

A Double ITCZ in the Eastern Tropical Pacific

D. Halpern (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109, U. S. A.) and B. Rubin (Department of Atmospheric Sciences, University of California, Los Angeles, CA 90095, U. S. A.)

An intertropical convergence zone (ITCZ) is associated with surface wind convergence, upper-troposphere wind divergence, cloudiness, abundance of rain, and high sea surface temperature. Analyses of 1992- 1996 ERS-1 surface wind velocity data in the eastern tropical Pacific revealed that surface winds were convergent throughout the year north of the equator (5° - 10° N), but south of the equator (5° - 3° S) surface winds were convergent only during March - May. The north-south asymmetry was striking in the eastern tropical Pacific (125° - 100° W) except when a double ITCZ appeared for three months each year. The equatorial cold tongue separates the two ITCZs. The situation is quite different in the warm water pool in the western tropical Pacific where no cold tongue existed and where surface winds north and south of the equator were convergent throughout the year. South of the equator in the eastern tropical Pacific, convergent winds were associated with rainfall (5 cm per month) and sea surface temperature above 27.5° C, which is known as the critical temperature for onset of atmospheric convection. In the ITCZ region south of the equator, no rain occurred during June - February when sea surface temperature was less than 27.5° C. The eastern tropical Pacific double ITCZ will be described in terms of surface wind convergence, upper-troposphere divergence, sea surface temperature, rainfall, and cloudiness. Why the double ITCZ did not occur twice each year is an enigma because there is a twice-yearly passage of the sun. The influence of ocean advection on sea surface temperature will be discussed.