CLIMATE CHANGE IMPACTS ON NATURAL AND MANAGED WETLAND WATERSHEDS IN THE WESTERN EVERGLADES

Satbyeol Shin[1]*, Younggu Her*[1]*, and Yogesh Khare*[2]

[1]Department of Agricultural and Biological Engineering & Tropical Research and Education Center, University of Florida, Homestead, FL ,USA
[2]The Everglades Foundation, Palmetto Bay, FL, USA

Low floodplain wetlands such as the western Everglades in South Florida are vulnerable to extreme events, and their water quality largely varies depending on changes in water levels and discharges. The future climate is projected to result in increased frequency and magnitude of extreme events, which can negatively affect the water resources and natural ecosystems. This study evaluated climate change impacts on the runoff and total phosphorus (TP) of natural (L28 GAP) and managed (L28) wetland watersheds in the Western Everglades. For the assessment, we employed future climate projections made using 29 Global Circulation Models (GCMs) and a watershed loading model, Watershed Assessment Model (WAM). The watershed loading model was calibrated and validated for the baseline period (2000 – 2014), and the GCMs were incorporated into the model to project the runoff discharge and TP loads for the near-future (2030 – 2044) and far-future (2070 – 2084) periods. The variations of projected frequencies and magnitudes of extreme events were substantial, implying large uncertainty in the following hydrological modeling and projections. Modeling results obtained that the overall runoff volume decreased in the wet season from May to October (i.e., for the far-future period under the extreme scenario, 46% and 68% of flow decreasing in L28 and L28 GAP, respectively). TP loads were projected to decrease in the dry seasons, but their projections for the wet seasons were not consistent across GCMs. The impacts of projected climate changes on daily runoff and TP loads were limited by water control facilities in the managed watershed, highlighting the importance of watershed management practices for improved water quality. This study demonstrated how global-scale changes could affect the hydrological processes and water quality of the local wetland watersheds, which is expected to help develop effective climate change adaptation plans to improve the sustainability of the Greater Everglades System.

PRESENTER BIO: Satbyeol Shin is a second-year PhD student. Her doctoral research investigates optimal watershed management for mitigating climate change impacts on the Everglades system. She is developing a spatially integrated simulation tool that will be able to provide a holistic view of the connection between the upstream and downstream Everglades system.