**SATELLITE OBSERVATIONS OF TROPICAL PLANETARY BOUNDARY WIND SHEAR**

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Abstract

The Jet Propulsion Laboratory (JPL) Multi-angle Imaging SpectroRadiometer (MISR) instrument on the National Aeronautics and Space Administration (NASA) Terra satellite provides global observations of near-instantaneous cloud height and cloud velocity. MISR cloud motion vectors (CMVs) or wind vectors at 700-m height were determined by linear interpolation of MISR CMVs with heights from 500-900 m. The JPL SeaWinds instrument on the NASA Quick Scatterometer (QuikSCAT) satellite recorded wind vectors at 10-m height. Collocated MISR and SeaWinds measurements in 0.5°X0.5° areas within a 4.5-h interval were analysed over 2003-2008. The difference between 700- and 10-m wind vectors provided planetary boundary layer (PBL) wind shear.

The annual mean longitudinal distribution of zonal wind component along the equator from 0.5°S-0.5°N and 1° resolution in longitude in 2007 showed substantial shear from about 180° longitude to 90°W with magnitude ~ 2 m s-1 over 690 m from 160-120°W. Very little zonal wind shear occurred elsewhere in the Pacific, Indian and Atlantic oceans. The meridional wind shear was large over the 120-90°W region and negligible elsewhere. Where significant wind shear occurred, the magnitude of the wind aloft was larger than at the surface. The high wind shear region coincided with equatorial sea surface temperature (SST) less than 27.0-27.5°C, which is the SST threshold associated with tropical convection. The connection between wind shear and occurrence of rainfall will be discussed. Other years remain to be analysed, including selected months associated with the moderate-intensity El Niños in 2004 and 2006, moderate La Niña in 2006, and strong La Niña in 2007-2008. In 2007, the observed 10-700 m wind shear was similar to that produced by the European Center for Medium-range Weather Forecast (ECMWF) Reanalysis Interim (ERA-I) data product and was different from that produced by the United States National Oceanic and Atmospheric Administration National Centers for Environmental Prediction (NCEP). The amount of aliased wind shear caused by the MISR sampling pattern will be examined with ERA-I data products. The correspondence between observed wind shear and that derived from several numerical weather prediction data products, including ERA-I and NCEP, will be described.