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Evaluation of Satellite derived Land Surface Temperatures over the NAFE Research Sites.

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Land surface temperature (LST) is an important variable in the processes controlling the energy exchanges over the land-atmosphere interface. For climate modelling, in particular the continental to global scale modelling of land surface processes like sensible and latent heat fluxes, there is need for long-term remote sensing-based LST for validation and data assimilation procedures. Furthermore, LST is a key input variable in numerous soil moisture retrieval methodologies from space observations. In this study four different remotely sensed LST data products are compared with in-situ observations from The National Airborne Field Experiment (NAFE) research site in the western part of the Murrumbidgee catchment, Australia. The remotely sensed LST products are retrieved from (1) Ka-band passive microwave observations from a series of space based microwave radiometers, and thermal infrared observations from the (2) Advanced Along Track Scanning Radiometer (AATSR), (3) the Moderate Resolution Imaging Spectroradiometer (MODIS) and (4) from the thermal channel of the METEOSAT satellite. For cloud free conditions all datasets provide reliable absolute surface temperature values within a few Kelvin accuracy. For cloudy conditions only the microwave based LST products contribute effectively to the monitoring trends in LST conditions. With further improvements in processing techniques, operational satellites will increasingly deliver high-quality LST data. This may be of particular interest for land-atmosphere studies that investigate surface energy fluxes such as evaporation.