

地球科学学院大气科学系《诊断分析与绘图实验》报告

实验七 填色图和等值线图的绘制

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一、目的：

掌握等值线图和填色等值线图的绘制；练习各种相关资源的使用；初步练习图形叠加。

方法：（见实验指导书）

二、回答习题（可逐题回答，也可以把执行的命令或脚本一次写完，把要说明的内容加成注释或在最后说明）：

找出图 7.1 中蓝色和绿色标注的图形组件对应的资源属性名，并在习题二中对这些属性进行适当的设置。

```
begin
f = addfile("/home/xiaoma/nc/0328/era5.nc", "r")

v = f->v
;printVarSummary(v)
a = v(0, :, :)
a1 = 0.0006063674149766387 * a + 2.596384133187043
copy_VarMeta(a, a1)
```

数据读取及处理。

```
wks = gsn_open_wks("x11", "area")
res = True
res@gsnAddCyclic = False
;res@gsnFrame = False
;res@gsnDraw = True
;res@gsnMaximize = True;auto find the right and big picture

res@mpMinLatF = 15
res@mpMaxLatF = 30
res@mpMinLonF = 100
res@mpMaxLonF = 115

res@gsnLeftStringFontHeightF = 0.017
res@gsnRightStringFontHeightF = 0.017

res@tiXAxisString = "Latitude"
res@tiXAxisFontHeightF = 0.019
```

```

res@tiYAxisString = "Longitude"
res@tiYAxisFontHeightF = 0.019
;res@tiXAxisConstantSpacingF = 10;every alphabet spacing in x
title
;res@tiYAxisDirection = "Down";positions of X title
;res@tiXAxisPosition = "Right"
res@tiXAxisOffsetYF = 0.01;positions of X title
res@tiYAxisOffsetXF = 0.01

res@tmXBLLabelFontHeightF = 0.015
res@tmYLLLabelFontHeightF = 0.015
res@pmTickMarkDisplayMode = "Always";add du

res@cnInfoLabelOn = False

```

选取部分数据绘制等值线图，修改了坐标轴的表示方式（加了°，但会使间隔为2。），添加XY坐标轴标题并修改相应字体大小，去除 contour 信息。

使用 uv300.nc 中的经向风变量绘制等值线，绘制两个图形分别满足以下条件：

(1) 设置最大最小等值线数值为-12 和 12，等值线间隔为 3；

(2) 只绘制-8，-5，-3，0，2，4，9 这几条等值线；

对图形中的等值线效果和等值线标记进行适当的设置。

```

;;;;;;;;;;question2.1;;;;;;;;;;
; res@cnLevelSelectionMode = "ManualLevels"
; res@cnMinLevelValF = -12
; res@cnMaxLevelValF = 12
; res@cnLevelSpacingF = 3
;;;;;;;;;;question2.2;;;;;;;;;;
res@cnLevelSelectionMode = "Explicitlevels"
res@cnLevels = (/ -8., -5., -3., 0., 2., 4., 9. /)
;;;;;;;;;;question2 ohter;;;;;;;;;;
res@cnLineColor = 35
res@cnLineThicknessF = 2
res@gsnContourZeroLineThicknessF=4
res@gsnContourPosLineDashPattern=0
res@gsnContourNegLineDashPattern=2

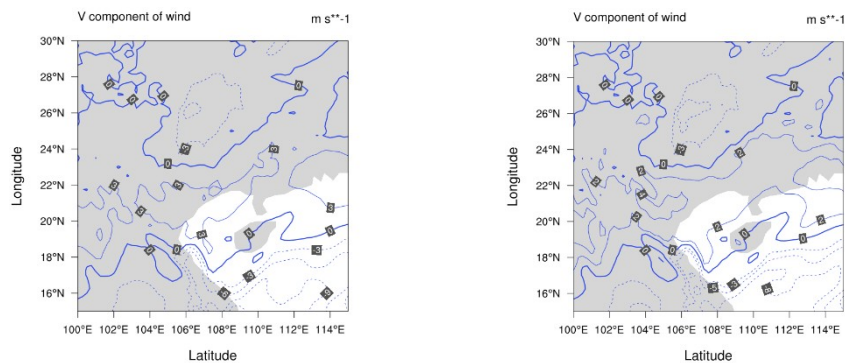
res@cnLineLabelInterval=1;to label every line instead of the
default every other line;default = 2
res@cnLabelMasking=True
res@cnLineLabelBackgroundColor="gray30"
res@cnLineLabelFontColor = "white"
res@cnLineLabelFontHeightF = 0.014

```

```
res@cnLineLabelDensityF=1;linelabel density
```

```
plot = gsn_csm_contour_map_ce(wks, al, res)
;end
```

问 题 (1) (2) 分 别 对 应 等 值 线 模 式 为 "ManualLevels" 和 "Explicitlevels"。等值线效果设置了颜色、粗细、零线为分界线的不同线型，等值线数值标记的字体大小，背景颜色，等值线密度。



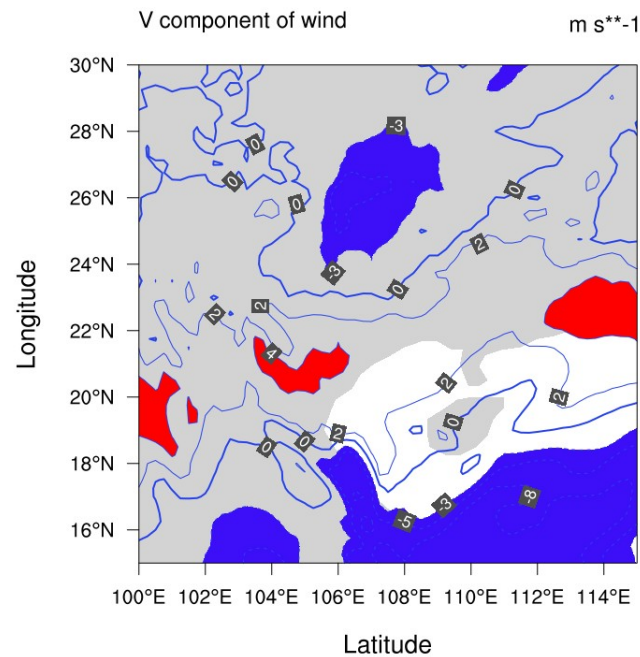
使用 gsn_contour_shade() 函数，绘制经向风变量的等值线和填色图叠加图形，图中将风速小于-3m/s 和大于 3m/s 的区域填上不同的颜色。

```
;;;;;;;;question3;;;;;;;;;
```

```
opt = True
opt@gsnShadeFillType = "color"          ; color is the default
opt@gsnShadeLow       = 14               ; color index 14
opt@gsnShadeHigh      = "red"            ; named color
plot = gsn_contour_shade(plot,-3.,3.,opt)

;overlay(plot,plot1)
draw(plot)
frame(wks)
end
```

通过官网示例学习了用法，14 代表蓝色（不纯）。（等值线使用问题 2(2) 的设置）



参考 <http://www.ncl.ucar.edu/Applications/shapefiles.shtml> 中对 shp 文件使用方法的介绍，用 cnhimap.shp 文件绘制带高分辨率中国地图的任一水平场图形。

```
begin
```

```
wks = gsn_open_wks("x11", "plot_map")
```

```
res = True
```

```
res@mpOutlineOn = False
```

```
res@mpFillOn = False
```

```
;res@mpDataBaseVersion = "MediumRes";media resolution
```

```
res@mpLimitMode = "LatLon"
```

```
res@mpMinLatF = 20
```

```
res@mpMaxLatF = 50
```

```
res@mpMinLonF = 115
```

```

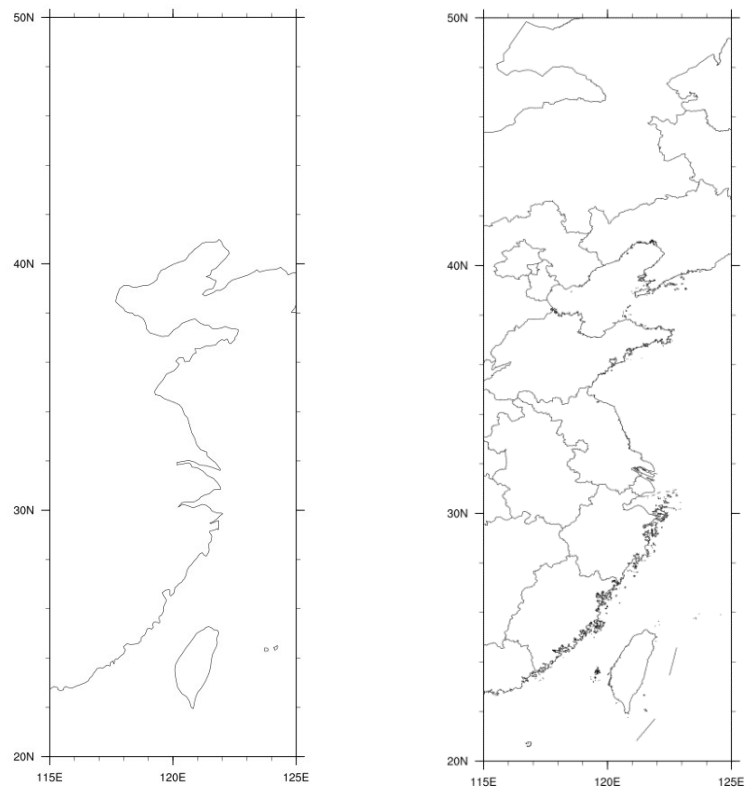
res@mpMaxLonF = 125

map = gsn_csm_map(wks, res)

hres = True

map1 =
gsn_add_shapefile_polylines(wks, map, "nc/cnmap/cnhimap.shp", hres
)
draw(map)
frame(wks)
end

```



随机选取一部分沿海地区（便于分别）。这里没有对边界线做设置，均采取默认并取消了地图填充，只保留了边界线。与中分辨率地图进行对比可以发现明显分辨率上的不同。

```

begin

f = addfile("/home/xiaoma/nc/0328/era5.nc", "r")

```

```

v = f->v
;printVarSummary(v)
a = v(0, :, :)
a1 = 0.0006063674149766387 * a + 2.596384133187043
copy_VarMeta(a, a1)

wks = gsn_open_wks("png", "plot")

res = True
res@gsnAddCyclic = False
res@gsnFrame = False
res@gsnDraw = True
res@mpOutlineOn = False
res@mpFillOn = False

res@gsnLeftStringFontHeightF = 0.017
res@gsnRightStringFontHeightF = 0.017

res@tiXAxisString = "Latitude"
res@tiXAxisFontHeightF = 0.019

res@tiYAxisString = "Longitude"
res@tiYAxisFontHeightF = 0.019
res@tiXAxisOffsetYF = 0.01;positions of X title
res@tiYAxisOffsetXF = 0.01

res@tmXBLLabelFontHeightF = 0.015
res@tmYLLLabelFontHeightF = 0.015
res@pmTickMarkDisplayMode = "Always";add du

res@cnInfoLabelOn = False

res@cnLevelSelectionMode = "ManualLevels"
res@cnMinLevelValF = -12
res@cnMaxLevelValF = 12
res@cnLevelSpacingF = 3

res@cnLineColor = 35
res@cnLineThicknessF = 0.5
res@gsnContourZeroLineThicknessF=1
res@gsnContourPosLineDashPattern=0
res@gsnContourNegLineDashPattern=2

```

```
res@cnLineLabelInterval=1;to label every line instead of the
default every other line;default = 2
res@cnLabelMasking=True
res@cnLineLabelBackgroundColor="gray30"
res@cnLineLabelFontColor = "white"
res@cnLineLabelFontHeightF = 0.014
res@cnLineLabelDensityF=1;linelabel density

;res@mpDataBaseVersion = "MediumRes";media resolution
res@mpLimitMode = "LatLon"
res@mpMinLatF = 15
res@mpMaxLatF = 35
res@mpMinLonF = 95
res@mpMaxLonF = 115

map = gsn_csm_contour_map_ce(wks, a1, res)

hres = True
hres@gsLineColor = "gray30"
hres@gsLineThicknessF = 2.0

map1 =
gsn_add_shapefile_polylines(wks, map, "nc/cnmap/cnhimap.shp", hres
)
draw(map)
frame(wks)
end
```

