



Ubiquitous & Complex Nature of Diurnal Rainfall Processes from TRMM & CloudSat Measurements: Is Mediterranean Basin Representative of Rest of Earth?

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The datasets from TRMM and CloudSat satellites have enabled discovery of the multifaceted and ubiquitous nature of regional and global multimode / multiform diurnal rainfall variability and processes. These variability modes and processes can be parsed into five distinct mechanisms: (1) multiple mode diurnal variations; (2) continental-maritime primary diurnal mode differentiation; (3) spectral-vertical diurnal variations with concomitant coherent spatial signatures (where spectral signifies the spectrum of rain rate); (4) two-stage phase propagation of the diurnal maximum of rainfall, including a diurnally controlled stage, induced by north-south aligned mountain ridges; and (5) diurnal oscillations of tropical cyclone intensities. The intricacies of these five mechanisms are explained with emphasis on their impacts on weather and, more speculatively, on climate. Each of these mechanisms is a ubiquitous process of rainfall when examined at the global scale or regional scale. The specific topic of interest for the Plinius Conference is whether the diurnal rainfall processes within the Mediterranean basin are representative of the other portions of the Earth. It is shown, in fact, that in most ways the Mediterranean basin has its own very unique signatures of diurnal rainfall variability and diurnal rainfall processes. The implications of these different signatures are paramount to understanding how the concomitant diurnal heating signals manifest themselves in affecting atmospheric circulations on the weather and climate scales. Various of these implications are discussed.