Session: B4 Oral presentation

Satellite observations of sea surface temperature as a climate data record

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Sea surface temperature (SST) observations from space are steadily improving in accuracy through the development of more sophisticated methods of estimation. Recently, a global SST time-series for 1991 to 2009 was developed with the following properties: full independence from in situ observations (retrieval based on the physics of radiative transfer); accuracy (absence of bias) over spatial scales of 1000 km of order 0.1 K (demonstrable for the final years of the record); with both skin SST (directly retrieved) and drifting-buoy depth estimates (inferred); and using satellite overlap periods to homogenise the record for instrument calibration. This new SST record will be described. It is based on the Along-Track Scanning Radiometer (ATSR) instruments, which are highly stable and accurate. However, the sampling the ATSRs deliver is somewhat limited compared to that of the "workhorse" for satellite SST, the Advanced Very High Resolution Radiometers (AVHRRs). Conversely, AVHRR SSTs to date are less accurate and stable. A new project, the SST element of the European Space Agency's Climate Change Initiative, aims to integrate AVHRR and ATSR records. By using the ATSR as a calibration reference, consistency will be achieved while preserving independence. Issues related to potential aliasing of the SST diurnal cycle are more critical when using AVHRR data, and a novel solution to preserve the stability of the time series will be described. Provision of climate-quality SST is critical for many applications in climate science and modeling, and so key issues will be raised regarding the current and future provision of satellite SSTs and their integration with the historical record.