# DEVELOPMENT OF AN ALL-SKY METEOR TRAIL INPUT FUNCTION

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Specular meteor echoes are signals backscattered from expanding trails of ionized particles that are created during the passage of a meteoroid through the upper atmosphere. Detection occurs when a radar **k** vector points perpendicularly to the trajectory of the trail. The observed specular trails as well as their temporal/spatial evolution provide a plenitude of information about incoming meteor particles and the background state of the atmosphere and ionosphere. Additionally, these trail echoes are an important tool to monitor the amount of extraterrestrial material being deposited into the Earth's atmosphere. In this paper, we present the first algorithm that models the meteor flux detected by an all-sky meteor radar. The all-sky antenna volume is partitioned in *N*x*N* parcels. Each parcel is tested using the Meteor Input Function (developed for high-power large-aperture radars) in order to determine meteoroid properties associated with this volume. The synthesized meteoroid properties for each parcel are then used to determine and verify which meteoroids will develop trajectories that are perpendicular to the **k**-vector of the all-sky meteor radar and therefore generate specular meteor echoes. It is in this fashion that the all-sky meteor trail input function is constructed. This function is particularly important because it will allow us to quantify: 1) the number of meteoroids that are not detected by the radars; 2) the number of underdense and overdense specular meteor echoes that an all-sky meteor radar expects to observe; and 3) the importance of plasma instabilities in the population of meteors detected with an all-sky meteor radar. Notice that item (3) is crucial in terms of the inference of mesospheric temperatures from trail diffusion rates and the implications for developing robust meteor scatter communication systems. The all-sky meteor trail flux algorithm represents an opportunity to investigate statistical properties of both meteoroid and background atmosphere, as well as their coupling effects. We present first results of the all-sky meteor trail flux function and compared these results with meteor trail observations collected with the University of Illinois SkiYMet radar, operated in Urbana, Illinois.