Problem 1. (50 pts)
Employ the accompanying spreadsheet to evaluate the plume downwind centerline ground-level concentration of SO$_2$ as a function of distance, $x$, for Stability classes A, C, and F (class D results have already been generated). Plot the results for each stability class on a single graph, clearly identifying each stability class result. Briefly describe this plot (figure) in a short paragraph and identify the stability class that results in the highest ground-level concentration of SO$_2$. Hand in both the plot and the paragraph description. Make sure you hand in your own work but you may work together on the spreadsheet if you like.

Problem 2. Diffusion of 2,4,6-Trichlorophenol (TCP) Through a Capping Sediment Layer (50 pts)
Use equation (11) from the Thoma et al. article to calculate the flux of TCP from the capping sediment to the overlying water (mg TCP / (m$^2$ day)) as a function of time for $D_c = 2.5 \times 10^{-6}$ cm$^2$/s, $R_f = 100$, $a = 35$ cm, and $\rho_{A*} = 800$ mg TCP/L. Use only as many values of $n$ in your series solution as needed for accuracy. Hand in a plot of this result and identify the time required for the flux of TCP to achieve 1% of its maximum. This time represents the TCP flux delay time caused by the capping sediment. Now, double $R_f$ and repeat the calculations. What effect does $R_f$ have on this TCP flux delay time. Hand in the plots and explain in a few sentences your key results.

Due Fri. March 6, 2009.