1- Open the HYDRUS-1D file named "Orig.h1d" which is provided to you with this problem set.

   a-   change the top layer of the soil profile to a sandy soil and execute HYDRUS-1D

   b-   change the top layer of the soil profile to a clay soil and execute HYDRUS-1D

   c- Plot and compare the surface runoff, bottom flux, and evaporation between case "*a*" and "*b*". Discuss the differences.

2- Open the HYDRUS-1D file named "Solute.h1d" which is provided to you with this problem set.

   a- Change the Dispersivity to 10 cm and execute HYDRUS-1D.

   b- Change the Diffusion Coefficient in liquid phase to $10 \text{ cm}^2 \text{ d}^{-1}$ and execute HYDRUS-1D.

   c- Change the Dispersivity to 10 cm and also the Diffusion Coefficient in liquid phase to $10 \text{ cm}^2 \text{ d}^{-1}$ and execute HYDRUS-1D.

   d- Plot and compare the spatial and temporal changes of solute concentration within the profile and also solute flux at the bottom of soil profile of case "*a*", "*b*" and "c". Discuss the differences.

3- Open the HYDRUS-1D file that you made in question #2-c.

   a- Change the distribution coefficient K_d to 0.1 and execute HYDRUS-1D.

   b- Change the distribution coefficient K_d to 0.5 and execute HYDRUS-1D.

   c- Plot and compare the spatial and temporal changes of solute concentration within the profile and also solute flux at the bottom of soil profile of case "*a*", "*b*" and "2-c". Discuss the differences.

4- Open the HYDRUS-1D file that you made in question #3-a.

    a- Change the degradation constant (SinkWater1) to 0.01 and execute HYDRUS-1D.

    b- Plot and compare the spatial and temporal changes of solute concentration within the profile and also solute flux at the bottom of soil profile of case "*a*" and "3-a". Discuss the differences.

5- Open the HYDRUS-1D file that you made in question #3-a and change the solute number to 2.

    a- Change the degradation constant for daughter production (SinkWater1') to 0.01 and execute HYDRUS-1D.

    b- Change both (SinkWater1) and (SinkWater1') to 0.01 and execute HYDRUS-1D.

    c- Plot and compare the spatial and temporal changes of solutes concentration within the profile and also solutes flux at the bottom of soil profile of case "*a*", "b" and "4-a". Discuss the differences.

6- Project. A major part of the final grade of the class is the final project (~50%). For that purpose, you need to provide (1) title, (2) Introduction with short description of the project, and (3) objectives. It should not be longer than one single page. We will give you feedback as soon as possible.

You will have about 4 weeks to complete the final project. You will be asked to make a small size poster presentation on June 16 or 17. We will take a 2-hour block of time for you to present your work and view the work of others. Details will follow.