Meteor showers have long been observed to have significant effects on ionospheres. In particular, the ablated meteoric materials are expected to produce temporary layers of metallic ions. These layers would then increase the total ion content of the ionosphere. This increase in total ion content could then absorb or attenuate radar signals propagating through the ionosphere. The MARSIS radar experiment onboard Mars Express operates at frequencies that might be expected to be affected in such a manner.

However, previous observations during a predicted meteor shower at Mars showed no signs of this meteoric layer. We report here observations from another predicted shower, the Martian Geminids. Again, we find no obvious signs of the meteoric layer and see that instead the surface returns are generally strong for the days during the predicted shower. The figure below shows an MARSIS AIS mode ionogram during this time. The solid line (in light green) on the right side of ionogram is the ground return.

A number of interpretations are plausible to explain this result. It is unlikely that the predicted timing of the shower was incorrect. However, it is possible that the density of the dust sources was not sufficient to produce an appreciable shower. Alternatively, it is possible that theories regarding the production of the meteoric layer are in error in some fashion. If this is the case, the published observations of the layers by radio occultation methods need to be explained. We discuss the implications of these different interpretations and discuss the possibilities for future observational opportunities.