Yearly changes in dust devil tracks within Malea Planum, Mars

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Goal and Objectives

Goal:
Constrain current aeolian activity on Mars through dust-devil track (DDT) behavior

Objectives:
• Characterize the year-to-year behavior of DDTs within Malea Planum, Mars
• Create detailed maps of DDTs found on repeat Context Camera (CTX) [Malin et al., 2007] images collected in different Martian years (MY) to determine:
  1) dominant trends of DDTs over time;
  2) how the areal density of DDT changes over time;
  3) the role of local topography in the formation of DDTs.

Methods

• Used Java Mission-Planning and Analysis for Remote Sensing (JMARS) [Christensen et al., 2009] to identify repeat CTX images
• Enhanced image contrast and applied edge filter using 7 x 7 pixel kernel
• Mapped DDT using ArcGIS and QGIS
• Calculated DDT trends using start and end points
• Used Rose.Net (http://mypage.iu.edu/~tthomps/programs/html/Introse.htm) to generate rose diagrams

Results 1

Mapping DDT in site 1

Results 2

Mapping DDT in site 2

Future work

• Map DDTs at 4 more sites within Malea Planum
• Constrain how much time is required for DDT to disappear

Preliminary Conclusions

• DDT trends vary slightly from year to year
• DDTs generally trend to the NW

References


Malea Planum, as mapped by Tanaka et al. (2014). Malea Planum is the purple unit southwest of Hellas Planitia.