

ES476/576 Hydrology Surfer-Groundwater Assignment

Your assignment is to generate a groundwater contour map using Surfer and the data provided on the map in Problem #16 of Groundwater Problem 1. A grid transparency was overlain on the original map point-data, with locations determined in Eastings (X) and Northings (Y) coordinates. The overlay was set in a grid to a scale of 0.2 in/mile. The origin of the grid (0,0 coordinate) was at Pt. A on the attached map (SW corner of map). Each point was assigned an X coordinate, Y coordinate, and Z value = groundwater elevation. Complete the following tasks:

1. Download the groundwater elevation data file from the class web site, lab-data section. The data represent static groundwater elevations from wells in the area. Right click on the link and save the *.xls spreadsheet in a special subfolder on your H:\ drive account. Use excel, open the “gwcontour.xls” data file, examine the file structure and compare well locations to groundwater levels depicted on your base map of the well field.
2. Use surfer to grid the data with the following three techniques:
 - A. Kriging (select this as the grid option)
 - B. Inverse Distance
 - C. Triangulation

****You will create three separate grid *.grd files here: name them gwcont1.grd, gwcont2.grd, and gwcont3.grd, respectively. Save to your H:\ folder.**

3. Contour the 3 separate contour map files, use the Map-Contour Map command
 - A. Label the maps with : Name, Title, Scale, and North Arrow
 - B. Save your three separate surfer maps as gwcont1.srf, gwcont2.srf, and gwcont3.srf.
4. Using the principles of pressure and head, create a groundwater “vector flow” net for each map.
 - A. Use the Map-Vector map command, overlay the vector map on the groundwater contour maps, save and print them out separately. Make them look nice and professional... you know have a groundwater flow map for this region!!

Questions:

- A. Calculate the average hydraulic gradient of the aquifer depicted on your contour-vector maps (**use your Kriged map for the calculations).

- B. Assume the hydraulic conductivity of the aquifer is 0.0001 cm/sec and that the effective porosity of the aquifer is 0.19 . Calculate the seepage velocity of the groundwater system for the norther tier of the map (east-west along T8N line) (again, use the Kriged map for your calculations)
- C. Will chemical contaminants travel at the same velocity as the ground water, as calculated in B above? Why or why not, what other factors may influence groundwater transport of dissolved chemical in the printers?