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Subject: How to plot shaded relief image  
Posted by [Dave\[4\]](#) on Fri, 04 Jan 2008 11:03:40 GMT  
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Dear guys:

How to use IDL to plot shaded relief image, just like  
<http://denali.gsfc.nasa.gov/gridview/index.html>? Thanks very much!

Dave

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Subject: Re: How to plot shaded relief image  
Posted by [Dave\[4\]](#) on Fri, 04 Jan 2008 19:29:34 GMT  
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Yes, Rick. I find this web site, '<http://www.astro.washington.edu/deutsch-bin/getpro/library09.html?TOPO>', It's may be a good start!

On Jan 5, 2:33 am, Rick Towler <[rick.tow...@nomail.noaa.gov](mailto:rick.tow...@nomail.noaa.gov)> wrote:  
> Dave wrote:  
>> Dear david:  
>> 2) I have try the SHADE\_SURF with top view, it's good. But I want  
>> to find a 2D way to do this.  
>  
> I'm a little slow, but how can you do this in 2D? Don't you need to  
> generate the shading from a 3D dataset and a light source?  
>  
> -Rick

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Subject: Re: How to plot shaded relief image  
Posted by [JMB](#) on Wed, 09 Jan 2008 20:28:57 GMT  
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Hi all,

I have to correct my precedent post.  
The "kind of shading matrix" I introduced before is NOT the shading  
given by a source of light incident on the DEM,  
It is a directional gradient of the DEM. High positive values  
correspond to high slopes in uphill direction, low negative values

correspond to high slopes in downhill direction, zero values correspond to flat areas. The 3x3 matrix operator defines the direction of the gradient of interest.

I will try to give in a few days a better algorithm to compute shading on a dem from an incident light defined by a 3D vector.

Cheers,

Jerome

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Subject: Re: How to plot shaded relief image  
Posted by [JMB](#) on Thu, 10 Jan 2008 11:56:02 GMT  
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Very simple example in easy case:  
South illumination, only sun angle (i) can be set:

```
.*****  
,  
dem=read_tiff('dem.tif')  
dims=size(dem,/dimensions)  
  
; Edit a 3x3 gradient operator (vertical)  
  
gradv=[[1,1,1],[0,0,0],[-1,-1,-1]]  
  
; convolution of the dem with the 3x3 matrix  
  
gradient=convol(float(dem),float(gradv))  
  
; Sun angle respect to zenith (0 = vertical light, 90 = horizontal  
light)  
  
i=60  
cosi=cos(i*pi/180.)  
sini=sin(i*pi/180.)  
  
; resx = Dem horizontal resolution in meter (needed for normalization)  
  
resx=90 ; SRTM at 90 meter resolution in this test example  
resxmat=make_array(dims[0],dims[1],value=2*resx) ; matrix used for the  
scalar product  
  
; Computation of the shading matrix:  
; Scalar product of incident vector and normal gives cosinus angle  
  
Norm=1/(sqrt(gradient^2+(2*resx)^2)) ; Normalization
```

```
costeta=Norm*(cosi*resxmat-sini*gradient)>0
```

```
window,0,xsize=dims[0],ysize=dims[1]
```

```
tvsl,dem
```

```
window,2,xsize=dims[0],ysize=dims[1]
```

```
tvsl,costeta
```

```
end
```

```
,*****  
,
```

Cheers,

Jérôme

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