

Observations of the SITCZ During 1993 - 1999

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The Intertropical Convergence Zone (ITCZ) is a discontinuity of the surface meridional wind component caused by the convergence of the northeast and southeast tradewinds north of the equator in the tropical Pacific Ocean. The Southern (Hemisphere) Intertropical Convergence Zone, named SITCZ, occurs from 8S to 2S and 130W to 90W. Four characteristics distinguish the SITCZ from the ITCZ: SITCZ is located south of the equator and ITCZ is north of the equator; SITCZ occurs only in March - May while ITCZ is present throughout the year; SITCZ remains poorly observed while ITCZ has been extensively studied; numerical simulation of SITCZ is greatly more difficult compared to ITCZ. The SITCZ is described for the 1993 - 1999 period with 1 x 1 monthly mean satellite measurements of surface wind vector, rainfall, sea surface temperature, integrated cloud liquid water, and integrated water vapor. Three periods are highlighted: normal, January 1993 - April 1997; El Nino, May 1997 - May 1998; La Nina, June 1998 - December 1999. (1) Normal. Rainfall occurs above the threshold on only March and April and only when the surface wind is convergent and the sea surface temperature is above 27 C. The five occurrences of March - April convergence revealed a biennial modulation of the normal annual cycle. Largest values of integrated water vapor and integrated cloud liquid water also appeared in March -April, when the values were two times greater than the minimum values in September and October. (2) El Nino. In the SITCZ region, 1997 was a year without a "winter". In March - April 1998, the wind convergent values were similar to those found in the same months in 1994 and 1996, which continued the presence of a biennial pattern, sea surface temperature reached 29 C, and the rainfall rate exploded to 9 mm/d. Integrated water vapor and integrated cloud liquid water also reached supreme values in March and April 1998. The intense rain rate was not caused by local processes, such as stronger surface wind convergence which did not occur. The intense rain rate was produced by the ITCZ which had migrated south of the equator in response to the El Nino. (3) La Nina. In June - December 1998, the SITCZ surface wind remained strongly convergent, which was unusual because the rain rate had dropped to zero, the sea surface temperature had usual values, and the integrated water vapor and integrated cloud liquid water were typical for this time of year.