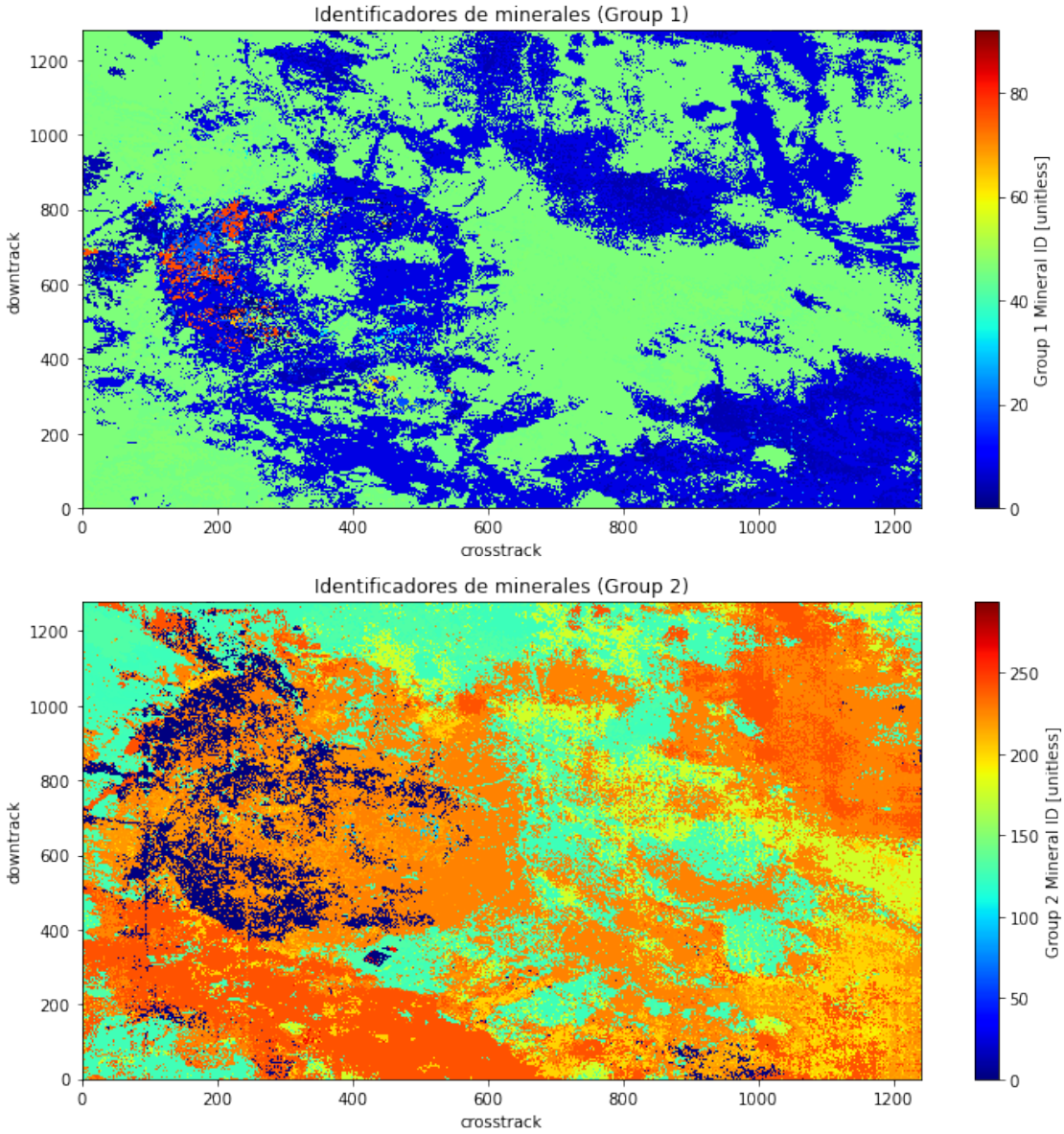
0.1 MINERAL

[4]:
```
import xarray as xr
import matplotlib.pyplot as plt

def cargar_nc(archivo):
    """
    Carga un archivo .nc y retorna el dataset
    """
    ds = xr.open_dataset(archivo)
    return ds

def visualizar_mineral(ds, mineral):
    """
    Visualiza la abundancia espectral de un mineral específico del dataset
    """
    data = ds[mineral]
    data.plot()
    plt.title(f'Abundancia espectral de {mineral}')
    plt.show()

if __name__ == "__main__":
    archivo = "EMIT_L2B_MIN_001_20231005T044208_2327803_023.nc"

    # Cargamos el dataset
    ds = cargar_nc(archivo)

    # Lista de minerales que deseas visualizar
    print(ds)
```

```
<xarray.Dataset>
Dimensions:                (downtrack: 1280, crosstrack: 1242)
Dimensions without coordinates: downtrack, crosstrack
Data variables:
    group_1_band_depth     (downtrack, crosstrack) float32 …
    group_1_mineral_id     (downtrack, crosstrack) float32 …
    group_2_band_depth     (downtrack, crosstrack) float32 …
    group_2_mineral_id     (downtrack, crosstrack) float32 …
```

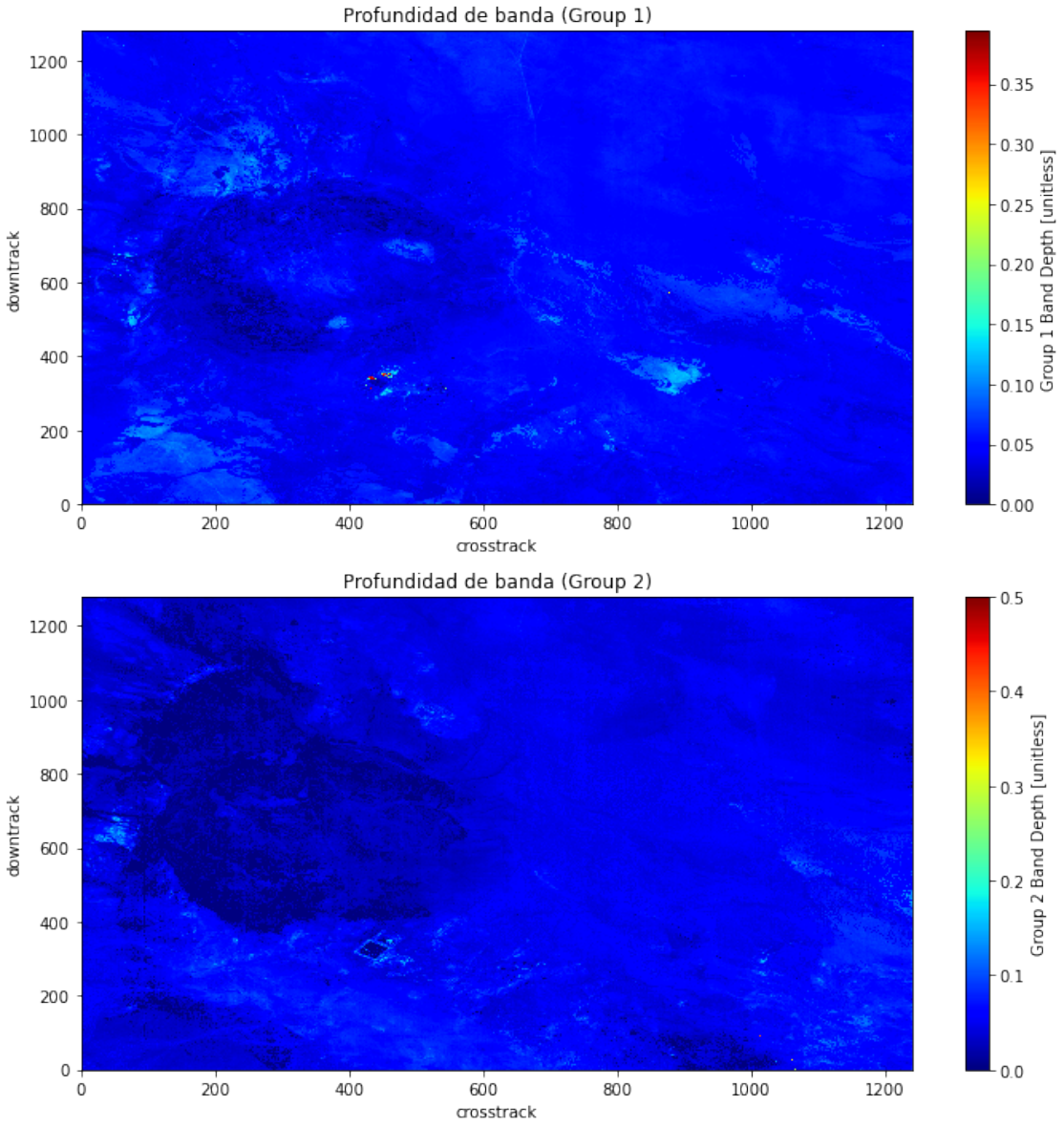
```
Attributes: (12/37)
    ncei_template_version:             NCEI_NetCDF_Swath_Template_v2.0
    summary:                           The Earth Surface Mineral Dust Source …
    keywords:                          Imaging Spectroscopy, minerals, EMIT, …
    Conventions:                       CF-1.63
    sensor:                            EMIT (Earth Surface Mineral Dust Sourc…
    instrument:                        EMIT
    …                                  …
    southernmost_latitude:             42.69343819330785
    spatialResolution:                 0.000542232520256367
    spatial_ref:                       GEOGCS["WGS 84",DATUM["WGS_1984",SPHER…
    geotransform:                      [ 1.06307121e+02  5.42232520e-04 -0.00…
    day_night_flag:                    Day
    title:                             EMIT L2B Estimated Mineral Identificat…
```

[9]:
```python
import matplotlib.pyplot as plt

def visualizar_identificadores(ds):
    fig, axarr = plt.subplots(2, 1, figsize=(10, 10))

    # Visualiza los identificadores para group_1
    ds["group_1_mineral_id"].plot(ax=axarr[0], cmap='jet')
    axarr[0].set_title('Identificadores de minerales (Group 1)')

    # Visualiza los identificadores para group_2
    ds["group_2_mineral_id"].plot(ax=axarr[1], cmap='jet')
    axarr[1].set_title('Identificadores de minerales (Group 2)')

    plt.tight_layout()
    plt.show()

visualizar_identificadores(ds)
```



[10]:
```
def visualizar_profundidad_banda(ds):
    fig, axarr = plt.subplots(2, 1, figsize=(10, 10))

    # Visualiza la profundidad de banda para group_1
    ds["group_1_band_depth"].plot(ax=axarr[0], cmap='jet')
    axarr[0].set_title('Profundidad de banda (Group 1)')

    # Visualiza la profundidad de banda para group_2
    ds["group_2_band_depth"].plot(ax=axarr[1], cmap='jet')
    axarr[1].set_title('Profundidad de banda (Group 2)')
```

```
    plt.tight_layout()
    plt.show()

visualizar_profundidad_banda(ds)
```



[11]:
```
def mostrar_estadisticas_basicas(ds, variable):
    print(f"Estadísticas para {variable}:")
    print("-----------------------------")
    print("Mínimo:", ds[variable].min().values)
    print("Máximo:", ds[variable].max().values)
    print("Media:", ds[variable].mean().values)
```

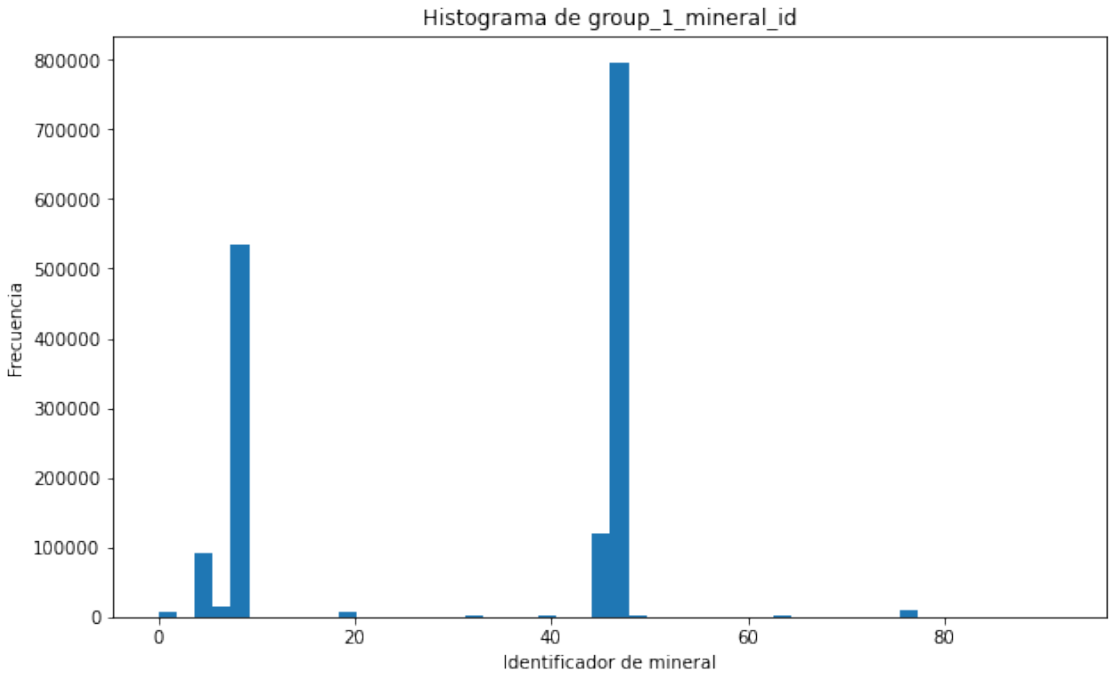
```
    print("Desviación Estándar:", ds[variable].std().values)
    print()

def mostrar_muestra_datos(ds, variable):
    print(f"Muestra de datos para {variable}:")
    print("-------------------------------")
    print(ds[variable][:10, :10].values)  # Mostramos una submuestra de 10x10
    print()

variables = ["group_1_band_depth", "group_1_mineral_id", "group_2_band_depth",␣
 ↪"group_2_mineral_id"]

for variable in variables:
    mostrar_estadisticas_basicas(ds, variable)
    mostrar_muestra_datos(ds, variable)
```

```
Estadísticas para group_1_band_depth:
-------------------------------
Mínimo: 0.0
Máximo: 0.39411765336990356
Media: 0.04644731
Desviación Estándar: 0.013089786283671856

Muestra de datos para group_1_band_depth:
-------------------------------
[[0.03921569 0.04705882 0.04509804 0.04313726 0.03921569 0.04117647
  0.04117647 0.04117647 0.03921569 0.03921569]
 [0.03333334 0.04509804 0.04509804 0.04313726 0.03921569 0.04117647
  0.03921569 0.03921569 0.04117647 0.04117647]
 [0.04117647 0.04901961 0.04705882 0.04509804 0.04313726 0.04117647
  0.03921569 0.04117647 0.04117647 0.04117647]
 [0.04705882 0.05686275 0.05490196 0.04901961 0.04509804 0.04313726
  0.04117647 0.04117647 0.03921569 0.0372549 ]
 [0.04901961 0.05686275 0.05490196 0.05490196 0.05098039 0.04705882
  0.04313726 0.04313726 0.03921569 0.04117647]
 [0.04705882 0.05294118 0.05294118 0.05490196 0.05098039 0.05098039
  0.04509804 0.04509804 0.04313726 0.04509804]
 [0.04509804 0.05294118 0.05294118 0.05294118 0.04901961 0.04901961
  0.04705882 0.04313726 0.04313726 0.04117647]
 [0.04313726 0.05490196 0.05490196 0.05294118 0.04705882 0.04705882
  0.04901961 0.04313726 0.04117647 0.04117647]
 [0.03921569 0.05098039 0.05490196 0.05098039 0.04901961 0.04901961
  0.05294118 0.04705882 0.04313726 0.04313726]
 [0.0372549  0.05098039 0.05098039 0.04901961 0.04901961 0.05098039
  0.04901961 0.05098039 0.04705882 0.04509804]]

Estadísticas para group_1_mineral_id:
```

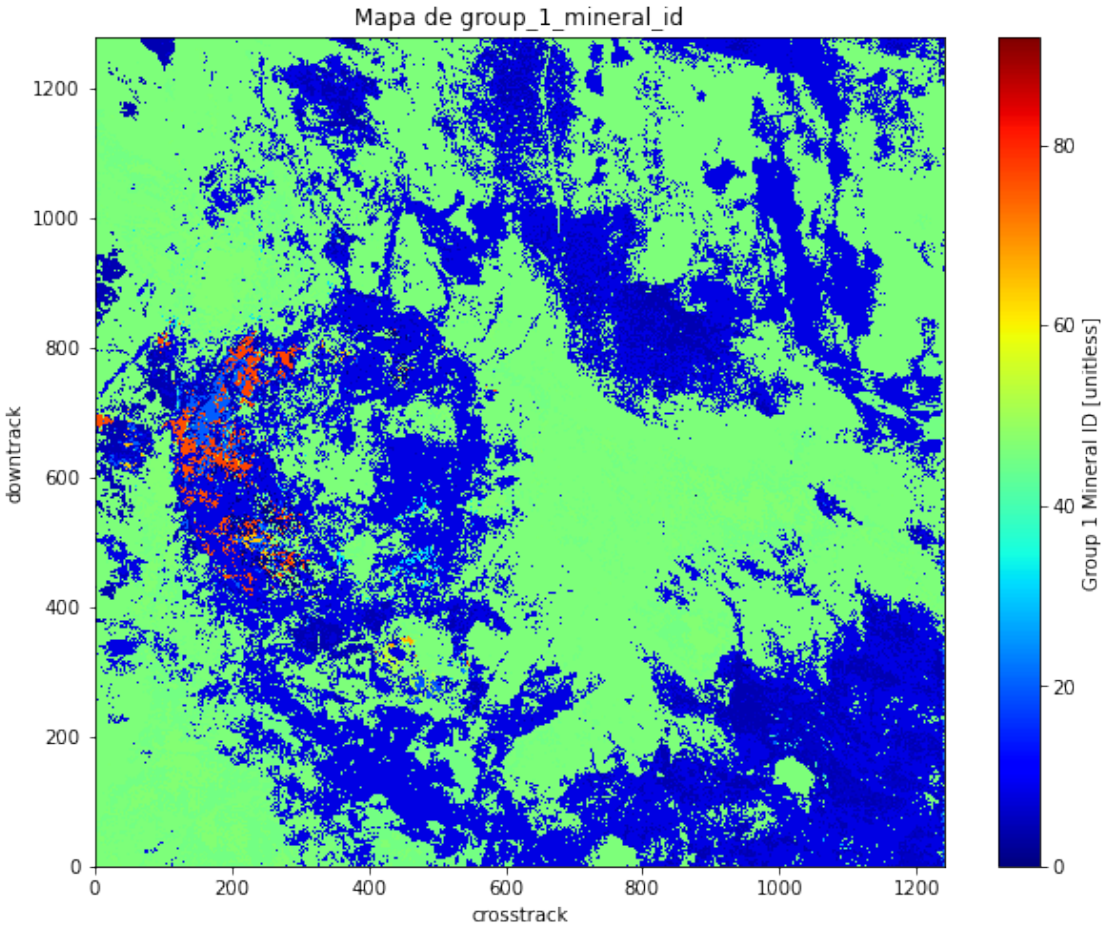
```
------------------------------
Mínimo: 0.0
Máximo: 92.0
Media: 30.272066
Desviación Estándar: 19.28168487548828

Muestra de datos para group_1_mineral_id:
------------------------------
[[46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]
 [46. 46. 46. 46. 46. 46. 46. 46. 46. 46.]]

Estadísticas para group_2_band_depth:
------------------------------
Mínimo: 0.0
Máximo: 0.5
Media: 0.042797666
Desviación Estándar: 0.019883587956428528

Muestra de datos para group_2_band_depth:
------------------------------
[[0.05294118 0.04313726 0.04117647 0.04705882 0.04313726 0.03529412
  0.0372549  0.05490196 0.05686275 0.05098039]
 [0.04313726 0.04117647 0.04509804 0.04705882 0.04117647 0.0372549
  0.04509804 0.04509804 0.04313726 0.0372549 ]
 [0.05098039 0.04705882 0.04509804 0.04313726 0.04901961 0.03333334
  0.04313726 0.04117647 0.04117647 0.03333334]
 [0.06078431 0.05098039 0.04705882 0.04509804 0.04509804 0.04509804
  0.04509804 0.04313726 0.04509804 0.04313726]
 [0.06078431 0.05098039 0.04901961 0.04901961 0.04509804 0.0372549
  0.04313726 0.04509804 0.04705882 0.04509804]
 [0.06078431 0.06078431 0.05294118 0.05490196 0.05490196 0.04509804
  0.0372549  0.04901961 0.04705882 0.04509804]
 [0.06470589 0.0627451  0.05882353 0.0627451  0.05686275 0.05294118
  0.03921569 0.04901961 0.04705882 0.04509804]
 [0.06666667 0.06470589 0.0627451  0.06862745 0.0627451  0.05490196
  0.04313726 0.0372549  0.04509804 0.04901961]
 [0.05686275 0.06470589 0.06470589 0.07450981 0.06470589 0.0627451
  0.05882353 0.04117647 0.0372549  0.04117647]
 [0.06862745 0.07058824 0.06862745 0.06862745 0.07254902 0.06862745
  0.0627451  0.05098039 0.04117647 0.03921569]]
```

```
Estadísticas para group_2_mineral_id:
------------------------------
Mínimo: 0.0
Máximo: 294.0
Media: 182.1625
Desviación Estándar: 66.32171630859375

Muestra de datos para group_2_mineral_id:
--------------------------------
[[126. 126. 126. 126. 126. 131. 131. 131. 131. 131.]
 [126. 126. 126. 126. 126. 126. 226. 226. 226. 126.]
 [227. 126. 126. 126. 227. 126. 227. 227. 227. 227.]
 [227. 125. 125. 126. 126. 227. 227. 227. 227. 227.]
 [227. 125. 125. 126. 126. 126. 227. 227. 242. 227.]
 [125. 125. 125. 125. 125. 125. 126. 227. 227. 227.]
 [125. 125. 125. 125. 125. 125. 126. 227. 226. 227.]
 [125. 125. 125. 125. 125. 125. 125. 126. 226. 227.]
 [177. 125. 125. 125. 125. 125. 125. 126. 126. 126.]
 [125. 125. 125. 125. 125. 125. 125. 125. 126. 126.]]
```

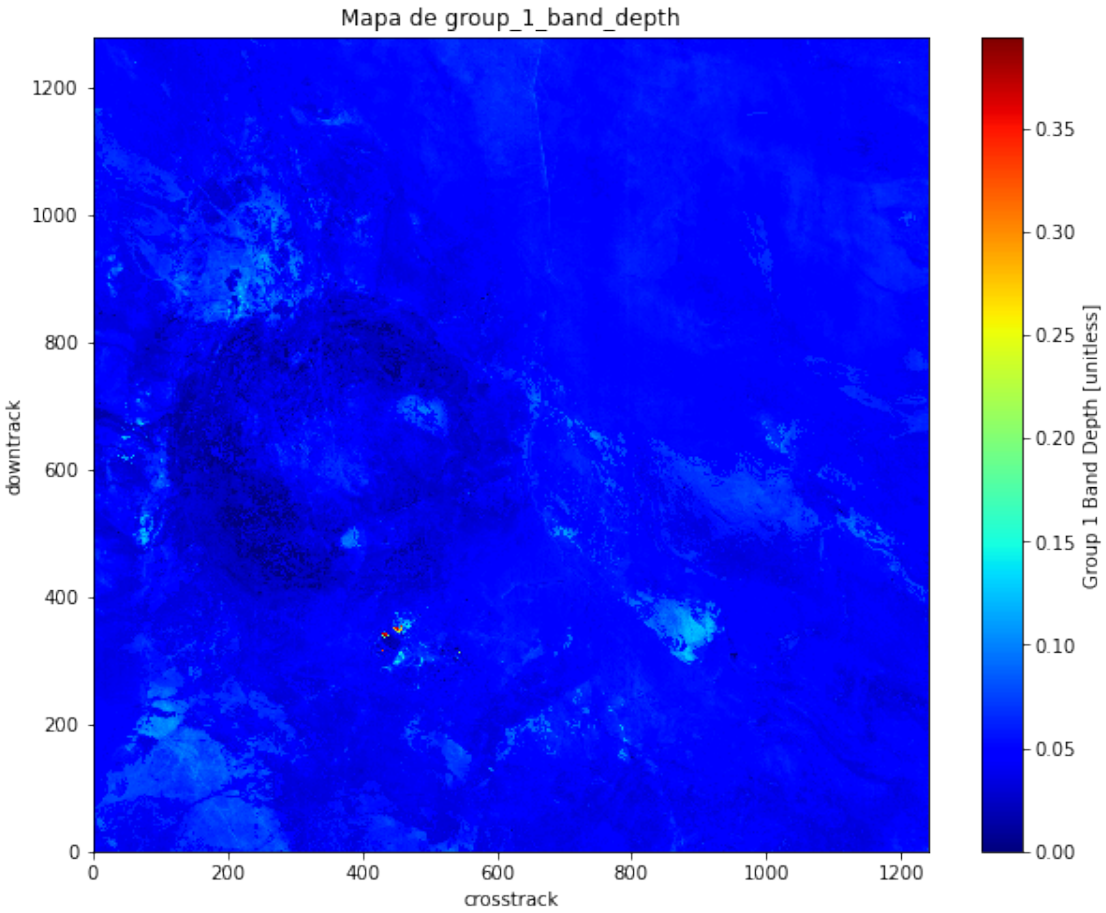
[12]:
```python
def mostrar_histograma_minerales(ds, variable):
    ds[variable].plot.hist(bins=50, figsize=(10, 6))
    plt.title(f'Histograma de {variable}')
    plt.xlabel('Identificador de mineral')
    plt.ylabel('Frecuencia')
    plt.show()

# Ejemplo para group_1_mineral_id
mostrar_histograma_minerales(ds, "group_1_mineral_id")
```



[13]:
```python
def mostrar_mapa_identificadores(ds, variable):
    ds[variable].plot(figsize=(10, 8), cmap='jet')
    plt.title(f'Mapa de {variable}')
    plt.show()

# Ejemplo para group_1_mineral_id
mostrar_mapa_identificadores(ds, "group_1_mineral_id")
```



[15]:
```python
def mostrar_mapa_profundidad_banda(ds, variable):
    ds[variable].plot(figsize=(10, 8), cmap='jet')
    plt.title(f'Mapa de {variable}')
    plt.show()

# Ejemplo para group_1_band_depth
mostrar_mapa_profundidad_banda(ds, "group_1_band_depth")
```


Mapa de group_1_band_depth
downtrack
crosstrack
Group 1 Band Depth [unitless]
0
200
400
600
800
1000
1200
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35

[ ]: