



Dynamics of the ITCZ and the tropical wind-driven ocean circulation

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In the tropics, the most intense rainfall occurs in a narrow band known as the inter-tropical convergence zone (ITCZ). Here, the role of the tropical wind-driven ocean circulation in setting the position of the ITCZ is studied using an idealized atmospheric model coupled to a slab ocean model with a novel diagnostic parameterization of Ekman heat transport. The idealized coupled model captures several key observed features of the relation of the ITCZ to the tropical circulation, such as: (a) the damping of ITCZ migrations in response to hemispherically asymmetric heating, (b) the emergence of double ITCZs and anti-Hadley circulation, and (c) regional bifurcations of the ITCZ, such as those observed in the tropical Pacific. More generally, the idealized coupled model captures the observed tropical ocean heat transport and provides a powerful tool for understanding coupled tropical ocean-atmosphere dynamics.