

## A transport model for your exploration:

[http://inside.mines.edu/~epoeter/\\_GW/22ContamTrans/TransportModel/tdpf1.0web/pflow/pflow.html](http://inside.mines.edu/~epoeter/_GW/22ContamTrans/TransportModel/tdpf1.0web/pflow/pflow.html)

Explore plume spreading as a function of heterogeneity as represented by K variation AND local heterogeneity as represented by the input dispersivity

Create grid. Make sure you understand the size of the system you are working with.

Properties: Run at least 1 homogeneous and 1 heterogeneous model

Calculate heads

Choose particle movement for flow (this is by random walk ... advecting based on Ks and gradient then randomly displacing each particle based on dispersivity)

Be aware of the number of particles you use given spacing, grid size and your drawn area

Use the same particles for the above comparison of 1 homogeneous and 1 heterogeneous model

Choose # days per second such that you will get transport across your grid in a matter of a minute or so (make a rough estimate of travel time given gradient, K, porosity and distance)

Always choose to show center of mass, std deviation bars of particles and plot the variance of particle locations.

Run both your homogeneous and heterogeneous models with and without local dispersion. When you use local dispersion make sure it is a reasonable value. Try varying the value.

For all cases note the spatial variance of the particles. Explain the results.

When does it stop plotting spatial variance? Why?

### Extra Credit DUE (at my office BH121B) no later than 12 noon Wed DEC 16

In order to earn up to 5 extra points on your final course score for the class, prepare a report on your transport model explorations. The report should have a title, author, and organizational headings. Under each heading use well organized paragraphs and well written sentences to provide a concise explanation of your work.

Include at least 4 models: your homogeneous and heterogeneous models with and without local dispersion. In your homogeneous model use an approximately equivalent hydraulic conductivity to your heterogeneous model so the overall velocity is about the same. The report should include a clear and thorough description of the set up dimensions and parameter values. Explain why the values are equivalent.

Although the computer model does not calculate concentrations, make an approximately equivalent calculation of the plume using an analytical solution and compare your results to the computer model. Define the parameters, show your calculations (if you use a spreadsheet submit it and include text in it that allows the work to be easily followed), and provide a screen shot of the equivalent plume at the same time in the computer model. By equivalent calculation I mean use approximately the same values of velocity and dispersion then note the position and spreading of the plume at the same time in all cases. Explain why you feel they are equivalent.

The dispersion term in your computer model will represent both the advective and the local dispersion in the computer model. Use a similar value in both cases and explain why you think they are equivalent. Try varying the value in the computer model to match your analytical model. Note the value will need to be larger in the homogeneous model in order to get the same effect. As mentioned on the previous slide, for all computer cases note the spatial variance of the particles, showing a screen shot of what you are describing. Explain the results.

Making screen shots: To make a copy of the active window, press ALT+PRINT SCREEN. To copy the entire screen as it appears on your monitor, press PRINT SCREEN. To paste the image into a document, click the Edit menu in the document window, and then click Paste.