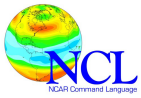
NCL



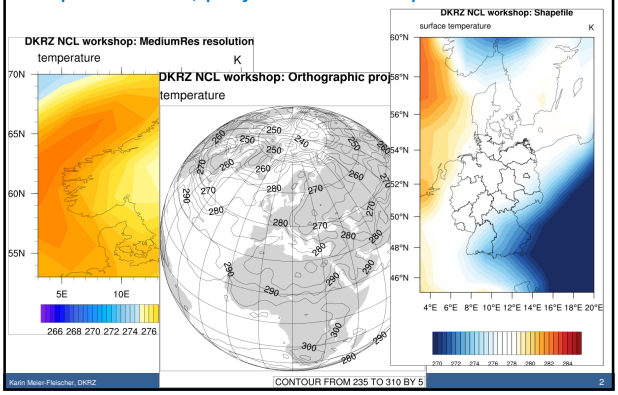
Part VI

Map resolutions, projections and shapefiles

Exercises and tasks

NCL

Map resolution, projection and shapefiles

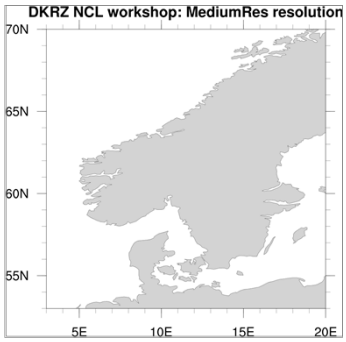


NCL

Map Resolution

```
begin

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

  res                   =  True
  res@gsnMaximize       =  True            ; maximize plot output

  res@mpMinLonF         =   3.             ; min lon
  res@mpMaxLonF         =  20.             ; max lon
  res@mpMinLatF         =  53.             ; min lat
  res@mpMaxLatF         =  70.             ; max lat

  res@mpDataBaseVersion = "MediumRes"      ; map data base version

  res@tiMainString      = "DKRZ NCL workshop: MediumRes resolution"
  res@tiMainFontHeightF =  0.02

  plot = gsn_csm_map(wks, res)

end
```

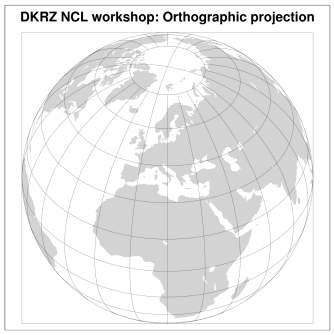
Map Resolution



Map Projection

```
begin

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

  res                       =  True
  res@gsnMaximize           =  True            ; maximize plot output

  res@mpProjection          = "Orthographic"   ; choose map projection
  res@mpCenterLonF          =  15              ; center plot on lon value
  res@mpCenterLatF          =  40              ; center plot on lat value
  res@mpGridAndLimbOn       =  True            ; draw grid and limb lines

  res@tiMainString          = "DKRZ NCL workshop: Orthographic projection"
  res@tiMainFontHeightF     =  0.02

  plot = gsn_csm_map(wks, res)

end
```


Map Projection



Shapefiles – outline counties of Germany (1/3)

```
begin

;-- shapefile
   shp_filename = ("$NCL_TUT/data/Shapefiles/DEU_adm/DEU_adm1.shp")

;-- open workstation
   wks = gsn_open_wks("png","part_VI_shapefile")

;-- set resources for the map
   res                  =  True
   res@gsnDraw          =  False        ; don't draw the plot
   res@gsnFrame         =  False        ; don't advance frame yet
   res@gsnMaximize      =  True         ; maximize plot in frame

;-- select coordinates for Germany
   res@mpFillOn         =  False        ; turn off map fill
   res@mpOutlineOn      =  False        ; draw map outlines
   res@mpProjection     = "Orthographic" ; set map projection
```

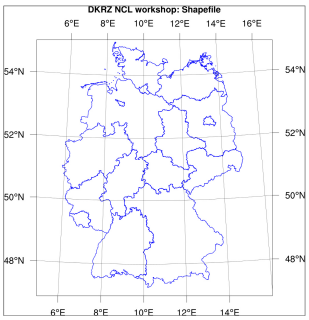

Shapefiles – outline counties of Germany (2/3)

```
   res@mpLimitMode      = "LatLon"      ; must be set for sub-region selection
   res@mpCenterLatF     =  50.          ; center latitude
   res@mpCenterLonF     =  10.          ; center longitude
   res@mpMinLatF        =  47.          ; min lat
   res@mpMaxLatF        =  55.          ; max lat
   res@mpMinLonF        =   5.          ; min lon
   res@mpMaxLonF        =  16.          ; max lon

   res@mpGridAndLimbOn  =  True         ; plot grid lines
   res@mpGridLatSpacingF =  2.
   res@mpGridLonSpacingF =  2.

   res@pmTickMarkDisplayMode = "Always"     ; draw tickmarks

   res@tiMainString     = "DKRZ NCL workshop: Shapefile"  ;-- draw title
   res@tiMainFontHeightF =  0.015

;-- generate map, but don't draw it
   plot = gsn_csm_map(wks,res)
```


Shapefiles – outline counties of Germany (3/3)

```
;-- polyline resources
   polyres                  =  True
   polyres@gsLineColor      = "blue"
   polyres@gsLineThicknessF =  3.0

;-- add polylines from the shapefile to the plot
   poly = gsn_add_shapefile_polylines(wks, plot, shp_filename, polyres)

;-- draw the plot and the attached shapefile outlines and advance the frame
   draw(plot)
   frame(wks)

end
```

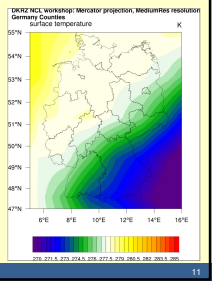
Shapefile



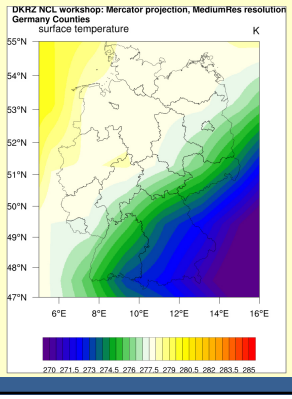
Task: Map of Germany with Mercator Projection

- Use the script **part_VI_map_projection.ncl**
- Modify:
  - Use **Mercator** projection and choose the region of **Germany lon: 5-16°** and **lat: 47-55°**
  - Center the plot on **lon=11°** and **lat=51°**
  - Map resolution **MediumRes**
  - Choose a nice colormap
  - Read the shapefile as learned before to plot Germanys county lines

Hints:
See also part_VI_map_resolution.ncl
- **mpProjection**
- **mpDataBaseVersion**
- **mpMinLonF/mpMaxLonF/mpMinLatF/mpMaxLatF**
- **mpCenterLonF/mpCenterLatF**
- **cnFillPalette**
- **gsn_add_shapefile_polylines**



Task: Map of Germany with Mercator Projection



Task: Map of Germany with Mercator Projection (1/3)

```
begin
   f    = addfile("$NCL_TUT/data/rectilinear_grid_2D.nc","r")
   var  = f->tsurf(0,:,:)

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

   res                      =  True
   res@gsnDraw              =  False          ; don't draw the plot
   res@gsnFrame             =  False          ; don't advance frame yet
   res@gsnMaximize          =  True           ; maximize plot in frame

   res@cnFillOn             =  True           ; turn on countour fill
   res@cnFillMode           = "RasterFill"    ; contour cell fill mode
   res@cnRasterSmoothingOn  =  True           ; contour smoothing on
   res@cnFillPalette        = "testcmap"      ; choose a colormap
   res@cnLinesOn            =  False          ; don't draw contour lines
```


Task: Map of Germany with Mercator Projection (2/3)

```
   res@cnLevelSelectionMode = "ManualLevels"  ; set manual contour levels
   res@cnMinLevelValF       =  270.0          ; minimum contour value
   res@cnMaxLevelValF       =  285.0          ; maximum contour value
   res@cnLevelSpacingF      =    0.5          ; contour value increment

   res@mpFillOn             =  False          ; turn off map fill
   res@mpProjection         = "Mercator"      ; set map projection
   res@mpLimitMode          = "LatLon"        ; LatLon for Mercator
   res@mpMinLatF            =  47.            ; min lat
   res@mpMaxLatF            =  55.            ; max lat
   res@mpMinLonF            =  5.             ; min lon
   res@mpMaxLonF            =  16.            ; max lon
   res@mpOutlineOn          =  False          ; draw map outlines
   res@mpDataBaseVersion    = "MediumRes"     ; choose map resolution
   res@pmTickMarkDisplayMode = "Always"       ; draw tickmarks

   res@tiMainString = \
   "DKRZ NCL workshop: Mercator projection, MediumRes resolution~C~Germany Counties"
                                              ; draw title
   res@tiMainFontHeightF    =  0.015
```


Task: Map of Germany with Mercator Projection (3/3)

```
;-- generate map, but don't draw it
   plot = gsn_csm_contour_map(wks,var,res)

;-- add polylines from the shapefile to the plot
   shp_filename = ("$NCL_TUT/data/Shapefiles/DEU_adm/DEU_adm1.shp")
   poly = gsn_add_shapefile_polylines(wks, plot, shp_filename, False)

;-- draw the plot and the attached shapefile outlines and advance the frame
   draw(plot)
   frame(wks)

end
```