

Evapotranspiration in a Subtropical wetland savanna using low-cost Lysimeter, Eddy Covariance and Modeling approaches

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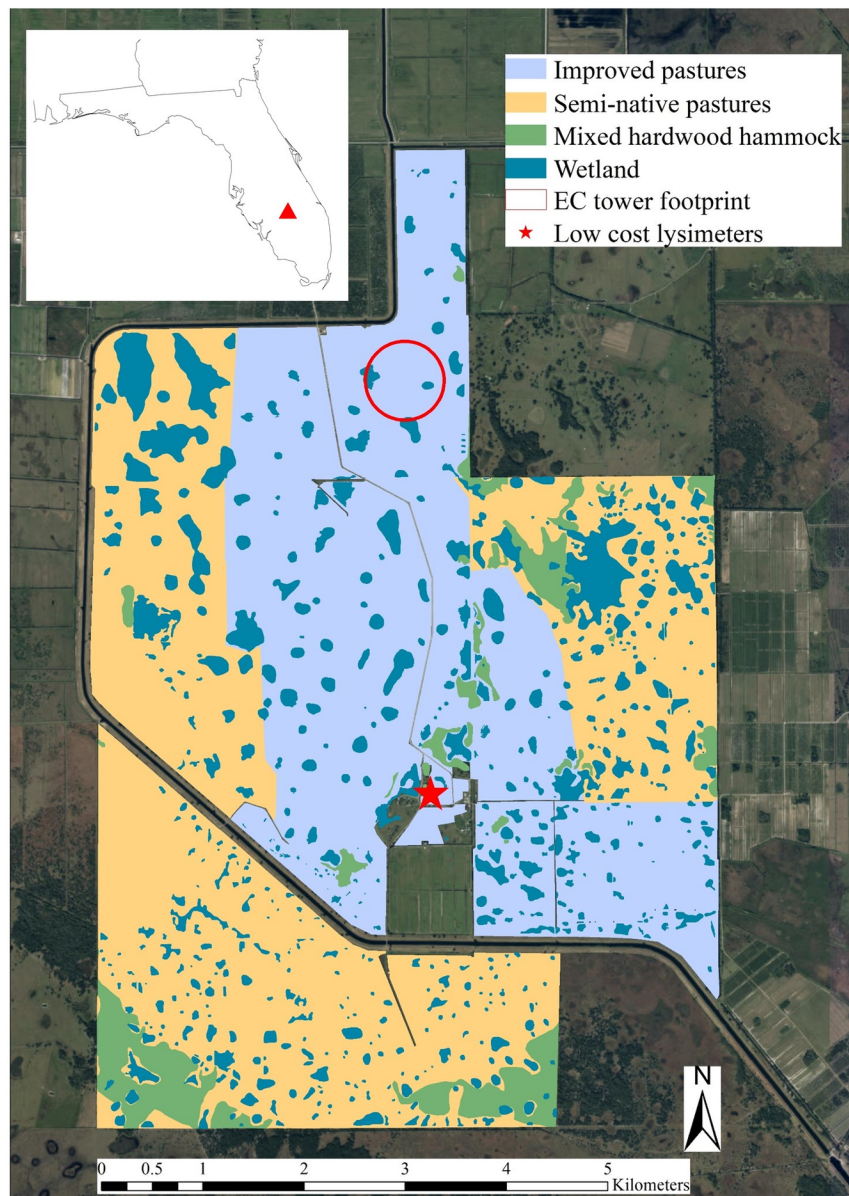
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Abstract

Evapotranspiration (ET) constitutes the largest loss of water from subtropical grassland and wetland ecosystems, yet estimates have high uncertainty at the landscape scale as there is little information on plant water use. A major reason for this is the complexity and expense of field-based ET quantification methods such as agricultural lysimeters and eddy covariance systems. This study developed two different low-cost lysimeters – weighing-type and water level based, to measure ET under controlled conditions for single species as well as mixed grassland and wetland communities. Lysimeters were placed in an open sided shadehouse with a transparent roof to exclude rainfall. ET values were then compared with (i) Actual ET measurements from an eddy covariance tower onsite, (ii) vapor transport-based ET models - FAO Penman-Monteith, Modified Turc and Abtew Simple Radiation models, and (iii) ET data from the Florida Automated Weather Network. Both weighing-type and water level lysimeters showed seasonal patterns and annual magnitudes similar to the other ET methods. Annual ET measurements from weighing lysimeters (881-1278 mm for four plant species, n=5 per species) and water level lysimeters (1085 mm, n = 30) were similar to model estimates (1000-1200mm). Actual ET from eddy covariance was 722 mm for ten months (missing data for February and March), similar to lysimeter measurements for the dominant grass *Paspalum notatum* (885mm for 10 months). Low-cost lysimeters can easily inform regional ET models/remote sensing data lacking field validation and thus are potentially useful for water resources and ecosystem management in data-poor regions of the world.

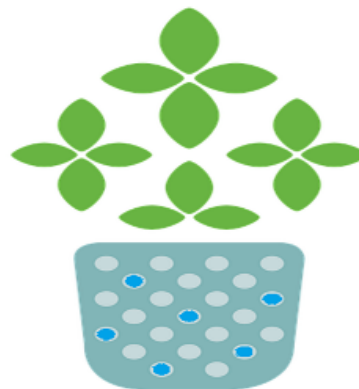
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Evapotranspiration_LYSIMETERS_EDDYFLUX_MODELS in a Subtropical grassland_Saha_et_al.docx available at <https://authorea.com/users/414893/articles/522809-evapotranspiration-in-a-subtropical-wetland-savanna-using-low-cost-lysimeter-eddy-covariance-and-modeling-approaches>





WT (a)



WT (b)



WL (a)



WL(b)

