

MORPHOLOGY AND SEDIMENTOLOGY OF LANDFORMS ASSOCIATED WITH PLAYAS IN WESTERN DESERT OF EGYPT: POSSIBLE ANALOGS FOR MARS. Abdallah S. Zaki, Department of Geography, Ain Shams University, Abbaseya, Postal code 11566, Cairo, Egypt.(abdallah.sami@art.asu.edu.eg)

Introduction: The exact number of playas in Western Desert of Egypt and possible playas on Martian surface is unknown due to the fact that not all of them are studied in Western Desert or detected on Mars. The geological map of Egypt shows that there are more than 100 playas whose area exceeds two square kilometers in the Western Desert (Embabi, 2004). Some of the playas are featureless, while most of them are characterized by yardangs, spring mounds, and lunettes. This work illustrates the field investigation for south Farafra playa, north Kharga playa, and Bahariya playa, this will help us in understanding the nature of landforms associated with playas on Mars. These features can be summarized as follows.

Yardangs: The playas have been extensively eroded and lowered with numerous yardangs as an evidence of the once higher playa surface (Embabi, 2004). Yardangs have been identified, not only in most of the major deserts of the world (McCauley et al., 1977), but also on Martian surface (Ward, 1979). Figure 1 shows large field of yardangs in south Farafra playa, Western Desert, Egypt. Dimensions of yardangs in this field range from 0.8 to 3.2 m in height, widths range from 0.96 to 5 m, and lengths extend to 8 m (Embabi, 2004). HIRISE images show typical examples in Aeolis Planum (Fig. 2).

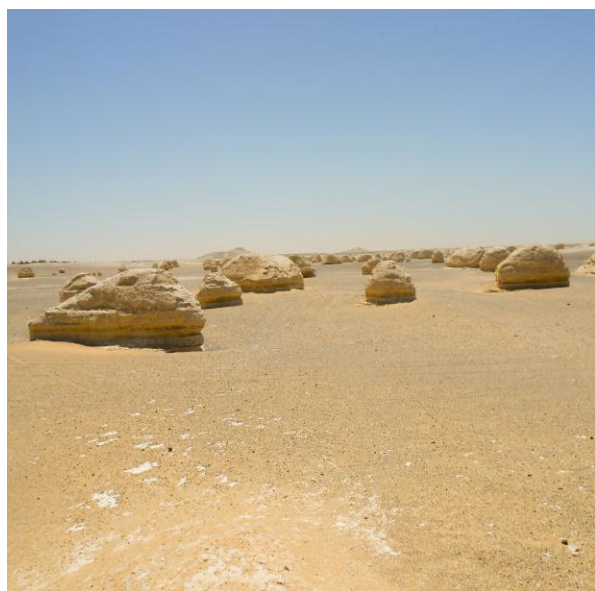


Figure 1: Field image shows large field of yardangs in south Farafra playa.

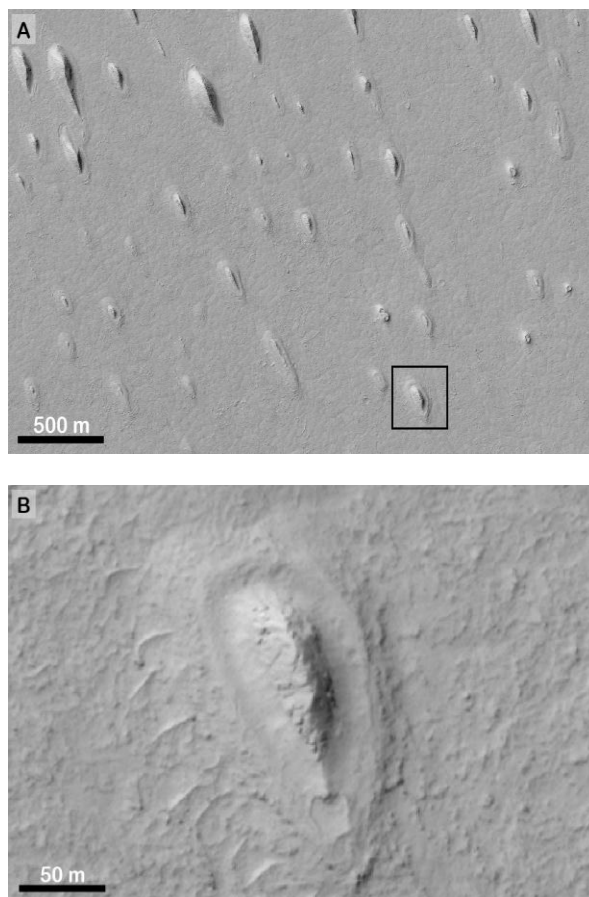


Figure 2: (A) and (B) HIRISE images show typical examples of yardangs field in Aeolis Planum. HIRISE image ESP_026383_1830_RED

Lunettes: In arid environments, playas are frequently bounded by crescentic dunes which are called “lunettes” in previous literature (e.g., Shaw and Thomas, 1997).

In Farafra, lunettes have been in several playas (Mahmoud, 1989; Embabi, 2004). Lunettes in Western Desert of Egypt are composed of aeolian sand, most of the of lunette (85% for coarse and medium sand, and 45.5 for fine sand) of the south Farfara playa is quartz (Donner et al., 1999; Embabi, 2004). Lunettes in other parts of the world like those of Australia and Arabia are mostly composed of caly or evaporitic materials and lie at the lee sides of playas (Goudie, 1991; Embabi, 2004).

Spring Mounds: Spring activity is relevant to playa development since-as mentioned earlier-many lakes owed their existence totally or partially to spring discharge (Embabi, 2004). The most important feature, which is the result of this activity, is what is known in previous literature as “spring mounds”. Said (1980) pointed out, these mounds appear in the form of small hillocks, mostly conical in shape, they range in height from a few meters to 20 m, and each mound has a vent that cylindrical in shape and is surrounded by layers of clay, ocher, sand or carbonates, depending on the composition of the oozing waters of the spring.

Figure 3 shows field image for a mound spring which captured in south Farfra playa.



Figure 3: Spring mound in south Farfra playa.

Summary: This work sheds light on the morphological and sedimentological characteristics of landforms which associated with playas, including yardanga, lunettes, and spring mounds.

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