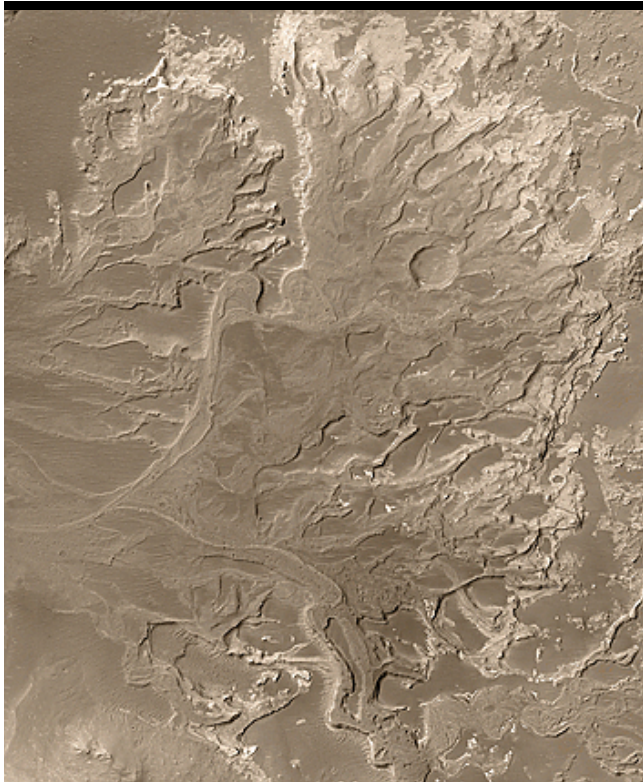# Modeling ideas - erosion, sediment transport (MARSSIM, GOLEM, CHILD?) and deposition (*SEDFLUX?*) on Mars
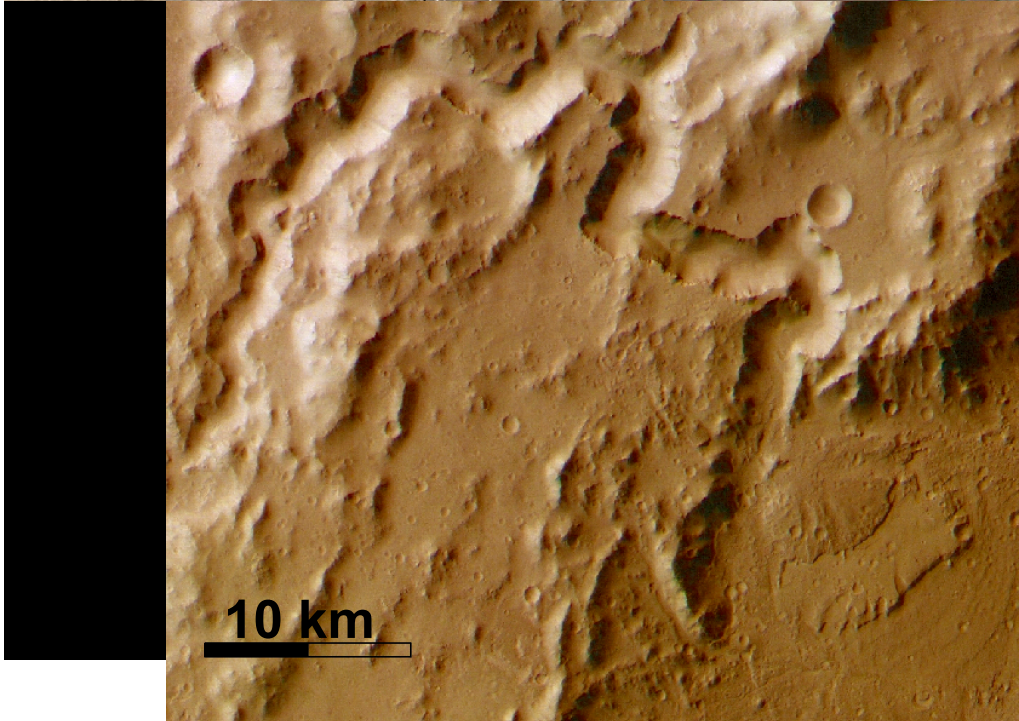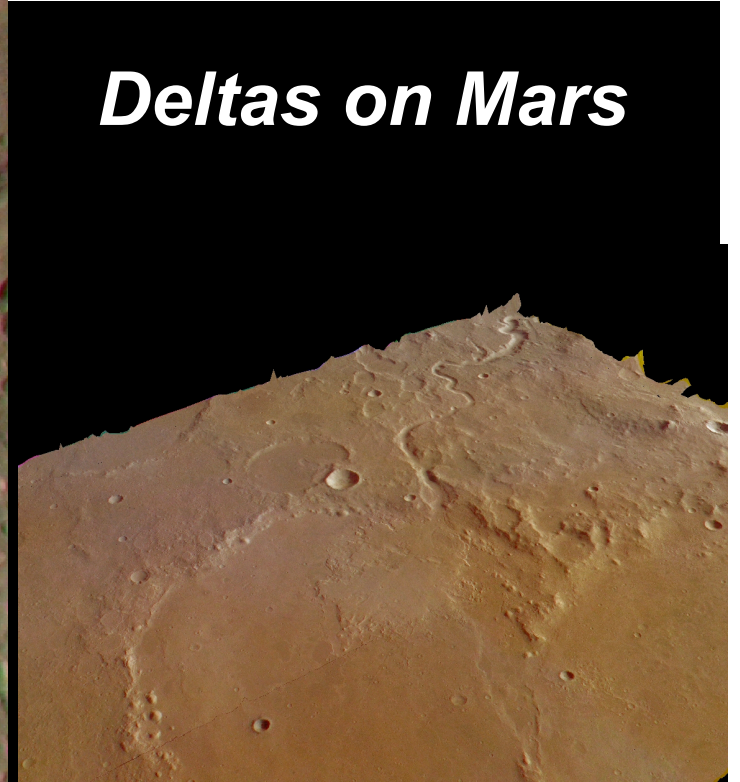
Gaetano Di Achille

LASP, University of Colorado
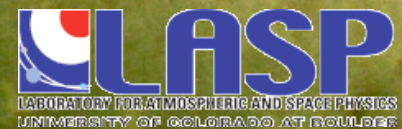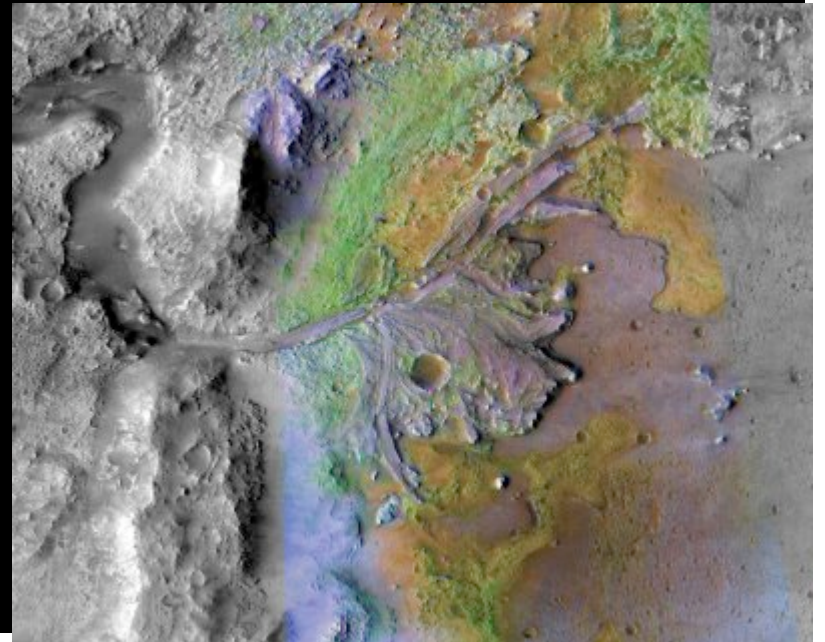
Deltas on Mars

10 km

10 km

WHAT WE CAN MEASURE

Morphometry of basins, deltas, and feeder channels

- Bathymetry

- With, depth, and slope of channels

- Volume and slope of deposits

- In some cases: "stratigraphy", mineralogy and sediments' grain-size (at least the coarsest)

WHAT WE CAN INFER

- Hydrological characteristics of channels (Manning, Darcy-Weisbach, MARSSIM)

- Paleohydrological and geological reconstructions of the sedimentary basins

- Time for the formation of the deposit (e.g. Moore et al., Bhattacharya et al., Kleinhans, Barnhart et al.,)

OPEN ISSUES

Paleoclimatic conditions (warm-wet vs. cold-dry)

Water sources (surface runoff vs. groundwater seepage)

Paleohydrology (e.g. discharges, sediment load)

Sedimentology (morphodynamics, time for formation and effect of gravity)

WHY THE MODELING?

In general, it can help to better understand:

- Paleohydrological boundary conditions of the depositional systems

- Effects of gravity on the morphodynamics (comparison with Earth)

- Formation time (e.g. by using channel erosion, morphometry of the deposits as controls)

- Response and adjust of the deposition after base level changes

For local studies where inputs are "known" (e.g. discharges, water level, etc.)

- Validation of possible scenarios

- Paleohydrological reconstructions

For regional studies where inputs are unknown (e.g. discharges, water level, etc.)

- Use of MARSSIM to obtain input parameters

- Use of the results in SEDFLUX

- Test of paleoclimatic scenarios that match the observational evidence