

Groundwater Hydrology, Exercise 1: TopoDrive

Report due: June 20, 9:00

1. Hubbert section (2pt)

- (a) Prepare a Hubbert section and print the image as a PDF file and convert it to JPG, or screen-capture the image and save it as a graphics file (e.g., PNG).
- (b) Copy and paste the image and annotate the recharge area and the discharge area.

2. Undulating topography (2pt)

- (a) Draw an undulating water table and prepare a flownet. Try to form 'squares' instead of elongated rectangles in the flownet. Save the image.
- (b) Copy and paste the image and annotate local and regional flow systems.

3. High conductivity layer (2pt)

- (a) Modify the cross section from the above by inserting a layer having a high hydraulic conductivity. Draw a flownet and save the image.
- (b) Comment on the effects of high-conductivity layer on the flow pattern.

4. Decreasing conductivity with depth (2pt)

- (a) Modify the cross section from the above by drawing the three zones of hydraulic conductivity. Draw a flownet and save the image.
- (b) Comment on the relative flow velocity of shallow and deep flow paths.

5. Effects of anisotropy (2pt)

- (a) Redraw the cross section from Task 2 above, and change the vertical hydraulic conductivity to 20% of the horizontal hydraulic conductivity. Draw a flownet and save the image.
- (b) Comment on the effects of anisotropy on angles of flowlines with respect to equipotential lines. Comment on the effects of anisotropy on the flow systems.

6. Lake-groundwater interaction (2pt)

- (a) Draw the water table representing a lake and the adjoining slope. Draw a flownet and save the image.
- (b) Comment on the density of flow lines near the lake shore and in mid-lake.

7. Interplay of topography and geology (3pt)

- (a) Modify the lake-slope cross section by adding geological heterogeneity and alter the slope of the water table.
- (b) Explore the combined effects of geological heterogeneity and slope morphology (angle, undulation, etc.). Save an interesting image or two.
- (c) Comment on the image(s) with respect to the effects of topography and geology.