**REMOTE SENSING EVAPOTRANSPIRATION MAPPING: A KEY TO DISAGGREGATE EDDY-COVARIANCE FOOTPRINTS**

Anders Hunter, University of Saskatchewan; Phillip Harder, University of Saskatchewan; Warren Helgason, University of Saskatchewan

In agricultural regions of the Canadian Prairies, variability in soil moisture and crop growth manifests as evapotranspiration (ET) differences. The eddy covariance (EC) method is widely used to measure ET over a footprint (upwind fetch). However, EC methods cannot distinguish the variable ET contributions from within the footprint. In order to map in-field variations of ET, we developed a new disaggregated Flux Footprint Prediction (disFFP) method, which employs a high-resolution ET model (HRMET) with a novel combination of UAV-based LiDAR and thermal inputs. Specifically, we use LiDAR-derived canopy viewing fraction to infer variable canopy heights, leaf area indices, and ensemble emissivity. We ascribe the resultant ET patterns to distinct seasonal intervals using metrics of ET rate, coefficient of variation, and phenology timing and use them to interpret cumulative EC footprints. Our proposed disFFP method combines the spatial extent and precision of a UAV-based ET map with the accuracy of the EC method. We tested disFFP with a barley field near Clavet, Saskatchewan, where three UAV flights from 2019 were used to disaggregate the EC seasonal footprint. This approach added new insights to the cumulative ET observed with the EC method (144 mm) by showing smaller contributions (90-120 mm) from non-cropped areas and revealing that landscape depressions contributed 38% higher ET (180 − 200 mm). The disaggregation of ET was consistent with vegetation patterns and topography (proxies for access to soil moisture). This research demonstrates the potential for using discrete remote sensing images to disaggregate continuous EC monitoring.