Production of an Enhanced Blended Infrared and Microwave Sea Surface Temperature Product

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The simultaneous availability of infrared and passive microwave satellite sensors provides highly complementary information enabling the creation of an improved all-weather, high-resolution sea surface temperature (SST) product. Infrared sensors provide high resolution and high accuracy estimates of the SST but the measurements are completely obscured by clouds. Passive microwave sensors, in contrast, have poorer resolution but are able to obtain measurements through non-precipitating clouds. We are preparing a blended SST product using infrared data from the AVHRR and passive microwave data from the TRMM Microwave Imager (TMI). The product consists of daily, global SST fields at 0.25 degree resolution along with an estimate of the amplitude of the diurnal cycle.

This paper will introduce the new product and describe the techniques used in its preparation. We first describe significant spatial differences that exist between the individual products and examine these differences as functions of such quantities as wind speed, water vapor, SST, and residual cloud effects. We next discuss the procedures used to compensate for diurnal warming effects and the different satellite measurement times while producing a single nighttime-representative product. We then explore different techniques for merging the data sets making use of their derived error characteristics. These techniques range from simple compositing methods to optimal interpolation. Finally, accuracy statistics of the blended products relative to independent in situ buoy measurements are presented and compared with the accuracy of the independent products.