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Title:
Development of an AQUA based near-surface parameter retrieval

Abstract:

The production of a satellite based turbulent surface flux product relies critically upon the near-
surface input parameters. Development of retrieval algorithms for the necessary near-surface
variables of wind speed, specific humidity, air temperature, and sea surface temperature has
proceeded relatively independent of each another until recently. The use of a neural network
approach using Special Sensor Microwave/Imager (SSM/I) data in conjunction with a first guess
sea surface temperature has led to successful retrieval of all parameters simultaneously.
However, SSM/I frequencies lack inherent sensitivity to the sea surface temperature (SST).
Recent studies have found improved air temperature and humidity retrievals can be obtained via
inclusion of microwave sounding channels weighted in the lower troposphere. The inclusion of
SSM/I-like frequencies as well as SST-sensitive microwave channels on AMSR-E along with
AMSU-A sounding data onboard the AQUA platform provides an unique opportunity. That is the
ability to provide near-simultaneous (in space and time) measurements allowing the retrieval of
all the near-surface variables, including SST. This study shows results of a new algorithm
designed to take advantage of the unique sampling ability of AQUA based sensors. Results from
a neural network based methodology will be shown as compared to in-situ based observations of
near-surface variables. Implications for creation of an AQUA based turbulent surface product are
also discussed.