Nighttime evapotranspiration (ET$_N$) has typically been neglected in estimating water loss from land surfaces. Our objective was to quantify the contribution of ET$_N$ to daily (24-h) ET (ET$_{24}$) of irrigated and dryland cotton (Gossypium hirsutum L.) and irrigated alfalfa (Medicago sativa L.) grown in a semiarid climate. The results were then examined using a Penman–Monteith ET model which separates control of ET into its radiation (equilibrium) and atmospheric demand (imposed) components. Nighttime ET was measured at Bushland, TX using weighing lysimeters containing monolithic soil cores of Pullman clay loam (fine, mixed, superactive thermic Torrertic Paleustoll) for alfalfa in 1998 and cotton in 2001. Measured ratios of ET$_N$ to ET$_{24}$ ranged from an average of 3% for a dryland cotton crop to 7.2% for irrigated alfalfa over a season. In the largest events, ET$_N$ was as much as 12% of ET$_{24}$ with single nighttime losses approaching 2 mm. Model calculations showed that virtually all ET$_N$ was the result of imposed atmospheric conditions, primarily vapor pressure deficit. However, ET$_N$ was also related to sensible heat transfer to the canopy. Nighttime ET can be an important part of total ET of irrigated crops in a semiarid environment.

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Evaluation of Sensible Heat Flux and Evapotranspiration Estimates Using a Surface Layer Scintillometer and a Large Weighing Lysimeter Sensors
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Evapotranspiration is the net water loss caused by the evaporation of moisture from the soil surface and transpiration by vegetation. For continuous evaporation, three conditions must be met. First, there is a latent heat requirement of approximately 590 cal/g of water evaporated at 15°C. Second, a vapor pressure gradient is needed between the evaporative surface and the atmosphere to remove vapor by diffusion, convection, or a combination of the two. Third, there must be a continuous supply of water to the evaporative surface. This situation can be solved by sectional construction in level areas to maximize the water level in a particular section of the bed. Sand Capillary Rise Characteristics The sand must be fine enough to draw up the water from. Nighttime evapotranspiration from alfalfa and cotton in a semiarid climate. Agron. J. The climate is noted for strong regional and local advection of sensible heat energy from predominately south and southwest winds during the growing season, with H contributing up to 60 percent of LE for fully irrigated alfalfa (Tolk et al., 2006b). The soil is a Following plant establishment, furrow dikes were installed in the interrows to control run on and run off of precipitation and irrigation water (Schneider and Howell, 2000). Advances in a two-source energy balance model: partitioning of evaporation and transpiration for cotton. Conference Paper. Nov 2015. Actual evapotranspiration is a key factor to understand the regional water cycle and energy balance. An in-depth understanding of regional evapotranspiration will benefit the water resource planning and management in arid and semiarid areas [9]. As a promising means of land surface observation, remote sensing has some salient characteristics, such as large scale coverage, multimtemporal observation, and low cost, and it provides excellent datasets for estimating regional evapotranspiration [10]. Many studies have been carried out on the retrieval of regional evapotranspiration based on remote s