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## Using IPIM to Simulate the Ionosphere's Response to Extreme Space Weather

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The IRAP Plasmasphere Ionosphere Model (IPIM) describes the transport equations of ionospheric plasma species along magnetic closed field lines. As input, the previous iteration of IPIM used basic models to provide estimations of the solar wind conditions, convection, and precipitation within the ionosphere. In this presentation, we discuss the development of a new operational version of IPIM as part of the EUHFORIA project to monitor and forecast space weather conditions and hazards. The developments of the model include using in-situ solar wind observations from the OMNI data set, ionospheric radar data of plasma motions from the Super Dual Auroral Radar Network (SuperDARN), and precipitation data from the Ovation model, as inputs to the model. We present the first results from the latest IPIM version, focussing on case study coronal mass ejections on 14th December 2006 and 14th July 2012 which featured clear magnetic clouds and long-lasting southward magnetic field. For these events, we explore simulations of plasma densities, temperature, and motions, and compare with observations from EISCAT ionospheric radars and ionosonde launches. With these results in mind, we will discuss the skill of using IPIM as a space weather forecasting and analysis tool.