DENVER MUSEUM OF NATURE AND SCIENCE
VENUS WINDS PROJECT
MINUTES OF MEETING

Date/Time/Location: 25 June 2015 6:00 PM Exploration Studio 106

ATTENDING

Art	Ashley	**Cristy**	Dave	Drew	Dylan
Elizabeth	**Emilie**	John	**Kevin**	Nick H.	Nick Z.
Mark	**Marta**	Mica	Michael D.	**Michael L.**	Rachel
Ricardo	**Terran**	Yvonne			

Guests: None

The meeting opened at 6:00 PM at Exploration Studio 106 in the Morgridge Wing. Those **attending** are listed above. We welcomed new analyst, **Elizabeth Kaiser**!

OLD BUSINESS

Your experience with DS9 and **Gimp** All

SAOImage DS9 is an analysis tool that is widely used by the astronomical community to extract the maximum usable information from astronomical images. One potential **DS9** analysis of Venus images would be to locate the maximum pixel values of cloud/gap features much more precisely than an analyst could pick them. The **DS9** website is located at **http://ds9.si.edu/**. It is free and available for PCs, Macs, and Linux machines. Analysts are encouraged to download both **DS9** and its accompanying documentation to try it out.

Art demonstrated an important use for **DS9**, creating contour maps of the clouds/gaps, and thus allowing determination of the coordinates of maximal and minimal pixel values corresponding to clouds and gaps. His experience is that it is relatively easy to accurately locate minima and maxima on the contour maps to the ***nearest pixel***. Such precision is not achievable with Adobe **Photoshop**; therefore, **DS9** may be reasonably expected to replace **Photoshop** in such analyses. In the course of discussion, we discovered several new features, such as "**Backup**", "**Restore**" and "**Paste as new layer**" option under "**Edit**".

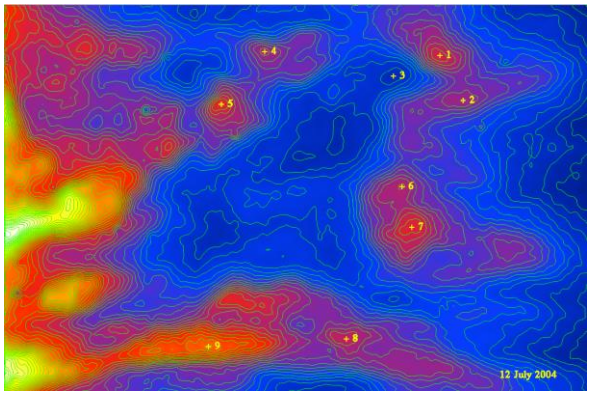
There was discussion of the relative merits of **Gimp**, another open source suite of programs, for similar analysis of images. Several of our analysts have experimented with **Gimp** already. We will have a discussion of the comparative merits of **Gimp** and **DS9** at a later date.

Tracking features present on July 12 and July 13, 2004 images Mark

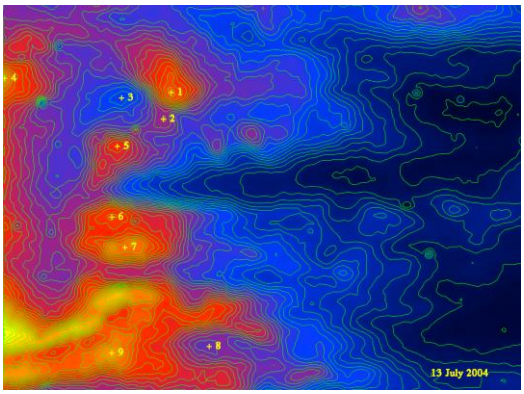
Earlier, Mark distributed one image each from July 12 and July 13, 2004 to be examined for cloud features that could be found on both days. The images are rendered in a cylindrical map projection (2048px x 1024px) to facilitate *x*,*y* coordinate determination. Analysts are asked to limit tracking features to the equatorial band (20°N to 20°S) and to present results at

this meeting, using the formula **[(*X2* – *X1*) x 5,959]/86,940** where ***X1*** is the *x*-coordinate from the July 12 image and ***X2*** is the *x*-coordinate from the July 13 image.

Mark then presented Art's work testing this task using DS9. Two images were displayed that showed contour maps of image brightness showing nine target points; eight were chosen at locations that had contour maxima and one at a contour minimum. Seven of the nine points showed significant (and expected) westward displacement; however, two in the southern hemisphere did not show westward displacement and thus, were considered unsuitable. Calculated average westward wind speeds were suspiciously low and will be resolved for the next round of experiments and a new equation will be provided.



12 July 2004



13 July 2004

Discussion followed on the suitability of DS9 for tracking purposes. Some deficiencies that Art encountered were resolved by Kevin and Mark. Mark encouraged our analysts to experiment further with **DS9** and/or **Gimp** on this exercise.

Wind Velocities to Date Mark

At a later date, Mark will summarize the results from all analysts who have completed velocity spreadsheets for July 12, 2004. The purpose is to show the strengths and weaknesses of the methods used so far, and to point to ways that might provide more consistent results. As a result, Christy will not do a statistical analysis of the results to date.

NEW BUSINESS

Volcanism on Venus? Mark

Mark described a new report [Shalygin et al., 2015, *Geophys. Res. Lett.*, ***42***, 1-4] that purports to show evidence of active volcanism on Venus. The research was concentrated on a small area near *Ganiki Chasma*, a rift zone in *Ganiki Planitia* at approximately 40°N, 195°E. Thermal imagery in the area showed several "hot" patches that had not been there two days prior; the patches lasted for about four months or less.

The next meeting on July 9 will be in Exploration Studio 106 at 6 PM.

Submitted by Arthur C. Tarr, Venus Winds Project Coordinator