

Unit 26 Applications Physical Hydrometeorology

1. Undergraduate students: Overgrazing causes a land-cover change that can yield to vegetation loss and soil erosion. Assume that stakeholders provided you the data in the Unit 26 excel spread sheet listed under task 1. To make this application more real life and provide you with needed job skills, these data are on purpose not ready to go. Thus, like in real life job or research applications you will first have to do some data processing before they are ready to solve the following additional subtasks. Hint: Your data have different temporal resolution. Thus, you will get them to the same time increment. Do not interpolate. The stakeholders want to know whether 1) evapotranspiration will increase or decrease due to over-grazing, 2) the soil will be drier or moister, and 3) whether the overgrazing may impact groundwater recharge. Of course, some of these questions are not answerable directly with the data at hand. Thus, you will do your best to give them some consultation. Here is what to do. Compare the soil volumetric water content behavior under vegetated and non-vegetated soil. Discuss the data in terms of the diurnal course, seasonal behavior in terms of daily means, changes of soil moisture with depth and time. Determine the difference in soil volumetric water content under the vegetated and non-vegetated soil. Determine the evapotranspiration. Then answer question 1) and 2). Based on what you see in the vertical profile what would you tell them regarding groundwater recharge? What would you need to actually answer their third question?
2. Graduate students: Land-use has impacts on weather, local recycling of precipitation, evapotranspiration, soil moisture and groundwater recharge as well as cloud and precipitation formation. Assume that a group of farmers provided you the data in the Unit 26 excel spread sheet listed under task 2. To make this application more real life and provide you with needed job skills, these data are on purpose not ready to go. Thus, like in real life job or research applications you will first have to do some data processing before they are ready to analyze the data. Since the farmers didn't take ATM625 Physical Hydrometeorology, they have no clue what quantities you need or not need, and what you have to do with the data to answer their questions. All they know is what they want to know: 1) Which of the crops is using the least and the most water, 2) and what to plant when they want to maximize ground water recharge. Explain what you did and why, and what you will answer the farmers. Hint: To get some ideas to start, read task 1.