A NEWLY RECOGNIZED TYPE OF MAGELLAN SAR ARTEFACT

G. M. Wolff[1], A. H. Treiman[2], H. Dalton[3], and S. Milazzo[1]
[1]University of Colorado Colorado Springs, [2]Lunar and Planetary Institute, [3]San Jacinto College

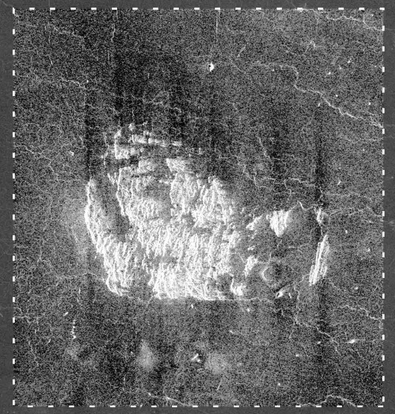

FIGURE 2
A Photoshop-enhanced portion of the pictured region exhibits the dark streaks more clearly.

WIND STREAKS? NO...

Anamalous dark features that resemble wind streaks are present throughout the Magellan Synthetic Aperture Radar data in varying concentrations. The most obvious of these (and the first noticed) are in the region represented partially in the background image of this poster centered around 30°N, 2°E. Though they are consistent with typical aeolian wind streaks composed of fine-grained material, they curiously are not consistent with the prevailing wind direction. Plausible origins including polar wander, tranverse dunes, and downdrafts were considered before realizing their artificial nature.

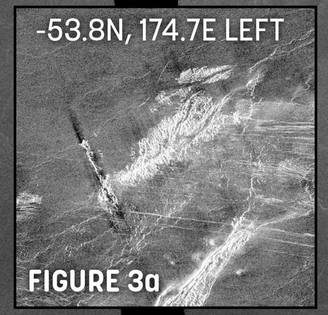

FIGURE 3a

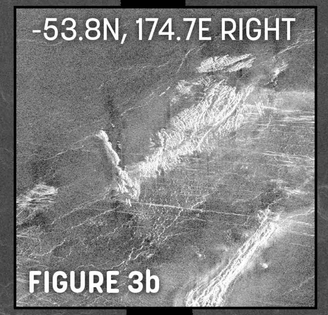

FIGURE 3b

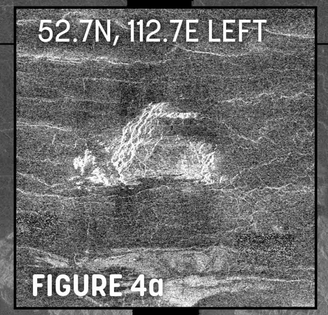

FIGURE 4a

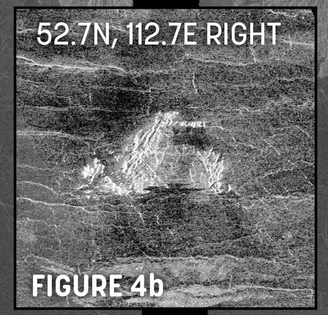

FIGURE 4b

EVIDENCE OF ARTIFICIAL NATURE

The parallel nature, regular spacing, independence from wind direction, and presence on opposing sides of rough features indicated the false nature of the streaks. However, it was difficult to falsify any hypothesis with a limited data set. As such, we expanded our search to catalog other such streaks using more than one source of data. We were able to find multiple instances of other streaks with different directions in both right-look and left-look SAR data that correlated with swaths of missing data--useful indicators of the spacecraft's orbital path. There remained a possibility that the instruments preferentially revealed aeolian features perpendicular to the SAR instrument's direction, but this was quickly ruled out by finding areas with both right- and left-look but with a large difference in angle between the respective paths and streak-directions. These examples are featured in the images in the column on the left (Figures 3-4).

LIST OF IDENTIFIED ARTEFACT LOCATIONS

52.7N, 112.7E
-53.8N, 174.7E
-36.5N, 221.1E
-28.8N, 225.8E
-22.7N, 62.0E
-6.5N, 158.1E
-17.5N, 8.5E

FIGURE 1
(Background): A portion of the basaltic plains in the region bound by 26N, 351E and 36N, 6E with separated massifs.

100 KM

IDENTIFICATION

Observed artefacts have the following characteristics:

- Mostly occur around radar-bright areas surrounded by darker plains
- Appear on both opposing sides of such areas and run parallel to one another
- Approximately 20 km long and between 1 and 5 km wide, though size varies
- Have different orientations in right-look and left-look images, both of which are aligned with orbital path at time of collection.

POSSIBLE CAUSES

We infer that these dark streaks are artefacts in the Magellan SAR images. Potential causes include the unintended consequences of data compression, processing raw SAR data into images, conversion of BIDR data to F-BIDR, or perhaps interference caused by the way radar reflects off rough and raised surfaces. Determining the cause is beyond the scope of this project, but we hope this serves as a cautionary statement for future missions aiming to image the surface of Venus and for those using Magellan data to understand the morphology of Venus

N