



GE110 Fall 2008 - Lab 4

October 23, 2008

Working with Map Projections and Coordinate Systems

You will be making a map using everything that you have learned

Working Directory D:\GE110\Lab_4

▽ **Save Your Project** - Make a new project in your student folder > Ge110_Lab4.mxd

▽ **Document Properties**

- ✓ Title your map
- ✓ Author your map
- ✓ Data Source Options - store relative path names

▽ **Set Your Data Frame Properties**

General Tab

- ✓ Name your Data Frame

Working with Map Scale

▽ **Add Data**

- ✓ Add Hillshade
- ✓ Add DEM – Use .lyr file, set 50% transparency
- ✓ Add an Aster Image – set no data to “no color” & Display Background Value as “no color”
- ✓ Save

▽ **Working with Scale**

- ✓ Turn on layers: DEM and Hillshade
- ✓ Turn off layers: Aster
- ◇ Set your map scale to 1:1,500,000 – How does it look? Is this a Small Scale or Large Scale Map?
- ◇ Now set your map scale to 1:5,000,000 – Can you see a lot of detail? _____
- ◇ One more time, set your map scale to 1:500,000 – Still look good? Is the resolution good enough to use for a Large Scale map? _____
- ✓ Turn on layer: Aster
- ◇ Right click on the layer in the TOC and select “Zoom to Layer” – How did this change your map scale? _____
- ◇ Set your map scale to 1:100,000 – How does this look? Is this resolution good enough to use for a Large Scale Map? _____
- ✓ Save

Working with map projections

▽ Verify your Data Frame Coordinate System

- ✓ Turn off layers: Aster, DEM, Hillshade
- ✓ Add Country_Boundary.shp
- ✓ Zoom to extent of Country_Boundary Layer
- ✓ Check your data frame coordinate system – What is it? _____

▽ Change Data Frame Coordinate Systems

- ✓ Projected Coordinate Systems > Continental > Asia >
 - ◇ Asia Lambert Conformal Conic
 - ◇ Asia North Albers Equal Area Conic
 - ◇ Asia South Equidistant Conic
- ✓ Projected Coordinate Systems > Continental > Europe >
 - ◇ Europe Lambert Conformal Conic
- ✓ Projected Coordinate Systems > Polar
 - ◇ North Pole Azimuthal Equidistant
- ✓ Projected Coordinate Systems > World >
 - ◇ Mollweide (World)
 - ◇ Times (World)
 - ◇ The World from Space
- ✓ Enough fun! Change the data frame coordinate systems back to where you started
- ✓ Zoom to DEM Layer
- ✓ Delete Country_Boundary.shp

“Projection on the Fly”

ArcMap can perform on-the-fly projection which means that it can display data stored in one projection as if it were in another projection. The new projection is used for display and query purposes only; the actual data is not altered. When is data projected on the fly? Data is projected on the fly anytime a data frame contains a layer whose coordinate system is defined as something different from the coordinate system definition of the data frame. ArcMap will not project data on the fly if the coordinate system for the dataset has not been defined. A dataset with an undefined coordinate system will simply be displayed in its native coordinate system. The coordinate system for any dataset can be defined using ArcCatalog.

Work Smart

Any time you are working with data that are “projected-on-the-fly” you run the risk of inaccurate results from your analysis. It is best to work with all of your dataset in the same projection! One easy way to do this is by exporting your data from your TOC by right clicking on the layer > export data > and select the “spatial reference” as Data Frame.

Datum Transformation

▽ Create A Shapefile from Waypoints

✓ Add XY Data

- ◇ D:\GE110\Lab_4\Shapefiles\Waypoints.txt
- ◇ Save the temporary shapefile

✓ Perform datum transformation

- ◇ Open Toolbox
- ◇ Data Management Tools > Projection and Transformation > Feature > Project
 - Select waypoints.shp
 - Name the output dataset
 - Define output coordinate system
 - Geographic Coordinate System > World > WGS 1984
 - Geographic Transformation
 - NAD_1927_To_WGS_1984_3

Georeferencing

▽ Create A Shapefile from Waypoints

✓ Add Projection lat long grid

- ◇ D:\GE110\Lab_4\Shapefiles\ latlong_grid.shp
- ◇ Label by "Value"
- ◇ Zoom to layer

✓ Add un-georeferenced figure


- ◇ D:\GE110\Lab_4\Imagery \Vernolle-Calais-JGR-2007-11_georef.tif

✓ Add Georeferencing Toolbar if not already there

✓ Verify that the Target Layer is the .tif

✓ Click georeferencing > fit to display

✓ Georeference image

- ◇  Select your control points and click once on the point on the image then once c
point on the grid
- ◇ Do this for each of the four corners

✓ Once complete update georeferencing

- ◇ Georeferencing > Update georeferencing

✓ Rectify

- ◇ Georeferencing > rectify
- ◇ Save as a .jpg in your student folder

✓ Add the new georeferenced .jpg to your project

Digitize

▽ Create A Shapefile in Catalog

- ✓ Make New Line Shapefile – Faults.shp
- ✓ Digitize a few fault in the Tien Shan region from the map georeferenced above
- ✓ Add a field to the shapefile – Name (text)
- ✓ Give names to the lines
- ✓ Label the fault layer by name

Set Up Layout

▽ Layout Items

- ✓ Set Map Page Size - choose letter
- ✓ Add Graticules
- ✓ Add north arrow
- ✓ Add scale bar
- ✓ Add title

To Turn In:

1. Create a layout and save it to a *.pdf in your folder