Use of J2000 hydrological model to study the impact of climate change on snowmelt and water availability.

Summary:

In this exercise, the impact of climate change on snowmelt is analysed using the temperature change scenario. Two hypothetical scenarios of 2 and 4-degree rise in temperature are used to observe the effect of rising temperature in the snowmelt.

Procedure:

1. Open the Dudhkoshi model from JAMS Launcher.
2. Run the model.
3. Go to the folder containing the output (Hint: J2K\output\current\).
4. Save the output of the model (timeloop.dat) in excel sheet.
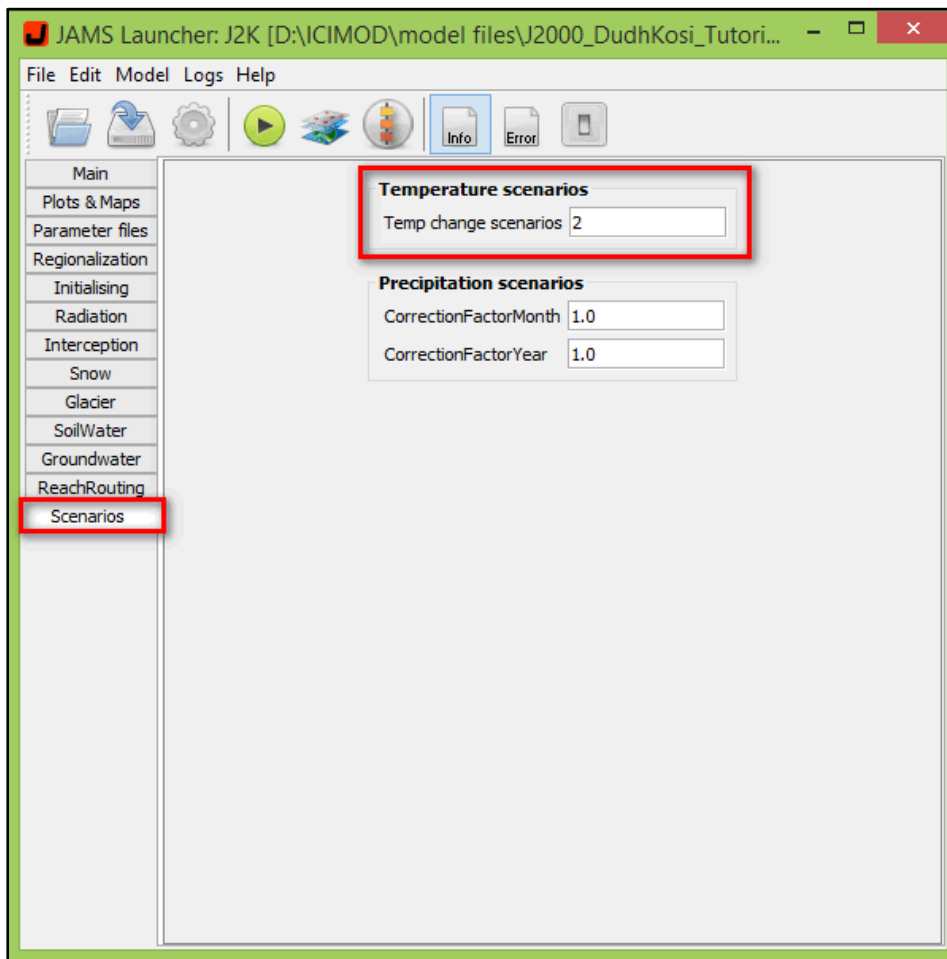5. Now go to the scenario module of the of the model through JAMS Launcher

Figure 1: Use of temperature change scenario at JAMS Launcher

6. Change the temp change scenario to 2 (**Figure 1**).
7. Save and run the model.
8. Save the output of the model in excel sheet.
9. Now, again, go to the scenario through JAMS Launcher and change the temperature change scenario to 4.

10. Save and run the model.
11. Save the output of the model in excel sheet.

Now, you have three outputs: output from the normal scenario, the output from the 2-degree temperature rise scenario and output from the 4-degree temperature rise scenario.

12. Identify the major snowmelt variables in output from the model.

(Hint: Snowmelt (*snowmelt from the non-glaciated area*), Snowmelt_G (*snowmelt from the glaciated area*), SnowStorage_G (*Snow storage in the glacier*), SnowToSWE (*Snow in soil water equivalent*))

13. Add the 'snowmelt and snowmelt_G' to find the **total snowmelt** of the area; convert the daily **total snowmelt** to monthly average using the pivot table.
14. Plot the **total snowmelt** contribution from the basin in these three different scenarios.

How does your graph look like? What is the **total snowmelt** contribution for each month? Here is my graph.
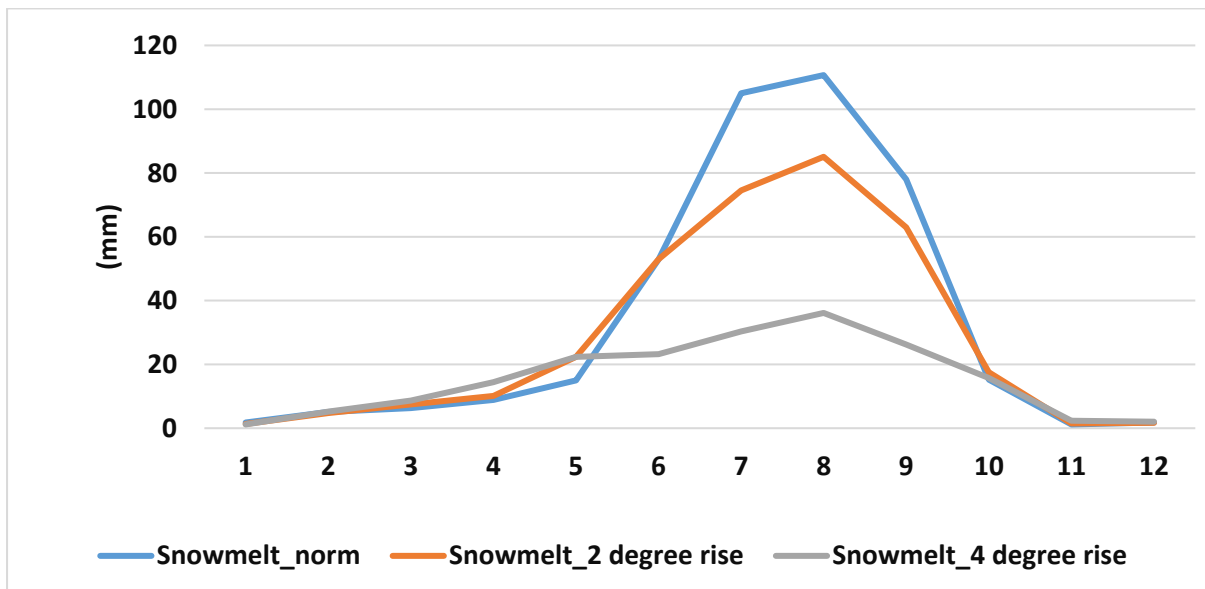
Note: Similarly, you can observe the impact due to changing climate on other output variables like Icerunoff, evapotranspiration etc. It will be helpful in the study related to the temperature incremental scenario.

Further more detail about snow module is available at:
<< http://jams.uni-jena.de/ilmswiki/index.php/J2000_modules_in_detail#Snow_module >>
And J2000 model at:
<< http://jams.uni-jena.de/ilmswiki/index.php/Applying_the_J2000_model >>

☺ Have a great time ☺

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