

On the Influence of Water Vapor on the Retrieval of Satellite Sea Surface Temperature

Dr. Jorge Vazquez

Dr. Robert Evans

ABSTRACT

The measurement of sea surface temperature (SST) from instruments such as the Advanced Resolution Radiometer (AVHRR) and the Along Track Scanning Radiometer (ATSR) is affected by the amount of water vapor in the atmosphere. Correlations between the SST as measured by both the AVHRR and ATSR instruments with the Reynolds Optimally Interpolated (O1) SST indicate a band of low correlation exists in the Tropical Equatorial Regions. In addition seasonal trends exist in the mean biases between the satellite measured SSTs and the Reynolds (O1) SST data. Such biases may exceed 1 °C indicating the importance of understanding the role that both water vapor and aerosols are having on the retrieval of satellite SSTs.

Correlations between the residuals as defined by the AVHRR SST minus the Reynolds SST and water vapor indicate that the Pathfinder algorithm is underestimating the SST in the equatorial band and overestimating the SST in the dry atmospheres of the high latitudes. Thus correlations between the AVHRR and Reynolds SST follow geographic patterns aligned with extremes in water vapor. To incorporate water vapor values in determining SSTs a model was applied in the Western Equatorial Pacific. A statistically significant correlation of **0.68** was found between the AVHRR measured SST anomalies and the SST anomalies as derived incorporating the water vapor values.