
EMIT for the Future!

Earth Surface Mineral Dust Source
Investigation (EMIT)

Team Robin#8263



2023 NASA International Space Apps Challenge

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Active Applications:

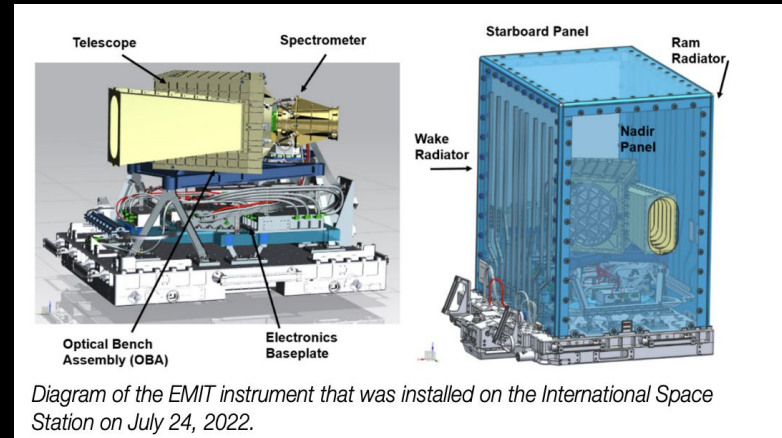
1. Greenhouse gas mapping
2. Snow properties and water resources

Our mission was to help raise community awareness of what EMIT is, how it can be used, and what has already been accomplished with its data. In our project, our objective is to identify areas where mineral dust settles using the EMIT satellite data. ***Through this, we aim to create more sustainable and efficient agricultural systems.***



Science Goals and Objectives of EMIT

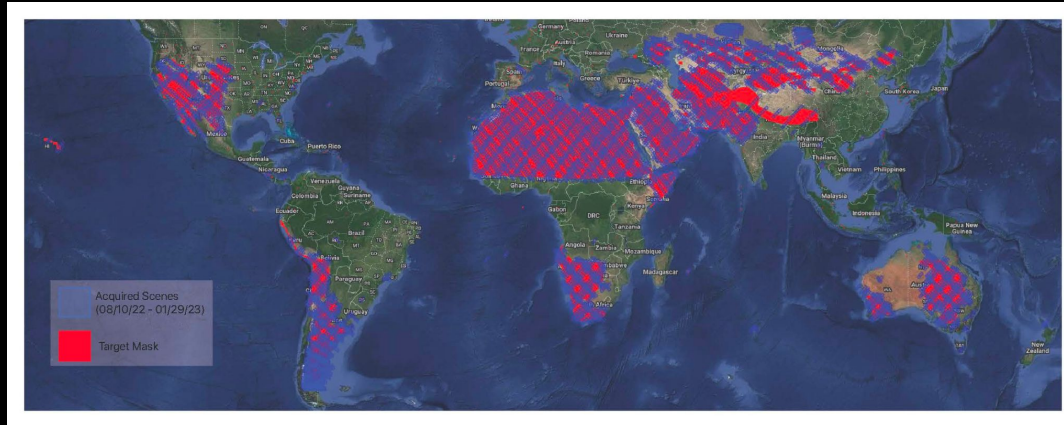
1. To acquire remote-sensing measurements of the abundance of surface minerals in arid regions between 50-degree south and north latitudes in Africa, Asia, North America, South America, and Australia
2. To deliver an improved assessment of the heating and cooling effects of mineral dust in Earth's atmosphere
3. To improve predictions of how future climate scenarios might change the amount and type of mineral dust emitted into Earth's atmosphere



“Identifying areas where mineral dust settles using the EMIT satellite data to create sustainable agricultural systems”

1. Data Utilization

When dust settles on both land and water surfaces, it brings with it valuable nutrients that can nurture ecosystem growth. Leveraging this natural phenomenon, our objective is **to identify areas where mineral dust settles using the EMIT satellite data**. Through this, we aim to create more sustainable and efficient agricultural systems.



EMIT coverage mask for arid and adjacent lands as well as dark signal, calibration, and validation targets. Additional areas are acquired along each orbit to account for timing uncertainty.

1.2 VISIONS (the VSWIR Imaging Spectroscopy Interface for Open Science) the EMIT Open Data Portal

1. **Analyzing EMIT Data:** Examining the EMIT data to identify areas abundant in mineral dust. In visuals (images 1.1 and 1.2), blue-colored regions indicate the latest dust coverage data in Turkey.
2. **Using EMIT for Mineral Identification:** Leveraging EMIT data to identify the mineral composition of dust source regions accurately. This information is crucial for understanding the environmental impact of the dust.

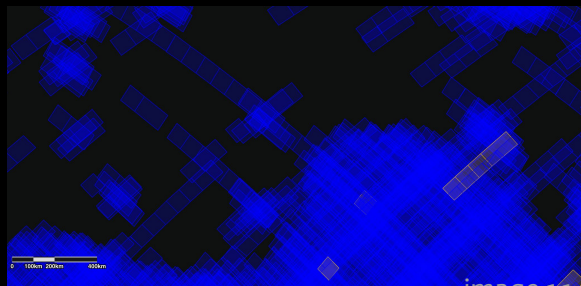


image 1.1

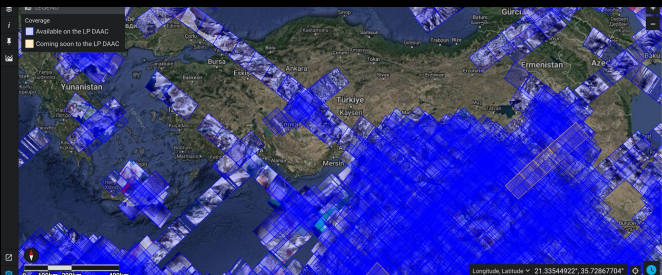


image 1.2

3. Creating Mineralogical Maps:

Generating mineralogical maps, as demonstrated in images 2.1 and 2.2. These maps showcase the distribution of specific minerals within the region, providing valuable insights into the mineral content of the Earth's surface.

Utilizing the mineralogical maps to assess the suitability of farmlands for sustainable agriculture. Different minerals can influence soil quality and crop growth differently, so this assessment helps identify the most appropriate areas for farming.

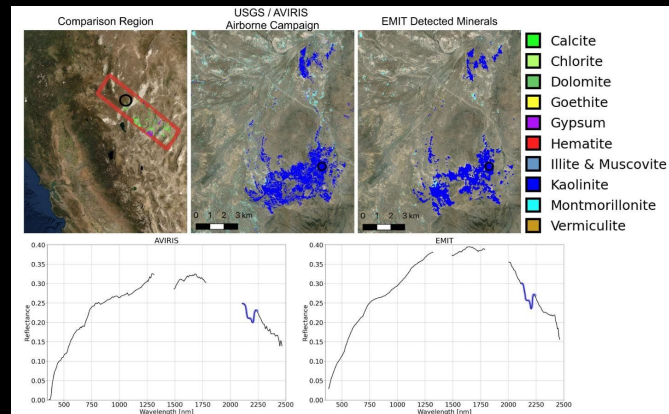


image 2.1

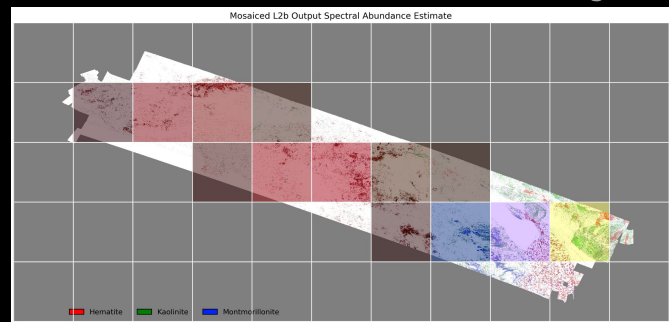


image 2.2

2. “Providing clear and actionable guidance to local farmers and agricultural communities based on EMIT's insights.”

Our goal is to provide clear and actionable guidance to local farmers and agricultural communities based on EMIT's insights. By doing so, we intend to empower them to moderate and enhance their farming processes. In this way, we strive to contribute to the enhancement of our local agriculture cycle while also advancing sustainable farming practices—a crucial element in addressing today's climate crisis.

Course of action:

Sustainable Farming Recommendations: Based on the mineralogical information, we'll develop clear and actionable recommendations for sustainable farming practices *tailored to the specific mineral composition of the soil in different areas.*

Implementation: Collaborating with **local farmers and agricultural communities** to implement the recommended sustainable farming practices in identified farmlands.

Adaptation: **Continuously monitoring the progress and outcomes** of the sustainable farming initiatives, adjusting recommendations as needed to optimize agricultural productivity and environmental impact.



3. Awareness Building

Our mission is to raise awareness about EMIT, its capabilities, and its accomplishments within the community. In order to provide a holistic approach contributing to both environmental conservation and the improvement of local agricultural systems.

To accomplish this mission, we have developed a website dedicated to EMIT and crafted an introductory-level video. Through these resources, we provide insights into what EMIT is, how it can be used, and what has already been accomplished with its data. Additionally, we emphasize our sustainable farming project, which uses EMIT data to promote environmentally responsible agricultural practices.

Website:

https://drive.google.com/drive/folders/1fBrXX5LEDZUmjwNyJhIDx4kU9jglMDHJ?usp=drive_link

EMIT Video:

