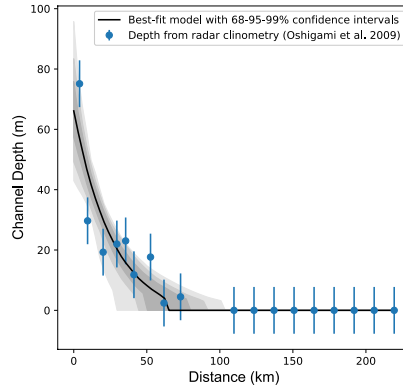
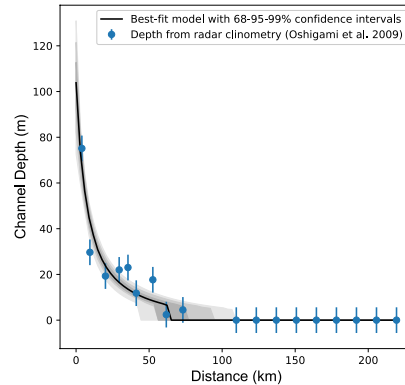


Thermal Erosion Models

Lunar-like Basalt



Carbonatite



Preliminary Results

Models assuming various lava types, including carbonatite, can match the depth profiles of rilles.

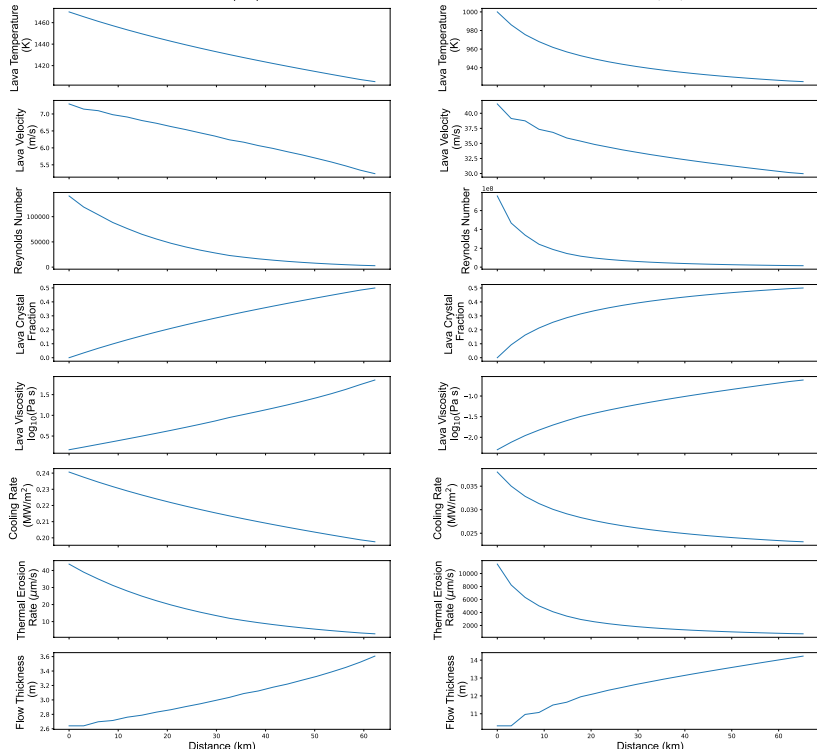
Lava Type	Flow Thickness (m)	Flow Duration (Earth months)	Total Lava Volume (km ³)
Tholeiitic Basalt	3.2 ± 0.7	4.5 ± 2.2	380 ± 77
Carbonatite	10.3 ± 1.6	0.01 ± 0	8 ± 1
Lunar-like Basalt	7.8 ± 1.6	0.6 ± 0.2	62 ± 11

Background

- Venus has >200 lava channels, including canali and rilles
- Carbonatite lava has been proposed to form canali. The lava type that formed rilles is unknown.
- Carbonatite has a very low viscosity, low temperature, high carbon content, and is rare on Earth.
- Recent studies show that large amounts of carbon could be present in Venus' crust even without plate tectonics

Methods

- Model channel formation by thermal erosion to match depth profiles
- Test various lava and substrate compositions – (lunar-like basalt, tholeiitic basalt, komatiite, carbonatite).



Next Steps

- Complete a database of rilles and canali
- Continue analysis for komatiite lava
- Incorporate mechanical erosion in models
- Benchmark 1D models with 2D and 3D simulations
- Estimate the production rate of carbonatite lava on Venus to assess new models of crustal (de)carbonation