MWS Capstone Project - Monthly Update

Project:	Representation of spatial heterogeneity in the land-surface hydrologic model MESH
Reporting Period:	May 2019
Date:	June 3, 2019
Student:	Haley Brauner

1. Work completed in the last reporting period

- Collected and analyzed data for model forcing and validation from various sources; included meteorological data, streamflow, soil temperature, and soil moisture
- Worked on literature review: research papers, textbook sections, Herbert's report, site familiarization, MESH/CLASS documentation, Ostrich documentation
- Modeling skill development:
    - Using the bash command line to access Andrew's server and Plato, navigate the folder hierarchy, and run CLASS and MESH
    - Programming using R - completed a number of tutorials related to data wrangling and visualization and basic R syntax and have practiced a number of skills on data for the project
    - MESH model training - 2x ½ day plus familiarization with Herbert's setup and the structure and parameters of the input files
- Software installation and familiarization: RStudio, Ubuntu, Green Kenue, QGIS
- Ran Scenario 1 of Herbert's model
    - Obtained the same results
    - To do this, created a script to find-replace calibration parameters in the template file with the best values obtained by calibration
- Sketched out and honed modeling methodology (ongoing)
- Set up and started working on the report

2. Team meetings held in the last reporting period (dates, times, attendance)

May 6 @ 10 am - Initial project meeting with Bruce and Andrew
May 7 @ 1 pm - Meeting with Bruce, Andrew, Chris, and Sadiq to discuss the watershed, the methodologies of the two projects, and potential for collaboration
May 13 @ 10 am - Update meeting with Bruce and Andrew

May 17 @ 1 pm - Met with Sadiq to discuss our collaboration on the compiling the driving dataset
May 27 @ 9:30 am - Meeting with Bruce to discuss model configurations, calibration/validation period, driving data, GRU vs HRU

3. Planned work for the next reporting period

- Model parameter selection and calibration plan
- Finish stitching together the forcing dataset (once receive GEM/CaPA data from Dan)
- Set up, run, then calibrate the simplest scenario on Baker Creek
- Prepare, run, and calibrate the more complex scenarios on Baker Creek
- Additional MESH training: scripting and results visualization, setting up and using Ostrich
- Continue writing the report as I go
- Continue with literature review

4. Information requested from advisors or partners

- GEM/CaPA dataset (forcing data)

5. Summary of any challenges

- Had some computer issues at the start of the project and had to spend some time (a few days) resolving

6. Summary of progress against the project plan

- So far, I think the project is progressing quite nicely. This month will be a busy one as I am aiming to have the replication phase of the modeling completed by the end of June so I can move on to taking the model further in July.
- According to the project plan, I am a little behind on the literature review. However, I feel I have a solid base of skills to progress to the next stage of modeling and have also done some work on the report, which was scheduled later in the project.

MWS Capstone Project - Monthly Update

Project:	Representation of spatial heterogeneity in the land-surface hydrologic model MESH
Reporting Period:	June 2019
Date:	July 3, 2019
Student:	Haley Brauner

1. Work completed in the last reporting period

- Training sessions for Ostrich, scripting, MESHr, and CRHMr
- Finished tidying, inspecting, refining, and stitching together the driving data from the various stations into one continuous set for all required meteorological parameters
- Selected parameters for Scenario 1 of the Baker Creek model setup and created the model input files
- Ran the MESH model with static values for Baker Creek and plotted the results
- Ostrich input files started

2. Team meetings held in the last reporting period (dates, times, attendance)

June 5 @ 1:30 pm - Meeting with Bruce to discuss a number of model configuration details
June 10 @ 11 am - Meeting with Chris to discuss model parameterization
June 25 @ 1 pm - Meeting with Dan to get some help with preparing the drainage database file, setting up the model file workflow, and compiling Ostrich on Plato server.

3. Planned work for the next reporting period

- Calibrate the simplest scenario on Baker Creek
- Prepare, run, and calibrate the more complex scenario(s) for Baker Creek
- Take the model further - investigate an alternative methodology, depending on modelling outcomes
- Continue writing the report as I go
- Continue with literature review

4. Information requested from advisors or partners

- Received an example MESH setup for Baker Creek for a hillslope area (needleleaf landcover only)
- Received some input and feedback on the model parameters selection and ranges, the calibration and validation period chosen, and some anomalies in the driving data

5. Summary of any challenges
- Working through and preparing the driving data took much longer than expected - Had some issues compling the Ostrich program on Plato -> got this resolved with the help of Dan Princz and U of S IT support - Have been having some internet connectivity issues with the ethernet connection at the office
6. Summary of progress against the project plan
- According to the project plan, I am about a week behind on the modelling. I will be working hard to complete the model calibration this first week of July, which will leave 3 weeks to take the model further and 2 weeks to prepare the first draft of the report for review.

MWS Capstone Project - Monthly Update

Project:	Representation of spatial heterogeneity in the land-surface hydrologic model MESH
Reporting Period:	July 2019
Date:	Not submitted
Student:	Haley Brauner

1. Work completed in the last reporting period
- Selected parameters for Scenario 2 and 3 - Green Kenue / QGIS training and setup of r2c file for Scenario 3 - Time trials for Scenarios 2 and 3 - Ran Scenario 2 and 3 full calibration models - Code model output graphs
2. Team meetings held in the last reporting period (dates, times, attendance)
July 3 - Meeting with Bruce to discuss model parameterization, report on the data preparation methodology used, and discuss the next step for increasing model complexity July 23 - Meeting with Bruce to discuss the model progress, and meeting with Dan to troubleshoot issues with the Scenario 2 setup
3. Planned work for the next reporting period
- Finish output processing from model runs and checking that they ran correctly - Take the model further - investigate an alternative methodology, depending on modelling outcomes - Write the report
4. Information requested from advisors or partners
- Received assistance with model errors and constructing the drainage database file
5. Summary of any challenges
- Errors running Scenario 2 caused a sizeable hold-up - Issues with run scripts required re-running the calibrations to ensure consistent results

- Tried to set up to run Ostrich in parallel, but was not successful, mostly due to problems with Plato

6. Summary of progress against the project plan

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