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194-4 Automated Methodology for Selecting Hot and Cold Pixel for Remote Sensing Based Evapotranspiration Mapping.

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Surface energy fluxes, especially the latent heat flux from evapotranspiration (ET), determine exchanges of energy and mass between the hydrosphere, atmosphere, and biosphere. There are numerous remote sensing based energy balance approaches such as METRIC and SEBAL that use hot and cold pixels from thermal imagery as a scale for thermal inertia to estimate ET. At present, these models use a manual approach for hot-cold pixel selection. This approach is user-dependent and produces different results with different user selection criteria. An automated selection of hot and cold pixel is expected to eliminate this problem and make the energy balance models more robust. In this study, we developed and applied a novel statistical algorithm for hot and cold pixel selection on a Landsat Thematic Mapper (TM) image acquired on July 10, 2007 to derive hourly ET for the highly advective Texas High Plains. Automated and manual selections of hot and cold pixels were implemented with both METRIC and SEBAL. Performance of the new algorithm was evaluated by comparing estimated hourly ET values against lysimetric data from four large lysimeters in Bushland, Texas [35° 11' N, 102° 06' W; 1,170 m elevation MSL]. Results indicated that the new approach may provide comparable or better ET estimates than manual approach. However, more evaluation under different agrimeteorological conditions and geographic regions is necessary to incorporate in an operational ET mapping methodology.

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