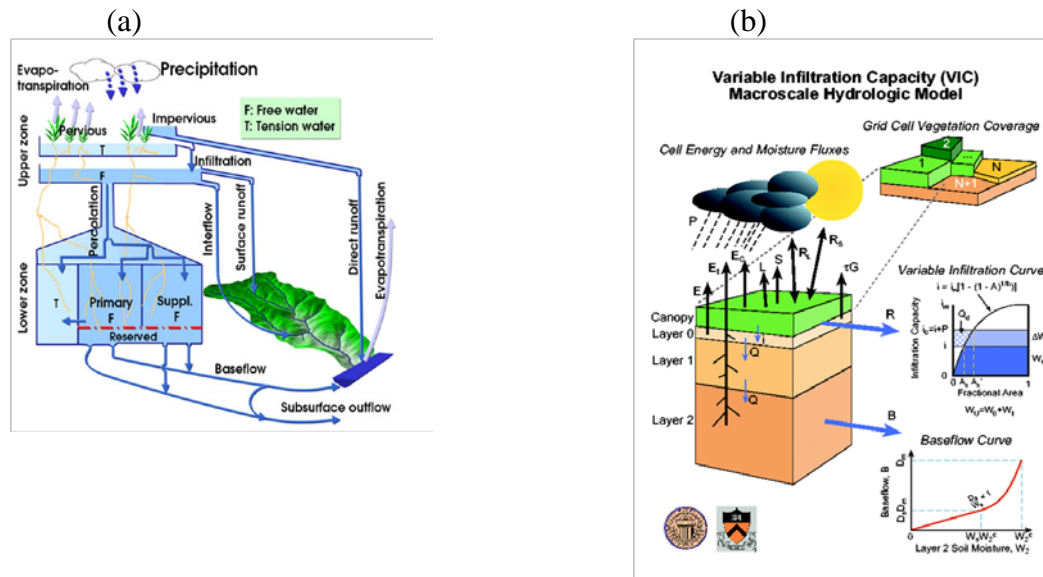


Unit 19 Applications Physical Hydrometeorology

1. All students: Explain the two schematic views of soil-vegetation models depicted in (a) and (b) in not more than ½ a page. Assume that the schematic views represent all processes considered by the model. Note that different vertical extension of layers, different horizontal distribution is how the models treat the surface within the grid-column. Which of the two would not be suitable to describe the fluxes of heat and matter at the soil/vegetation-atmosphere interface of a numerical weather prediction model? Explain why. Name the forcing data (i.e. the parameters of the soil or vegetation characteristics) needed to drive the models. Hint: They are mention in both schemes, but not identified explicitly as the forcing.



Graduate students: In addition, discuss the potential, advantages and disadvantages with respect to simulating the terrestrial part of the water cycle with respect to groundwater recharge and the atmospheric part with respect water vapor transfer to the atmosphere for the two models (Not more than ½ a page). For this part a table with keywords is fine.

2. Graduate students: There exist not enough soil moisture measurements to initialize soil moisture from observations in a similar way like the temperature, humidity, pressure and wind fields are initialized in NWP models. Thus, in NWP modeling, the soil and temperature fields at the end of the last simulation serve as initial conditions for these fields in the next simulation. On the discussion board, discuss which problems this approach provides for the prediction of the components of the atmospheric path of the water cycle as well as for the processes at the soil-atmosphere interface. Discuss the accuracy of the simulated soil temperature, frozen ground, and soil moisture distribution as well.