HRSC Level4 RGB & pan-sharp

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RGB with "xvd"

	H0010_0009_RE4.IMG, H0010_0009_GR4.IMG, H0010_0009_BL4.IMG	
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labelRedDn 200 labelGreenDn 202 labelBlueDn 169		
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Pan-sharpening

• What is it?

Fusion of a color data set with a panchromatic (greyscale) one with higher spatial resolution







Example: Landsat 7 ETM+



Example: Landsat 7 ETM+



Example: Landsat 7 ETM+



PAN sharpening algorithms

Multiple algorithms for pan-sharpening



- Multiple tools / software packages available for pan-sharpening:
 - E.g. Envi



RGB & Pan-sharpening

- HRSC Level4 data in all available color bands (RE, GR, BL, IR, ND) have already the same aspect ratio (no. lines/no. columns)
- RGB color composite is immediate
- Pan-sharpening is easy to perform





RGB: example H0360_0000



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PAN sharpening WHAT TO DO: Poor man's sharpening

- Nadir at full resolution
- Red, green, blue <u>oversampled</u>, fitting to Nadir (same no. lines, columns)
- RGB to Lab Color
- Nadir pasted into Intensity Channel

L: Lightness of the color (L=0 black, L*=100 white)

a: Position between magenta and green (a<0 green, a>0 magenta)

b: Position between yellow and blue (b<0 blue, b>0 yellow)



PAN sharpening











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image

Pan-sharpened 321 image



PAN sharpening - How?

- Requirement: Nadir & RGB coregistered, same number of lines & samples
- Build and RGB with Red, Green, Blue bands
- Transform RGB in Lab Color (lightness, a, b)
- Open Nadir
- Paste Nadir into "lightness"
- Transform back Lab Color in RGB

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Open RGB image

A similar task can be achieved with any image processing software, e.g. Adobe Photoshop





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Transform RGB in Lab Color

Extract Cha	nnels
◯ RGB	
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О СМУК	
O Alpha	1
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O YCbC	r_ITU_R470
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Lab Color





C
 N nadir_lowres.psd-4.0 (grayscale, 2 layers) 300x835
 Elle Edit Select View Image Layer Tools Dialogs Filters Script-Fu





Recompose RGB

INTERNATION

<u>File Edit Select View</u>	Image Layer Tools Dialogs Filters Script-Fu
B-200	Duplicate Ctrl+D
	Mode RGB
-	Transform
4	P Canvas Size
-	Fit Canvas to Layers Compose
-	Print Size Decompose
2-	Scale Image
·	/ Crop Image
-	Autocrop Image
-	Zealous Crop
2	Merge Visible <u>L</u> ayers Ctrl+M
5]	Flatten image
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Recompose RGB





Recompose RGB





PAN sharpening







PAN-sharp result



PAN-sharp result



Why not with Level3?

and the second sec	X xvd: red_8bit.vic, green_8bit.vic, blue_8bit.vic	Hel
Camera POV 37.8" × 11.9" Camera beight above Mars 300 km	Red: RE Green: GR Blue: BL	
	 Level3 data are NOT orthorectified on HRSC DTM !!! Color misalignment on Level3 RGB (across topographic feating of the second secon	tures) poor results



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