Seasonal and Interannual Relation Between Integrated Water Vapor and Greenhouse Warming over Ocean

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Greenhouse warming over ocean is estimated from the spacebased data of the Earth Radiation Budget Experiment (ERBE) and from the Advanced Very High Resolution Radiometer (AVHRR). It is related to the integrated water vapor derived from the Special Sensor Microwave Imager (SSMI) and the atmospheric circulation diagnostics derived from the numerical weather prediction products of the European Medium Range Weather Forecast (ECMWF). Large seasonal phase differences between normalized greenhouse warming and integrated water vapor are found in extratropical latitudes. Strong correlation between the interannual anomalies of the two quantities are found in the central equatorial Pacific and the link is found to lie in the displacement of the deep convection system during the El Niño Southern Oscillation.