LAB ASSIGNMENT #2  
(due Tuesday, 22 September)

As always, label each of the plots with an appropriate descriptive title using the title parameter. Every person must turn in their own maps, even if you are working with a partner. Make sure the map you are turning in is legible, this will become increasingly important as you learn new GEMPAK programs and prepare for your case studies.

1. Using 0000 UTC 15 September 2009 observational data, print plots containing the following variables.
   - 500 hPa geopotential height and wind
   - Surface wind (barbs; knots) and mean sea level pressure (smsl)
   - Weather symbol, sky cover, and surface temperature (degrees Fahrenheit)

   On the 500 hPa map, label the lowest and highest geopotential heights over the continental United States. In roughly 50 words, discuss how what you see on your 500 hPa map relates to your surface maps.

2. Using 1200 UTC 15 September 2009 observational data, print out vertical profiles of temperature and dew point from Albany, NY, and Oakland, CA (one plot for each station). If you need to, use the weather program to find the station ID for these cities. Use the following parameters to begin your plots (you will need to set the rest):

   ```
   LINE = 1;6/1/4/1
   PTYPE = skew
   VCOORD = pres
   STNCOL = 1
   WIND = bk1/0.8
   Marker = 0
   BORDER = 1
   YAXIS = 1000/200/100/;1;
   XAXIS = -40/40/10/;1;
   FILTER = 0.5
   PANEL = 0
   TEXT = 0.7
   THTALN = 8/1/1/1/
   THTELN = 14/1/1/1/
   MIXRLN = 11/2/1/1/
   ```
3. Using 1200 UTC 13 September 2009 observational data, print out a vertical cross-section of potential temperature (contoured every 3 degrees) and winds (barbs, knots) along a line of stations from Medford, OR to Aberdeen, SD (stations are given below). Use the following parameters for your plots:

```plaintext
CXSTNS  = mfr;boi;riw;rap;abr
SNPARM  = thta
VCOORD  = pres
PTYPE   = log
YAXIS   = 1000/250/100/;1;
LINE    = 3/1/1/1
BORDER  = 1
CINT    = 3
WIND    = 0
TITLE   = 1/-3/Your name here
PANEL   = 0
DEVICE  = xw
CLEAR   = y
TEXT    = 0.5/3//hw
CURVE   = 2
CONTUR  = 3/1
CTYPE   = c
```

Understanding what you are seeing in a cross section is a very important part in diagnosing the dynamics in our weather. In this cross section, label where you would find your cold column of air and where would you would find your warmer column of air. (Hint: remember you are looking at potential temperature.) With reference to the thermal wind equation, where would you expect to find a column of increasing geostrophic wind speed in the vertical? How did you come to this conclusion?