Radar Detectability of meteor head echoes and its implication on the Zodiacal Dust Cloud populations

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The total amount of meteoric input in the upper atmosphere is a hotly debated quantity, which estimates vary by 2 orders of magnitude, depending on measuring techniques. The majority of the input is in the form of microgram size particles, which, in most cases, completely ablate injecting metals in the mesosphere. These metals are the primordial material for most of the layered phenomena (LP) occurring in the mesospause region (MR). Accurate knowledge of this quantity is crucial for the study of LPMR and in many cases it can contribute to the improvement of Whole Atmosphere Models (WAM) by constraining parameters such as vertical transport in the middle atmosphere. In an effort that ultimately aims to estimate this quantity, we utilize a combination of Zodiacal Dust Cloud (ZDC) models that follows the dynamical evolution of dust particles after ejection utilizing the orbital properties of Jupiter Family (JFC) and Halley Type (HTC) Comets and asteroids. In addition, we couple these astronomical models with comprehensive description of meteoroid ablation, ionization and radar detection and thus enable accurate interpretation of radar observations of head echoes obtained with various High Power and Large Aperture (HPLA) Radars. This approach enables us to address potential biases that could, in principle, prevent ground-based instrumentation to detect a portion of the incoming flux and thus better estimate the role that each dust population plays in the total cosmic dust input.