The Humidity Composite Product of EUMETSAT's Climate Monitoring SAF: Towards Optimal Merging of Satellite Data Sets

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The need for a comprehensive and accurate global water vapour data set as an assisting tool for scientific studies in the atmospheric sciences has been acknowledged during the last 10 years. Such a data set is extremely useful for all aspects of climate science being dependent on accurate water budget data, e.g. general circulation model verification as well as global and regional climate studies. The water vapor product of the Satellite Application Facility on Climate Monitoring consists of total precipitable and layered precipitable water estimates as well as data sets of temperature and relative humidity. A first version using data from ATOVS and SEVIRI will be operational available in fall 2005. For future versions of the water vapor product it is intended to use a universally applicable technique to merge different satellite data sets to create daily mean water vapor fields and corresponding error fields. The talk will discuss the results of a pilot study merging precipitable water estimates from SSM/I and AMSU instruments using a Kriging approach. The technique has the potential to merge data from several completely different sources like SEVIRI on MSG, the Infrared Atmospheric Sounding Interferometer (IASI), the Global Navigation Satellite System Receiver for Atmospheric Sounding (GRAS), and several passive microwave instruments. The most relevant problem in using satellite data within this approach is that satellite pixels are not independent of each other. Applying the concept of decomposition of variance a comprehensive analyses yields that individual satellites can be regarded as independent information.