

Seismology and Magnetism, Fall 2002, Mag Problems #2 – due 10/21

1. Using either MagCad (in the lab or download it for yourself) or Excel, calculate the magnetic anomaly for a uniformly magnetized, one km radius sphere at our latitude ( $47^\circ$ ) at various depths (say 1, 1.5, 2, 3, 4, 5, 7, 10 kilometers), and devise a general rule for anomaly width versus the depth of the causative source. Measure width at one-half the maximum height of the anomaly. Include a couple representative and informative plots when you turn it in but you need not give me tables and pages of numbers. I want you to experiment and understand.

2. a. Given a VGP at  $77^\circ\text{N}$ ,  $100^\circ\text{W}$ , calculate declination and inclination at each site below (southern latitudes are given as negatives).

Latitude	Longitude	Declination	Inclination
75	$165^\circ\text{W}$		
55	$165^\circ\text{W}$		
25	$165^\circ\text{W}$		
5	$165^\circ\text{W}$		
-5	$165^\circ\text{W}$		
-30	$165^\circ\text{W}$		
-60	$165^\circ\text{W}$		
-70	$165^\circ\text{W}$		
-90	$165^\circ\text{W}$		

b. Graph declination and inclination versus latitude from the results above.

4. a. For the VGP positions given below, calculate the declination and inclination at Missoula ( $47^\circ\text{N}$ ,  $114^\circ\text{W}$ ).

VGP latitude	VGP longitude	Declination @ MSO	Inclination @ MSO
$75^\circ\text{ N}$	$0^\circ$		
$75^\circ\text{ N}$	$72^\circ\text{E}$		
$75^\circ\text{ N}$	$144^\circ\text{E}$		
$75^\circ\text{ N}$	$216^\circ\text{E}$		
$75^\circ\text{ N}$	$288^\circ\text{E}$		

b. Calculate the average declination and inclination at Missoula given the wandering VGP above.