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Combining satellite and lidar measurements to investigate the sodium nightglow

Julia Koch¹, Adam Bourassa², Chris Roth², Nicholas Lloyd², Titus Yuan³, and Chiao-Yao She⁴

¹University of Greifswald, Institute of Physics, Atmospheric Physics, Germany

²University of Saskatchewan, Saskatoon, SK, Canada

³Department of Physics, Colorado State University, Fort Collins, USA

⁴Department of Physics, Utah State University, Logan, USA

Using a combination of different measurement techniques is important to understand the numerous processes happening in the MLT-region. One of those processes is the excitation of atomic sodium by reaction with ozone which leads to emission of electromagnetic radiation: a phenomenon called Airglow. Although the sodium excitation mechanism was already proposed in 1939 by Sidney Chapman and further investigation was done by a great number of scientists, there are still some key parameters that are not well-known today. One of those parameters is the branching ratio f_A which determines the amount of sodium in the excited state. Exact knowledge of this value would offer the opportunity to use Na-nightglow measurements to determine sodium profiles in the MLT-region. In this study we used both, satellite measurements and ground-based Lidar measurements to help approach a more reliable branching ratio f_A . By comparing measurements that were made by the two instruments OSIRIS on Odin (Satellite) and the Lidar of the Colorado State University (ground-based) we found a branching ratio f_A of 0.064 ± 0.028 .