HIGH RESOLUTION INVESTIGATION ON SURIUS VALLIS MOUTH AND THE SINUOUS RIDGES OF ARGYRE PLANITIA, MARS. A. Pacifici[1] and M. Pondrelli[1], [1] IRSPS, Università d'Annunzio, Viale Pindaro 42, 65127 Pescara Italy. Email: pacifici@irsps.unich.it, monica@irsps.unich.it

Introduction: The basin of Argyre represents one of the oldest and largest impact craters of Mars. Located in the southern highlands of the planet (centered at about -55N 60W), it is formed by a mountainous ring about 1500 km large embaying a flat basin about 900 km wide.

Both the mountainous ring and the inner basin show several morphological features suggesting a very interesting geological evolution. According to several authors [1], [2], [3], [4] larger part of such features relates to a history in which the sculpting action of water and water ice appears to have been very effective in shaping the area. Glacial cirques, horns, rock glaciers, debris flows, gullies, fluidized debris aprons, fluvial channels have been observed and described in the Charitum Montes, which represent the southern portion of the mountainous ring of Argyre. Eskers, patterned ground, thermokarst, and fluidized ejecta are observed in the southern portion of Argyre basin. Some of such features, such as cirques, horns, eskers appear to be very similar to analogue terrestrial features. Three valleys debouches in Argyre Planitia from south. They are named Surius Vallis, Dzigai Vallis and Pallacopas Vallis. Although well developed deltas are not distinguishable at their mouths, other morphological features suggest a fluvial origin for such valleys [2].

Study area: We investigated a portion of southern Argyre Planitia proximal to Charitum Monthes, including the Surius Vallis mouth and the nearby sinuous ridges (Fig 1A). We used HiRISE, CTX, MOC, THEMIS, HRSC and MOLA data.

The study area is roughly characterized by two main typology of terrain: a rough-like terrain and a smooth-like terrain. The rough-like terrain (Fig. 1B) is characterized by a layered pattern, in which darker and brighter layers alternate. This terrain has been interpreted as formed in a proglacial and/or fluvioglacial environment, since at least part of sinuous ridges interpreted as eskers originate from this terrain and show the same layered pattern. Some evidences indicate possible multiple depositional activities, which could indicate cyclical climatic variations. The smooth-like terrain (Fig. 1C) usually occurs in areas comprised between two eskers. It is often characterized by polygonal pattern and layering is not observable. Locally, small portion of the smooth-like terrain outcrop on top of the rough-like terrain. This observation suggests that the smooth-like terrain overlaps and postdates the rough-like terrain.

In the proximity of the Surius Vallis mouth, a small delta is distinguishable. Evidences of this deltas were already observed in past by [2]. Now, CTX data show a more complex environment, in which the delta appears to partially overlap sinuous ridges.

Conclusions: These observations could imply that Surius Vallis deposits were emplaced, (at list at the final stage) successively to the emplacement of eskers, and successively to the wasting of the ice mass in which they were formed. This could explain the occurrence of smooth-like terrain overlapping the rough-like terrain as well. This hypothesis could also be consistent with the occurrence of a large depression comprised between two sinuous ridges: Cleia Dorsum and Hegemone Dorsum. In our model, in fact, Sinuous ridges could have acted as natural divides, preventing water coming from Surius Vallis to flow in this area, which has been preserved by flood(s).

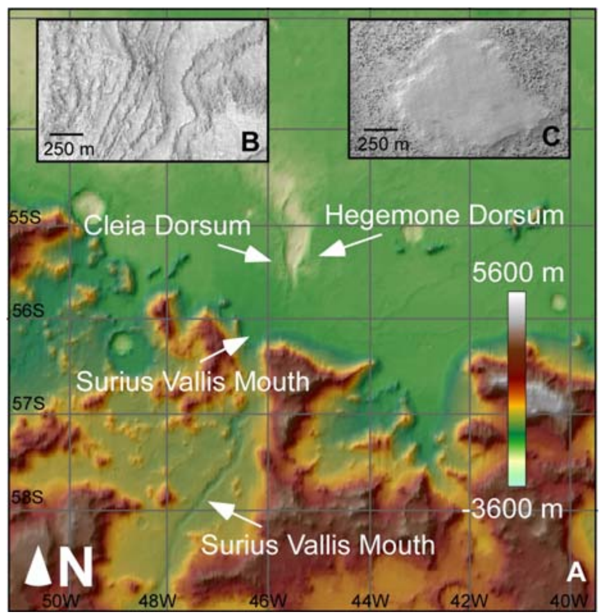

Figure 1. A) MOLA color-coded map of the study area. B) Sample of rough-like terrain (HiRISE ESP_011925_1245_RED). c) Sample of smooth-like terrain (HiRISE PSP_007007_1235).

References: [1] Kargel, J. S., Strom, R. G. (1992) *Geology, 20*, 3–7. [2] Hiesinger H. and Head J. W. . (2002) *Planetary and Space Sci., 50*, 939-981. [3] Banks E. M. et al. (2008) *JGR, 113,* E12015. [4] Banks E. M. et al. (2009) *JGR, 114,* E09003.