COMPARISON OF POSSIBLE RECENT WATER OR BRINE RELATED FLOW FEATURES ON MARS. A. Kereszturi[1,3], A. Sik[2,3], Sz. Bérczi[2,3], A. Horváth[1,3] ([1]Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences (MTA CSFK CSI) [2]Eotvos Lorand University of Sciences, [3]New Europe School for Theoretical Biology and Ecology, email: kereszturiakos@gmail.com)

Introduction: There are several flow-like features on Mars which might be produced by liquid water or brine flows ongoing today [1], although there are other models that interpret some of them by dry mass movements [2,3] and various other processes. In this work we review and compare these different flow-like features.

Methods: Since 2001 we have been analyzing MOC, HRSC, HiRISE images and topographic data and also reviewed the published results from other authors in peer-reiwed journals and the LPSC and EPSC conferences to identify the various possible flow-like features on Mars. Those features were taken as flow-like ones in this work, which are: 1. present on slopes, 2. show at least one morphological signature of fluid movement (meandering path, anabranching structure, accumulated pond-like feature at their termination), 3. forming on Mars today and their changes could be identified on different images acquired in the last years, 4. differ in albedo from their surroundings. Beyond the above mentioned data, CRISM and TES based spectral and temperature values were also analyzed where it was possible – although their lower resolution did not make possible to do comprehensive analysis.

Regarding the *nomenclature* the various terms used in this work are relevant only for the morphological description, and do not necessarily mean the same as they are sometimes used in classical Earth sciences. For identifying the features we used the terms slope streak, gully on dunes, DDS-seepage and recurring slope lineae

Results: First a short text-based description can be read and an image on the latitudinal distribution of these three features types (*Fig. 1.*). Later Table 1. and 2. list their detailed parameters and give possiblity for comparison. We mark these three feature types with letters A, B, C in the temporal order of their publication.

DDS-seepages (A): Beyond the general morphology, the most important feature of these flows are the accumulated pond-like features at the end of the flow [4,5,6,7,8]. The existence of the ponds prove the collecting downslope flow liquid at the bottom of the slope, where there is no preferred direction to continue moving of the liquid material.

Slope streaks (B) are low latitude flow-like features on dust covered terrains, that show anabranching pattern and usually darker than their surroundings. Based on Kreslavsky and Head and other author's work [9,10,11,12, 13, 14] they might form by the seepage of dense brines.

Recurring Slope Lineae (RSL, formerly TSL) (C): relatively dark albedo markings with sharp margins. They extend downslope on steep slopes. The narrow, some meters wide streaks have lengths up to 100s of meters. [15,16,17].

Alternative models may also explain the formation of these features without brines,with only dry mass movements [2,3].

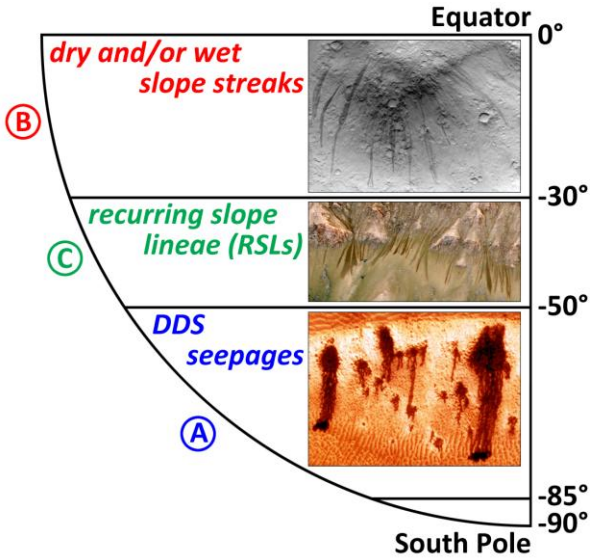

Figure 1. Latitudinal distribution of the three flow-like feature types on Mars

Conclusion: The importance of the features mentioned in this work is the possible role of liquid water in their formation. Reviewing the models of their origin the following similarities and differences are present:

- All of the observed morphological features and movement processes could be produced by flowing or seeping brines.

- In B, C cases the elevated temperature and low atmospheric humidity cause problems, although hygroscopic brines and their low evaporation rate may help in the formation.
- Using spectral data H_2O has not been detected at any of these features, although for the group A very close to the flow features water ice is present without CO_2 ice [18].
- There are possible analog features on Earth in the Antarctic region [19].
- Athough dry models could explain most of the observations for A, B, C groups, there is no such observation that contradicts to the wet models, and as a result these features are among the best candidates for the presence of liquid brines on Mars today.

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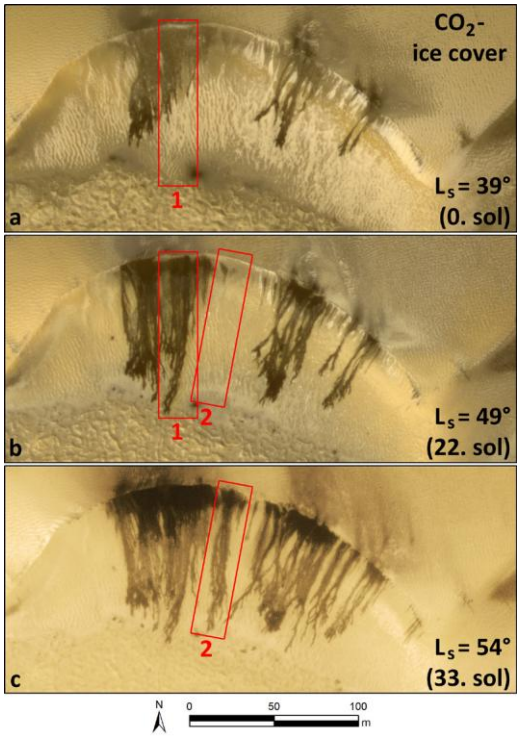

Figure 2. Example DDS-seepages at 77.5N 300E

Table 1. Spatial characteristics of the flow-like structures

Name	Location (latitude)	Steepness (degree)	Surface type	Duration of presence	Occurrence (Ls)	Source
DDS-seepages	65°-80° N+S	21 [3], 7 -16 [4]	seasonal frost covered basaltic dunes	months	N: 14°-65° [7] S: 210°-248°[6]	from Dark Dune Spots
Slope streaks	<30°N+S	steep dune slopes	dust rich terrains	years	all seasons [16]	no visible
Transient slope lineae	32°-48°S	>20° (equator, E, W facing)	debris slopes	months	260°-20°	bedrock outcrops, boulders

Table 2. Physical parameters of the flow-like structures

Name	Morphology	Average velocity of flow	Albedo, contrast to surroundings	Temperature (K)	Thermal inertia	Possible origin
DDS-seepages	10-100 m, branching	1.4 m/sol	darker, 0.2-0.3	180-220	200-400	brine flow
Slope streaks	few km long, sinuosing	?	usually darker, >0.25	>275	<100	dust avalanche / brine flow
Transient slope lineae	~100 m long, small channel	0.6 m/sol [8]	<0.20	250-300	180-340	brine flow