

Abstract

“Dynamics of the Madden-Julian oscillation“

Adam Sobel, Columbia University

The Madden-Julian oscillation (MJO) is the dominant mode of variability in the tropics on the intraseasonal time scale and one of the most important coherent, quasi-periodic modes of natural variability in the global climate system altogether. Though it was discovered over 40 years ago, we still do not understand the MJO, in the sense of being able to state a simple mathematical model that explains its basic features as consequences of clear physical mechanisms.

I will present evidence that the MJO is what some of us now call a "moisture mode", best analyzed through the budget of moist static energy or moist entropy. I will argue that cloud-radiative feedbacks are important to the maintenance of the MJO, while horizontal advection of moisture is important to its eastward propagation. I will present evidence from observations, theory, general circulation models, and cloud-resolving models to this effect.