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EVAPOTRANSPIRATION WITH IN SITU-BASED MEASUREMENTS AND REMOTE SENSING-BASED ESTIMATES IN THE CENTRAL PLATTE AND SAND HILLS OF NEBRASKA, USA

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ABSTRACT: Water is the most important constraint in most of the Central High Plains of the U.S.A.. Local, state and federal water management regulatory agencies need good quality water use estimates for different land surfaces to assess short and long-term water management, planning, and allocations on a watershed scale. The Bowen Ratio Energy Balance System (BREBS) technique offers alternatives for measuring evapotranspiration (ET) at a footprint scale. Satellite/remote sensing technology provides spatial and temporal variation of ET on a regional scale. Land surface energy balance models are routinely used to produce ET maps using satellite remote sensing data and weather measurements. Furthermore, high resolution thermal imagery from satellites such as Landsat made it possible to map within field ET variability. The main objective of research was to understand the surface energy fluxes mainly evapotranspiration using ground-based observations and remote sensing technique in Nebraska (NE). We measured ET of Central Platte and Sand Hills of NE using BREBS. The Sand Hills region of NE is one of the largest grass-stabilized sand dune formations in the world, with an area of roughly 50,000 - 60,000 km2 that supports a system of five major land cover types: (1) lakes, (2) wetlands (with lakes, ~5%), (3) subirrigated meadows (water table is within ~1 m of surface; ~10%), (4) dry valleys (water table is 1-10 m below surface; ~20%), and (5) upland dunes (water table is more than 10 m below surface; ~65%). We also applied METRIC (Mapping Evapotranspiration at high Resolution using Internalized Calibration) model to map ET for the study area. METRIC model predictions were compared with measurements from BREBS to evaluate generic model accuracy for estimating daily ET.

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