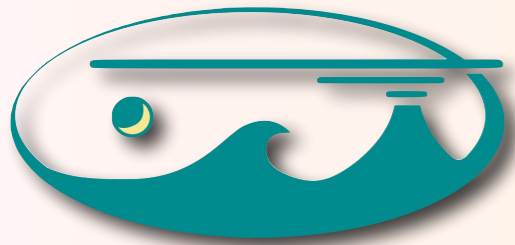




The Generic Mapping Tools (GMT)



Paul Wessel¹, Walter H.F. Smith²,
Remko Scharroo³, Joaquim Luis⁴,
Florian Wobbe⁵



THE GENERIC MAPPING TOOLS

¹SOEST, University of Hawaii at Mānoa, ²Laboratory for Satellite Altimetry, NOAA/NESDIS, ³EUMETSAT, Darmstadt, Germany, ⁴Universidade do Algarve, Faro, Portugal, ⁵Sea & Sun Technology GmbH, Germany



GMT Podcasts

GMT – The Generic Mapping Tools

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by Prof. Paul Wessel

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Description

GMT is an open source collection of about 80 command-line tools for manipulating geographic and Cartesian data sets (including filtering, trend fitting, gridding, projecting, etc.) and producing PostScript illustrations ranging from simple x-y plots via contour maps to artificially illuminated surfaces and 3D perspective views; the GMT supplements add another 40 more specialized and discipline-specific tools. GMT supports over 30 map projections and transformations and comes with support data such as GSHHG coastlines, rivers, and political boundaries. GMT is developed and maintained by Paul Wessel, Walter H. F. Smith, Remko Scharroo, Joaquim Luis and Florian Wobbe, with help from a global set of volunteers, and is supported by the National Science Foundation. It is released under the GNU Lesser General Public License version 3 or any later version. These podcasts discuss the basics of GMT and come from a Spring 2014 course in GMT offered by the University of Hawaii at Manoa.

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Becoming a GMT Guru

- Use a flexible shell on a UNIX-like system
- Think like a programmer
 - Automate, abstract away things, write functions for repetitive tasks
- Read documentation
- Work through tutorial
- Register and participate in the GMT Forums





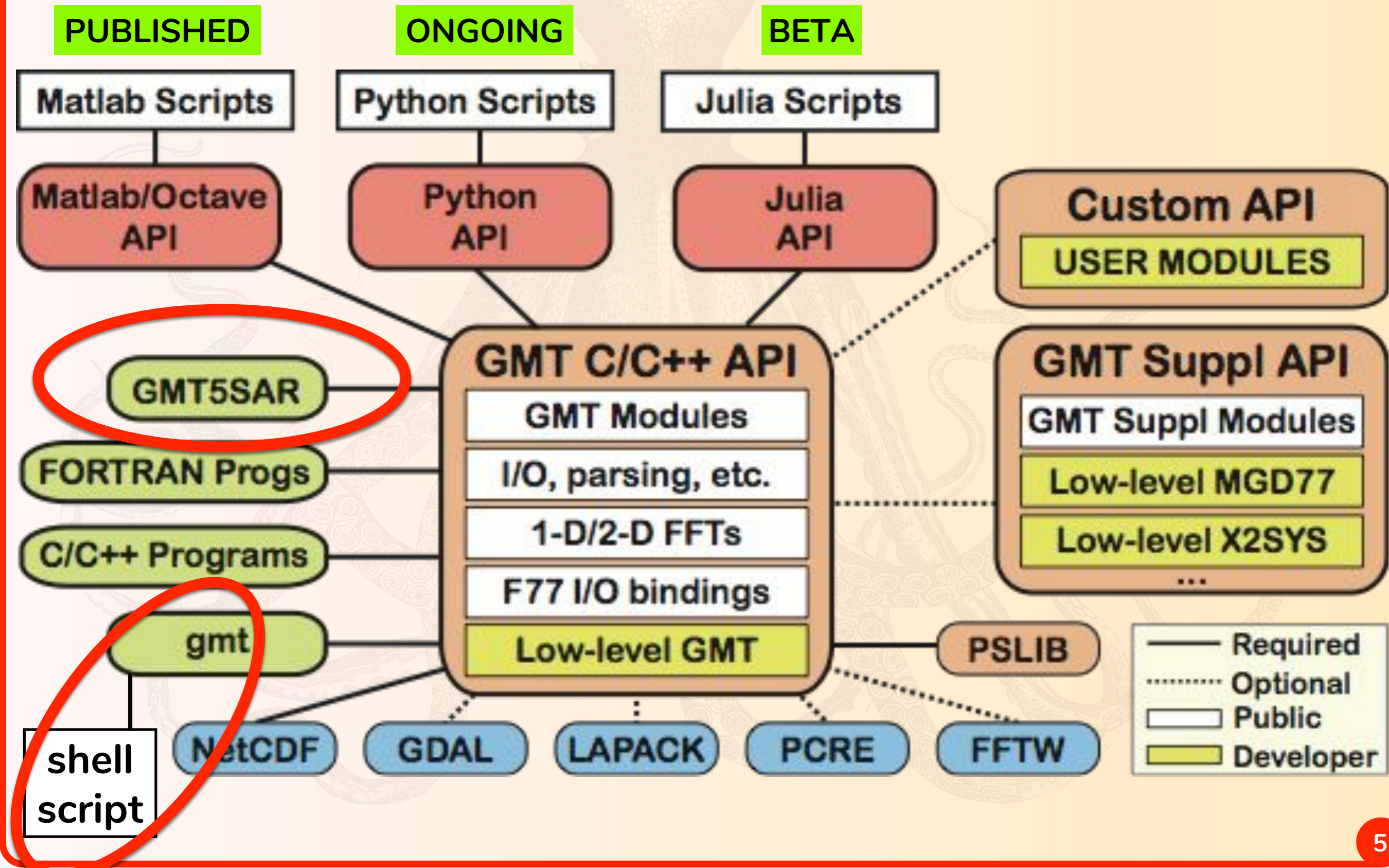
GMT Versatility

- GMT has been called the “Swiss Army Knife” of mapping tools
- Combines a wide array of data manipulation tools
- Infinitely configurable via user scripting
- It is possible to cut your fingers if not careful





The GMT Octopus





Upcoming Plans

- Current Release is GMT 5.4.4
- Team is working on GMT 6 (trunk)
- Will introduce **Modern Mode** which is considerably easier to learn and use
- Developing a Python and Julia interfaces
<https://github.com/GenericMappingTools>



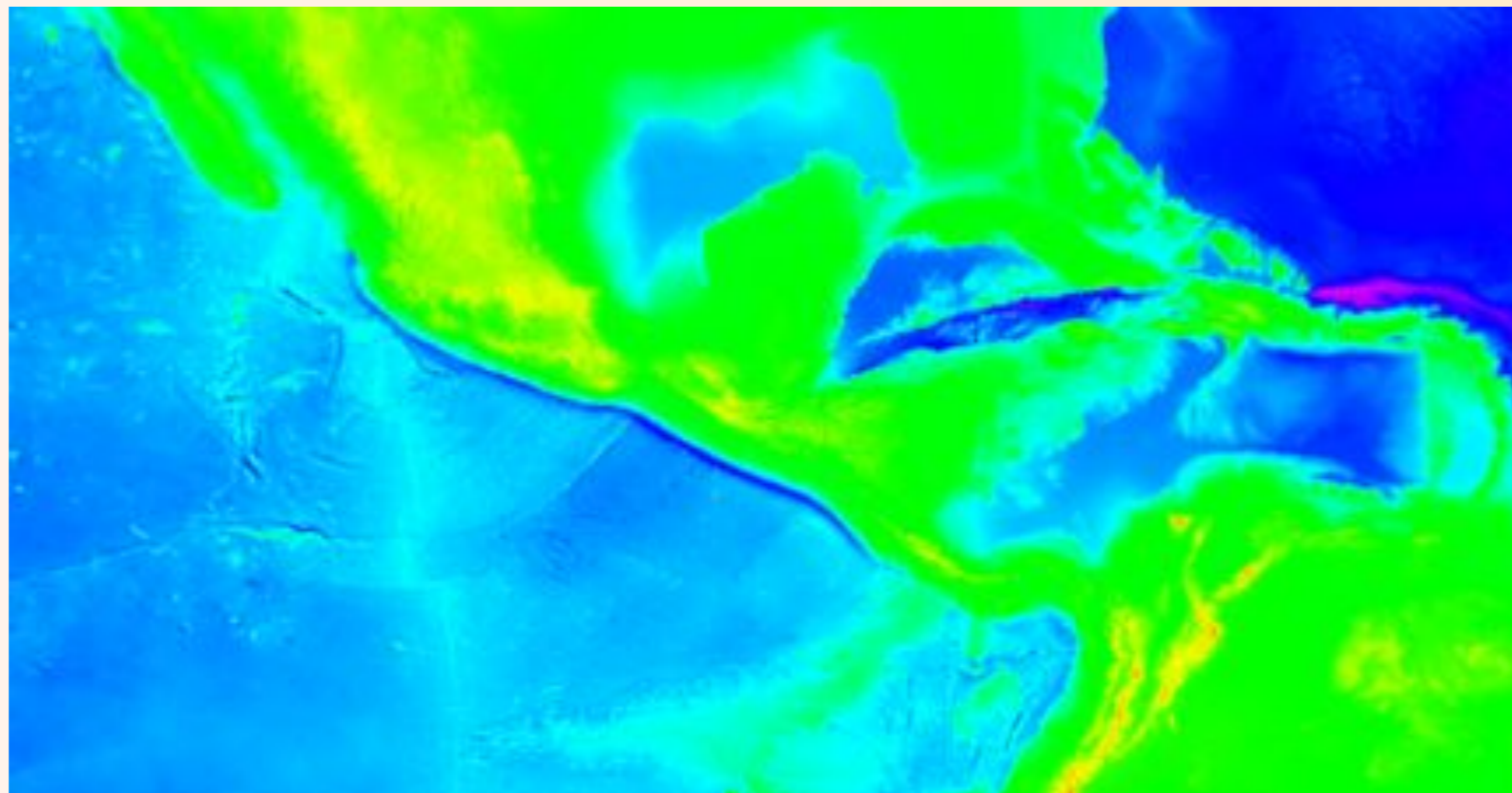
Making a map with **grdimage**

- “Quick-and-dirty map” [**grdimage**]
- More control with colors [**makecpt**]
- Add artificial illumination [**grdimage -l**]
- Add color bar [**psscale**]
- Get a DEM [SRTM1] subset from
<http://topex.ucsd.edu/gmtsar/demgen>



Quick and Dirty Maps

- GMT can access global relief files
- earth_relief_xx**m|s**.grd
- xx = **60,30,20,15,10,06,05,04,03,02,01**

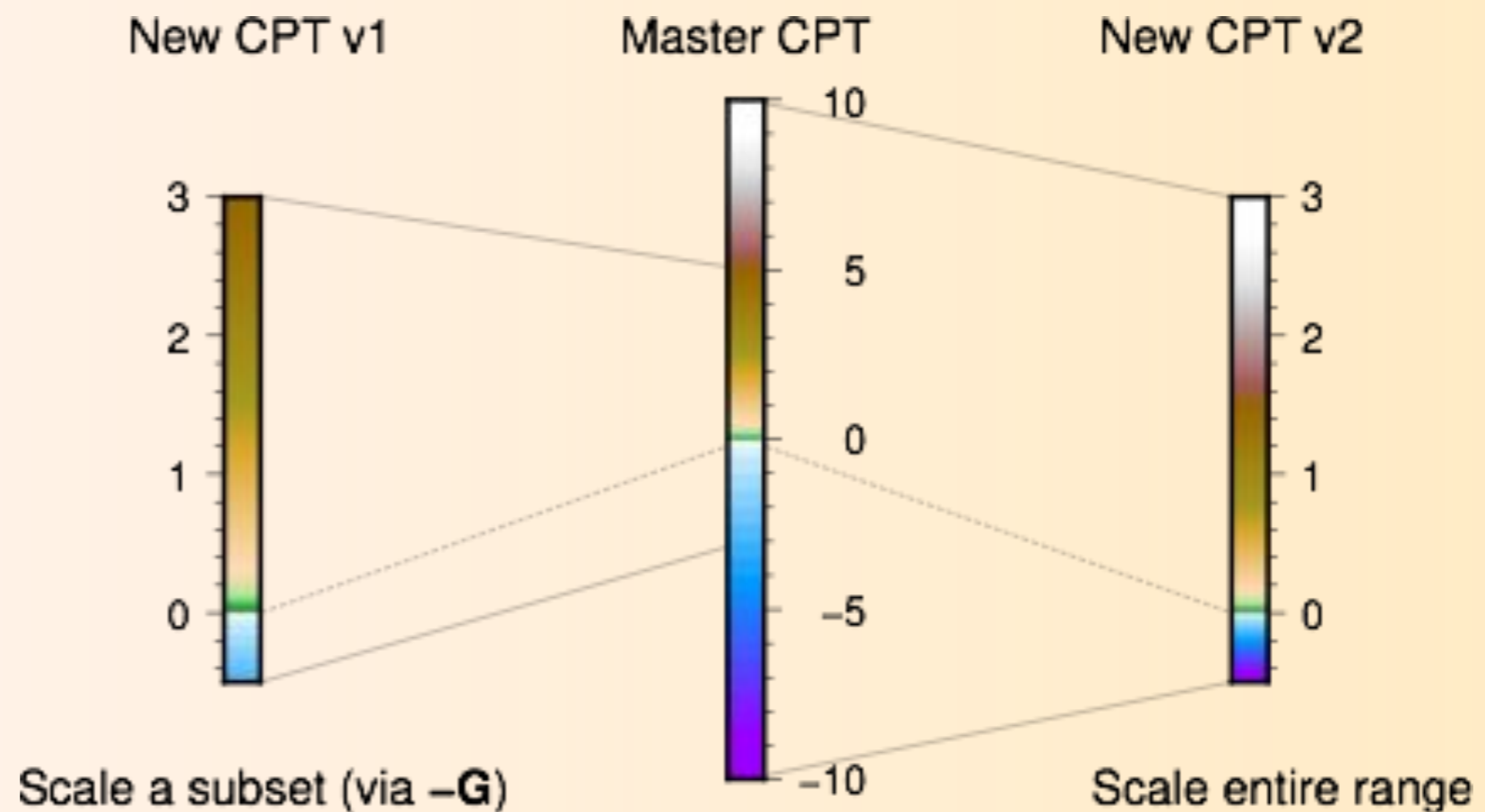
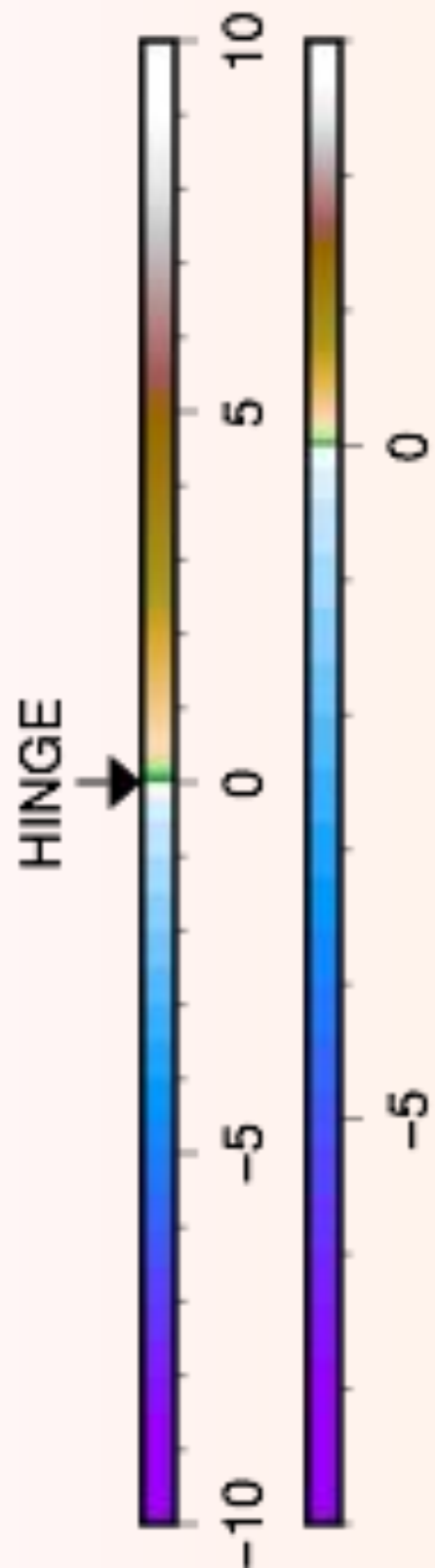


```
gmt grdimage earth_relief_02m.grd -P -JM6i -R120W/60W/0/30N > map.ps
```



More control over colors

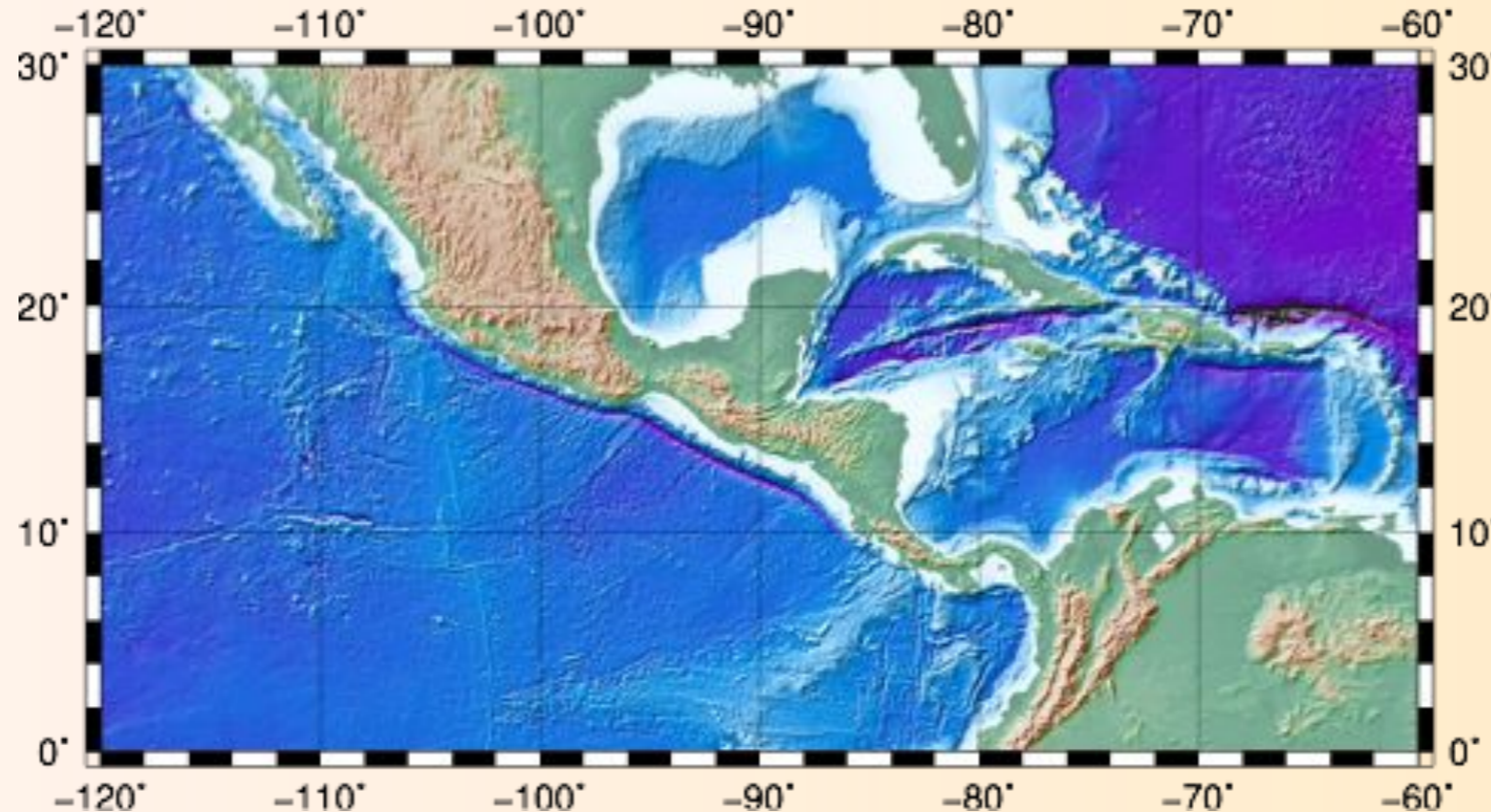
- **makecpt** manipulates color scales
- Extract subsets of scales and stretch them to your data range
- Many scales have **dynamic** hinges





Artificial Illumination

- Simple illumination set via **grdimage -I** option
 - -I+ gives default (i.e., -I+a-45+nt1)
 - Append modifiers for other shadings
 - Use **grdgradient** separately for complex shading

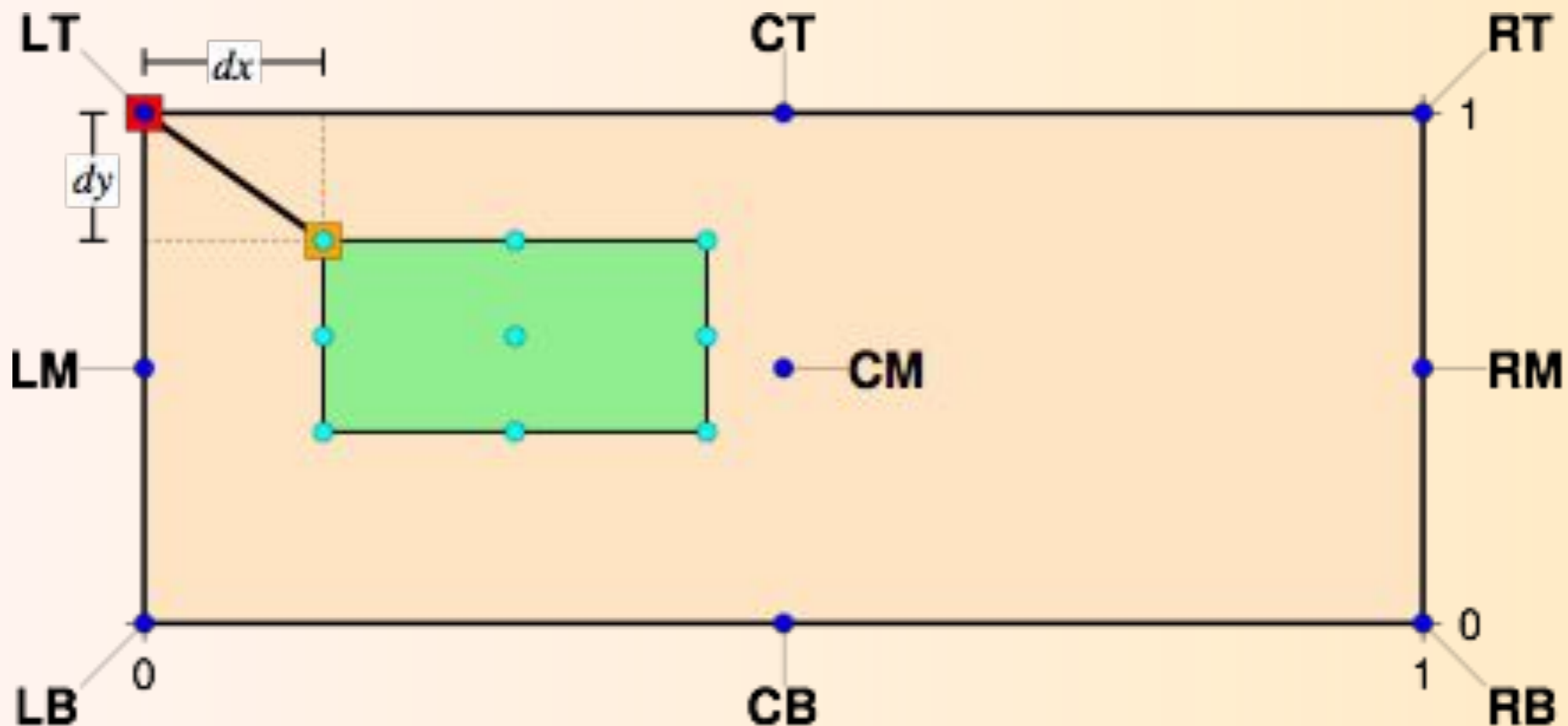


```
gmt grdimage -I+ earth_relief_02m.grd -P -R120W/60W/0/30N -JM6i -Bafg -Xc -Cterra > t.ps
```



Adding a color bar

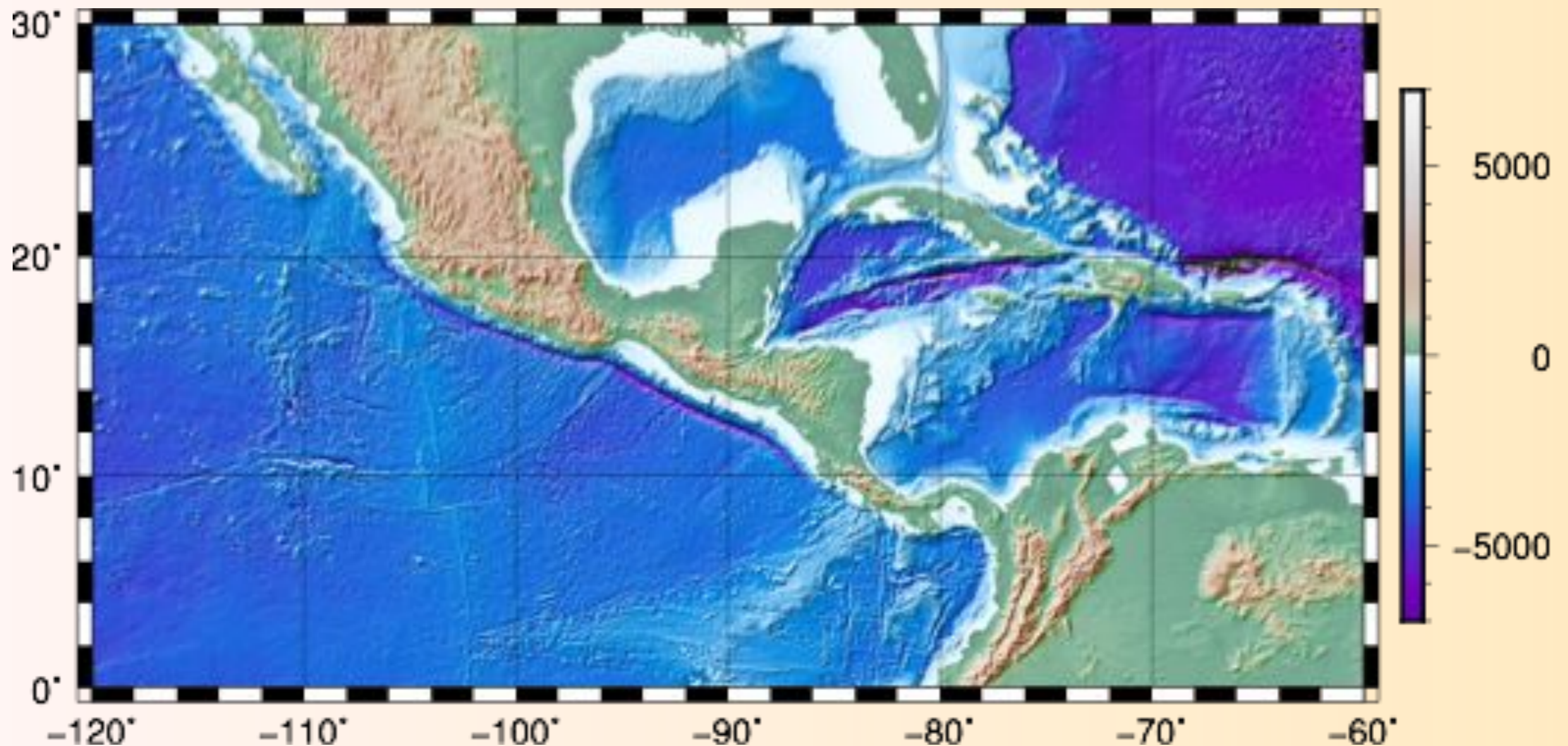
- Use **psscale** to place the color bar
- Use -DJ or -Dj to auto-adjust placement
- Simplest to place bar along one side





grdimage + psscale

```
gmt grdimage -I+ earth_relief_02m.grd -P \  
  -R120W/60W/0/30N -JM6i -Bafg -Xc -Cterra -BWSne -K > map.ps  
gmt psscale -Cterra -DJRM -O -R -J -Baf >> map.ps
```





Homework #2

“The last part of this exercise is to make a map of the area where you live using topography data from the following web site.

<http://topex.ucsd.edu/gmtsar/demgen/>

Use this on-line tool to extract a 1-degree grid of elevations for the area where you live. Use GMT5 to make a shaded relief map and send the resulting postscript file. This same tool will be used to prepare digital elevation models for InSAR processing. We will show all the relief maps during the short course.”