

## Supplemental Material

### Accessing Landlab landslide component through HydroShare

Access to a reproducible application of the Landlab LandslideProbability component for the North Cascades National Park Complex (NOCA) using a Jupyter Notebook via Hydroshare is provided through the following steps. The HydroShare resource contains or accesses the data, application driver code, and Landlab LandslideProbability component, all that is needed to reproduce the probability of failure discussed in this paper.

1. Go to <https://www.hydroshare.org> and click on 'Sign up now' blue Button
2. Create an account if you don't have one. After filling out "Sign Up" profile information (can edit at a later date), verify and activate account from your email (sent by HydroShare).
3. At <https://www.hydroshare.org>, sign In with you user name (email) and password.
4. Click on 'Discover' tab in the menu at top.
5. In Search window, type: "Regional landslide hazard using Landlab - NOCA Observatory". Select this resource. Read the *Abstract* about this resource and scan sections below.
6. Scroll down to see the 'Content' and the data used in the landslide component and the Jupyter Notebook that accesses the notebook "NOCA\_runPaper\_LandlabLandslide.ipynb" that will 'drive' the landslide model.
7. To run this reproducible application within HydroShare, once you've navigated to the "Regional landslide hazard using Landlab - NOCA Observatory", click on the 'Open with...' blue button and select "JupyterHub NCSA".
8. A "Welcome to the HydroShare Python Notebook Server" will open in a new window. This notebook steps through the model preparation, allowing you to execute the Landlab LandslideProbability component. Review the descriptions for this welcome notebook and scroll down to the first code box. To access HydroShare resources, execute the first shaded code box with `In [ ]`: in front and then typing "shift-enter" (both keys at the same time). A \* will appear in the [ ] when this code box is running and a number will appear in the [1] when it is finished.
9. You will likely need to enter your HydroShare Password again in the box provided. This should end with a green text saying "Successfully established a connection with HydroShare".
10. Also execute the next code box to see where the data to run the reproducible application is located, given by a long resource id.
11. "Get Resource Content" is the next code box. This accesses the "landslide\_driver.ipynb" NOCA application. If you've run this application before, it will ask if you want to overwrite your previous work, type 'y' ('n') for yes (no). this will end with the statement:  
'Successfully downloaded resource 07a4ed3b9a984a2fa98901dcb6751954'
12. A list of the content of this Observatory is provided as well as the notebook we need. Click on the "NOCA\_runPaper\_LandlabLandslid.ipynb" notebook in blue text.

13. Now you are inside the landslide application. Read the introduction and begin executing the code boxes one-by-one using “shift-enter”. Also read the before and after text boxes to understand what you’re executing. Some might take a few seconds or even minutes to run given the size of the datasets. If an error occurs, try restarting the kernel by clicking "Kernel" on the menu above and select “Restart”.
14. You can also try some of you own code by selecting the + in the menu bar at top, which adds a new code cell where you can execute python code.
15. You can save the execution of this notebook back to HydroShare as your own resource at the end of the notebook. View and download these files by clicking on the  icon in the upper left corner. View the notebooks folder and explore the subfolders, including the data folder.
16. To end your Jupyter server session, either select ‘File’, ‘close and halt’ within the notebook, or select the ‘Running’ tab, ‘Shutdown’ button within the Jupyter server.