

Abstract: Assimilation of VIIRS and AVHRR SST L2 Products with the Chesapeake Bay Operational Forecasting System

Bin Zhang and Chris Brown

The SST derived from VIIRS/SNPP observations has high resolution (750m) over the Chesapeake Bay area but with low temporal resolution. With only twice observations daily, the SST products cannot capture the fully diurnal variation of the SST over the Chesapeake Bay. AVHRRs onboard other Polar Orbiting Satellites, such as N15, N16, N17, N18, N19, Metop-A and Metop-B, view the Chesapeake Bay at different time every day. Thus these satellites together, can provide more frequent observations to the SST of the Chesapeake Bay than VIIRS itself, but with a little lower resolution (1.1 km at nadir). Though NOAA coastal watch program produces the daily composite AVHRR SST regardless of the different observational time, this SST product is not suitable to study the diurnal cycle of the coastal ocean.

In this study, we merged the VIIRS SST and AVHRR SST, of both L2 products, using the Chesapeake Bay Operational Forecasting System with the implementation of 4D-VAR scheme to create a synoptic view of the Chesapeake Bay SST in high resolution both in time and space. The results show the assimilation of both type of SST can greatly reduce the diurnal variation in the model bias compared to assimilation of only VIIRS SST or daily composite AVHRR SST. It indicates the importance of the assimilating of L2 SST products from various sources in the coastal ocean circulation.