

Surface fluxes and intraseasonal variability

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The observed spatial distribution of intraseasonal variance in precipitation and outgoing longwave radiation is highly structured, with large variance over the tropical oceans and substantially smaller variance over land. The land-ocean difference is manifest in both Northern and Southern hemispheres and all seasons, and is apparent even at small scales, with substantial gradients in variance across coastlines. Dynamically, the primary difference between land and ocean is that there can be no variations in total surface energy flux over land, while there can be substantial variations over ocean. The authors thus argue that the observed distribution of intraseasonal variance is evidence that interactive variations in the total surface energy flux play an important role in the dynamics of tropical intraseasonal variability.

Interactive surface fluxes are essential to the dynamics of intraseasonal variability in some idealized models, both of the eastward-propagating MJO and the northward propagating variations of the Asian monsoon. By no means do all idealized models exhibit such behavior, however. In general circulation models, it is straightforward to estimate the importance of interactive surface fluxes. Such sensitivity tests have been done in only a small number of models, with inconsistent results. The authors suggest that it would be useful to know the importance of surface fluxes to intraseasonal variability in a larger number of models. This knowledge might provide some insight into the relevance of interactive surface fluxes to intraseasonal variability in nature, thus making it possible to rule out some theoretical explanations of intraseasonal variability (either those in which surface fluxes are crucial, or those in which they are not).