



A Fundamentally New SuperDARN Technique

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All past SuperDARN models have been based on the idea that global convection pattern is controlled by the solar wind conditions. The implied causality raises a list of questions such as: What is the delay between the cause and effect, whether the magnetosphere-ionosphere (M-I) system has inertia and whether internal M-I processes can be ignored. In this talk we answer these question by presenting a new SuperDARN technique which is based on a fundamentally different approach. The method combines historical data from the SuperDARN data base, Principal Component Analysis and a spherical cap basis function expansion process in order to ‘fill-in’ convection data where there are observations for any given time. Our model show significant differences from all past SuperDARN models but its behavior is in excellent agreement with both the SuperMAG and AMPERE. We outline the technique, validate the solutions and show the results from a typical substorm as well as a storm event.