HiRISE Stereo Pairs
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HiRISE reimages locations of special interest with different spacecraft rolls (to the left or right of the groundtrack) to acquire stereo pairs or 3D views of the surface. A popular way to view the images is via stereo anaglyphs, in which the left-looking image is displayed in red and the right-looking image is displayed in green and/or blue. From the standard HiRISE data products there are several ways to do this:

1. Easy but wrong for large-scale topography. Use the RDRs, in which the images from 10 RED CCDs are nicely mosaicked and reprojected to a common scale. Just put the image with the more negative roll angle into a red channel, and the other image into green and/or blue channel, then view with the anaglyph glasses. These often look spectacular, but beware: we reproject the images using a smooth global altimetry dataset, so the large-scale topography has been removed and all you see is the higher-frequency residual topography. This is fine for some purposes but can be misleading, and can't be used for research.

2. Fairly easy but messy. Use the NOMAP products, which have not been reprojected, but which sometimes have noticeable mismatches along the seams between the 10 RED CCD images. The image acquired with the larger absolute roll angle has a slightly larger pixel scale, so one of the 2 images should be resized to make them match. Also, these are almost all acquired on the ascending part of the orbit, so north is roughly down, and you need to either rotate them 180 deg or reverse which image goes to each color (put the image with the more positive roll angle into the red channel).

3. The right way. Reprocess the raw images using ISIS software (http://isis.astrogeology.usgs.gov/UserDocs/) to create products in which the geometric distortions of the camera and those due to imperfect spacecraft pointing control have been corrected but are otherwise in raw geometry, then proceed as with the NOMAP products (step 2 above). The HiRISE team plans to eventually do this preprocessing and release the images, but we have not yet created the new pipeline processing procedures.

The polar stereo images are tricky to work with and best avoided for anaglyphs. Those observations that end with 800-1000 or 2600-2800 are within 10 degrees of the south or north pole and are best avoided for standard stereo viewing.

Those images with the largest change in roll angle provide the most precise measurements of relative height, but may be difficult to see properly in anaglyphs because the vertical exaggeration is so great. (The roll angles are not very meaningful for images near the poles, in which the stereo convergence is mostly parallel to the surface.) Also, those image pairs with the smallest differences in incidence angle are best, avoiding changes in shadows that confound stereo viewing. In some cases the 2 images look very different due to changes in dust or frost distribution, again confounding stereo viewing.