



Model Diagnosis of Nighttime Minimum Temperature Warming in Irrigated Cropland

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This study examines the mechanisms of nighttime minimum temperature warming in the California Central Valley during summer due to irrigation. The Scripps Experimental Climate Prediction Center (ECPC) Regional Spectral Model (RSM) was used to simulate climate under two land surface characteristics: potential natural vegetation and modern land use that includes irrigation and urbanization. In irrigated cropland, soil moisture was prescribed in three different ways: 1) field capacity, 2) half of field capacity, and 3) no addition of water. In the most realistic case of half field capacity, July daily minimum temperature in the California Central Valley increased by 3.5 degrees C, in agreement with station observation trends over the past century in the same area. It was found that ground heat flux efficiently keeps the surface warm during nighttime due to increased thermal conductivity of wet soil.