



A Case Study of a Sudden Sodium Layer Observed by the ALOMAR Weber Na Lidar

H. Nesse (1, 2), D. Heinrich (1), B. Williams (3), U.-P. Hoppe (1), J. Stadsnes (2), M. Rietveld (4), W. Singer (5), U. Blum (1), M. I. Sandanger (2) and E. Trondsen (6)

(1)Norwegian Defence Research Establishment, Kjeller, Norway, (2) University of Bergen, Bergen, Norway, (3) Research Associates/ Colorado Research Associates Division, Boulder, USA, (4) EISCAT Scientific Association, Tromsø, Norway, (5) Institute for Atmospheric Physics, Kühlungsborn, Germany, (6) University of Oslo, Oslo, Norway

Several possible mechanisms for the production of sudden sodium layers have been discussed in the literature, but none of them seem to explain all the accumulated observations. The hypotheses range from direct meteoric input, to energetic electron bombardment on meteoric smoke particles, to ion neutralization, to temperature dependent chemistry. The varied instrumentation located on Andøya and near Tromsø in Norway gives us an opportunity to test the different theories applied to high latitude sudden sodium layers. We use the ALOMAR Weber sodium lidar to monitor the appearance and characteristic of a sudden sodium layer that was observed on 5 November 2005. We also monitor the temperature to test the hypotheses regarding a temperature dependent mechanism. The EISCAT Tromsø Dynasonde, the ALOMAR/UiO All-sky camera and the SKiYMET meteor radar on Andøya are used to test the suggested relationships of sporadic sodium layers and sporadic E-layers, electron precipitation, and meteor deposition during this event. We find that more than one candidate is eligible to explain our observation of the sudden sodium layer.