OBJECTIVES

Qualify and quantify morphological elements of Martian fan-shaped deposits with HRSC-data and categorically classify types of these large fan-shaped deposits.

BACKGROUND

Martian fan-shaped deposits show architectural elements similar to those of terrestrial analogues. Fan morphology is related to upstream and downstream conditions such as water discharge and duration, sediment flux and properties, as well as basin size and water level [1, 2]; and is indicative of climatic conditions at time of deposition [3].

MORPHOLOGICAL PARAMETERS

<table>
<thead>
<tr>
<th>TYPE 1 Alluvial Fans</th>
<th>TYPE 2 Smooth Delta</th>
<th>TYPE 3 Branched Delta</th>
<th>TYPE 4 Stepped Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate Shape</td>
<td>Classic cone-shape</td>
<td>Smooth semi-circular</td>
<td>Branched fan-shape</td>
</tr>
<tr>
<td>Average Gradient</td>
<td>~ 3 degrees</td>
<td>~ 1 degree</td>
<td>~ 1 degree</td>
</tr>
<tr>
<td>Average Length</td>
<td>~ 20 km</td>
<td>~10 km</td>
<td>~ 5 km</td>
</tr>
</tbody>
</table>

SUMMARY

- Two important parameters, water level and degree of branching, can be used to distinguish between different types of deposits
- Alluvial fans form into dry basins, whereas deltas form into basins with ponding water and steady or rising water levels
- Deltas can be dominated by sheet-flow or channelized flow
- Relationships exist between different “end-member” types of deltas and overlap between types do occur (see Venn-diagrams)
- Different morphological types of fan-shaped deposits indicate different types of processes and possibly different types of climatic conditions at formation [13]

REFERENCES AND ACKNOWLEDGEMENTS


