Status on a Multi-sensor Approach to Satellite-based Retrievals of Near-surface Humidity and Temperature

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Accurate and high-resolution observations of near-surface humidity (Qa) and temperature (Ta) observations are considered essential for determination of turbulent sensible and latent heat fluxes at the ocean surface. Satellite retrievals provide an advantage over *in situ* observations for they can provide near global oceanic coverage of turbulent heat fluxes over less than one day. We will describe our latest satellite Qa and Ta retrievals methods, compare our method to previous satellite methods, and validate our method with the latest version of ICOADS data. Current methods of satellite-based Qa and Ta retrievals use multi-variable regression and neural network techniques that use matched *in situ* and satellite radiance observations to derive these parameters. Our multi-variable regression approach uses satellite observations from Advanced Microwave Sounding Unit - A (AMSU-A) and Special Sensor Microwave/Imager (SSM/I) to derive Qa and AMSU-A and sea surface temperature (SST) to derive Ta. The retrieved grid products derived from these satellite observations span 11 years of data (1999-2009) and have a resolution of 3 hours and 0.5^{o} for the 60^{o}N-60^{o}S domain. We will show how previous Qa satellite retrievals had a seasonally-dependent regional wet bias of ~3 g/kg found at some midlatitude regions which was caused by large scale temperature and humidity inversions that go undetected by satellite sensors. A correction for this bias that utilizes SST was developed and regional Qa bias was reduced significantly compared to previous satellite retrievals. The recent improvement of our Ta retrieval will be shown to have reduced RMS differences with the ICOADS Ta validation data by more than 1^{o}C when compared with previous methods. The implications on improving surface turbulent heat fluxes using these retrievals will be discussed.