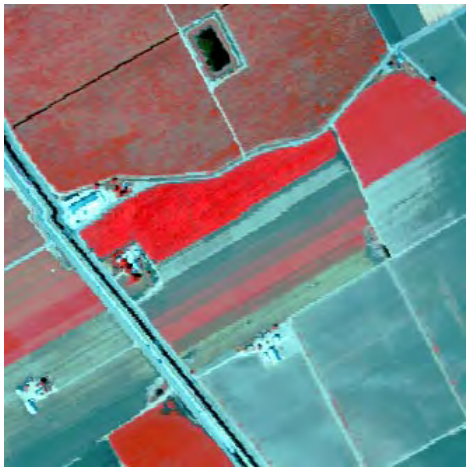
# Salinas Valley Agricultural Fields
# Low-Altitude AVIRIS Scene, 8 October 1998

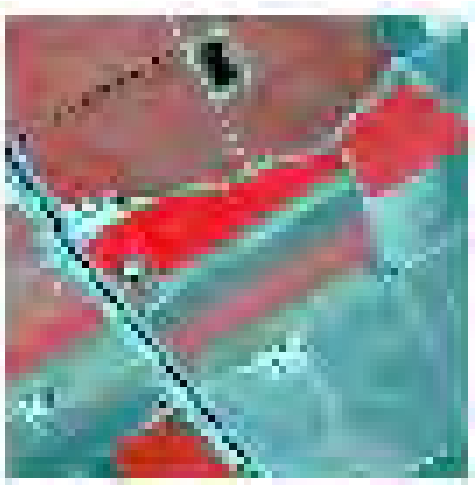
The following images summarize preliminary analysis results for part of a low-altitude hyperspectral image acquired in the Salinas Valley, California. The analysis was performed by MicroImages using tools in the TNTmips Hyperspectral Analysis process. The image was acquired by NASA's Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) during an experimental low-altitude flight program to acquire imagery with high spatial resolution. Each image pair below compares the result obtained from the data at full spatial resolution (4 meter pixel size, left) with the result obtained from image bands that were resampled (using cubic convolution) to the 20-meter spatial resolution of standard (high-altitude) AVIRIS images (right). These results demonstrate the benefits of higher spatial resolution in hyperspectral images, and were submitted to NASA in support of efforts to continue the low-altitude AVIRIS flight program.

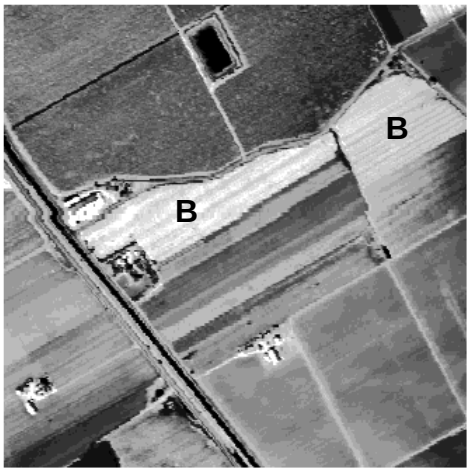
**Low-Altitude AVIRIS**
**Ground Resolution = 4 meters**



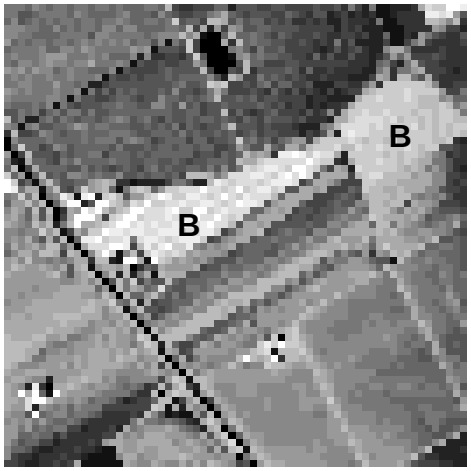
Approximate Color Infrared color combination of AVIRIS bands (R = 875 nm, G = 693 nm, B = 596 nm). AVIRIS-LA resolves details in cropping patterns and within-field variations in crops and soils.

**Synthesized High-Altitude AVIRIS**
**Ground Resolution = 20 meters**

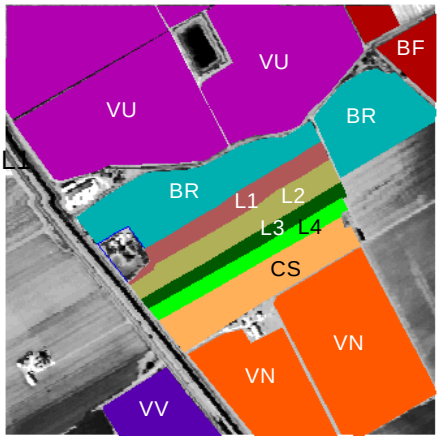





Component 2 images produced by the Minimum Noise Fraction Transform. AVIRIS-LA resolves variations in crop condition within broccoli fields (B) that are not resolved in the 20-m image. The reason for these row-parallel variations is not known at this time.

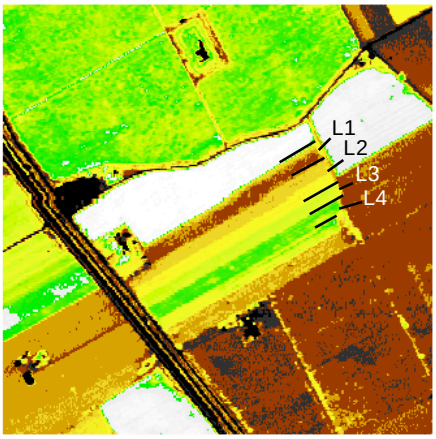



The MNF transform used a set of image bands ranging from 0.4 to 2.5 µm, omitting bands with high image noise due to atmospheric absorption. For this example only, the high-resolution MNF result (left) was resampled to 20-m pixel size to produce the image on the right. Because the MNF transformation is highly dependent on input image statistics, transform results from input bands with differing spatial resolution are not directly comparable. The low-resolution MNF image simulates the results obtained if low-resolution and high-resolution datasets had identical image statistics.

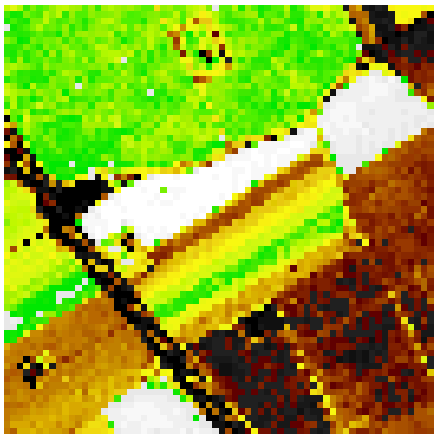


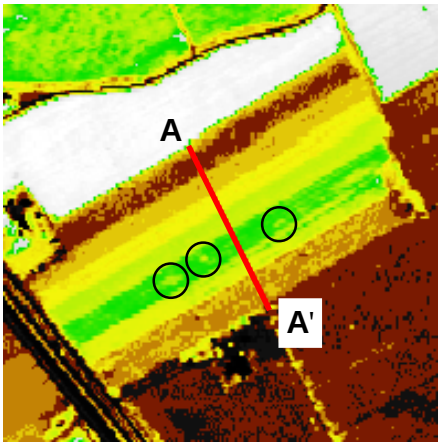

| | |
|---|---|
| BF | Bare Field |
| BR | Broccoli |
| CS | Corn - senescent, with some green weeds |
| L1 | Romaine lettuce, 4 weeks old, < 5% green cover |
| L2 | Romaine lettuce, 5 weeks old, 10% green cover |
| L3 | Romaine lettuce, 6 weeks old, 20% green cover |
| L4 | Romaine lettuce, 7 weeks old, 40 - 50% green cover |
| VU | Vineyard, untrained vines |
| VV | Vineyard, vines on vertical trellis |
| VN | Vineyard, new, mostly bare soil |

**Crop Map for 8 October, 1998 AVIRIS-LA flight date**

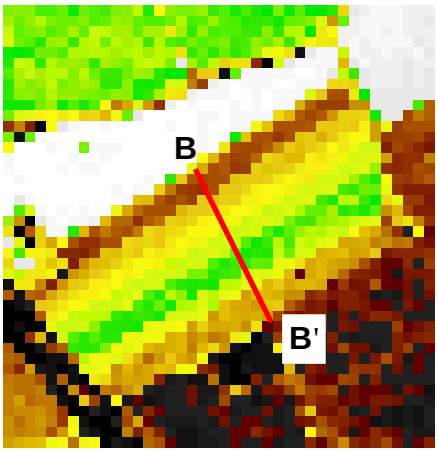


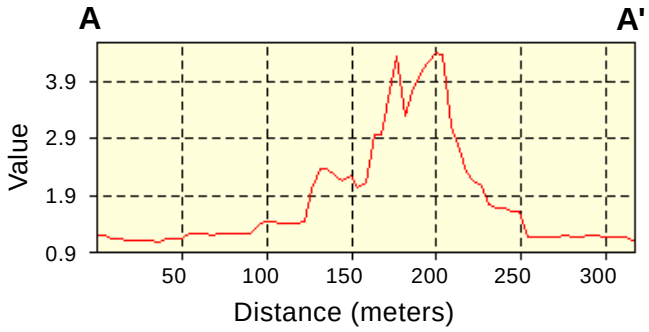

Color-mapped Chlorophyll-B Ratio Images (Refl. 800 nm / Refl. 635 nm). AVIRIS-LA provides better resolution of narrow lettuce fields with different planting dates and thus differing proportions of plant cover (L1 to L4).

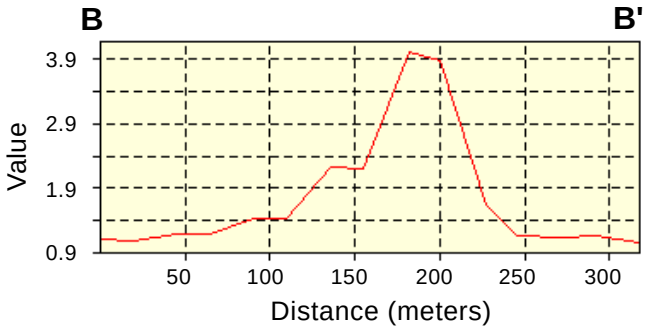





Magnified views of the lettuce fields. AVIRIS-LA resolves small areas of variation in crop condition within a single fields (circled in left image) that are not resolved in the 20-m image. The reason for this variability is unknown at this time. Plots of ratio values along the profile lines are shown below.




MicroImages, Inc. • TNTgis - Advanced Software for Geospatial Analysis
Phone ǂ 402 477 9554 • Support ǂ 402 477 9562 • info@microimages.com • www.microimages.com