East Nili Fossae site

Mangold, Poulet, Bibring, Mustard

Based on OMEGA detection of alteration material with landing ellipse inside this material over a smooth surface
Red = 2.3 µm band
Blue = 1.93 µm band
Green: olivine
Identification of an olivine-rich unit with hydration bands

- Olivine
- Hydration typical of clays (1.93+2.30 band)

⇒ Iddingsite?
⇒ Mixing of both types

- Serpentine?
Not exact spectra
Red = 2.3 μm band
Blue = 1.93 μm band
Green: olivine
A: Rough eroded texture

Red = 2.3 µm band  
Blue = 1.93 µm band  
Green: olivine
A: Rough eroded texture

B: Sand dunes

Red = 2.3 µm band
Blue = 1.93 µm band
Green: olivine

300 m
Red = 2.3 µm band
Blue = 1.93 µm band
Green: olivine

A: Rough eroded texture
B: Sand dunes
C: Smooth surface with layers
At MOC scale:
- Layering visible
- Rocks outcrops
- Smooth terrains at MOC scale

No HiRISE yet to clarify nature of layering
CRISM data?

Mafic: Red=olivine

Phyllosilicates (red=2.3 blue=)1.9)
CRISM
Smectites together olivine
Kaolinite might be present (Ehlmann; Mustard)
Interpretation:

1st hypothesis: Olivine rich material with local or partial alteration
⇒ More hydrothermal than sedimentary cases
⇒ Alteration as coating or veins alteration possible

2nd hypothesis: Spatial mixing of smectites with olivine sand
=> then upper part of the altered basement described by Jack

In both cases:
Diversity of material
Access to more than one unit
A VARIETY OF UNITS CAN BE REACHED BY THE ROVER

Olivine outcrops

Altered minerals with olivine

Altered minerals alone

Hydrous ejecta
Age: Noachian

Syrtis lavas
~3.7 Gy

Nili olivine
~3.9 Gy

Nili basement
>3.9 Gy

No alteration
Partial /local alteration
Basement alteration
SAFETY:
Regional slopes <3°
Inside ellipse
Elevation: -1.1 to -1.4 km
SAFETY:
Regional slopes <3°
Inside ellipse

Elevation:
-1.1 to -1.4 km

A few hills covers <5% of the area

THEMIS visible mosaic
THEMIS

Rocky terrains

TES inertia: medium to high (200 to 600)

No dust
Summary

• Hydrous minerals together with olivine signatures

• Altered material inside the landing ellipse (no go to site)

• Sample different units with the alteration record of the Noachian period

More in: Mangold et al., Mustard et al. 2007, JGR

Subliminal message

GO CHEMCAM!