



## **SPARC WAVAS-II: Comparison of satellite and frost point hygrometer data.**

Michael Kiefer (1), Dale Hurst (2), Stefan Lossow (1), Gabriele Stiller (1), and the WAVAS-II team

(1) Institute for Meteorology & Climate Research IMK-ASF-SAT, KIT - Karlsruhe Institute of Technology, Postfach 3640, 76021 Karlsruhe, Germany, (michael.kiefer@kit.edu), (2) NOAA Earth System Research Laboratory, Global Monitoring Division, Boulder, CO 80305, (dale.hurst@noaa.gov)

As part of the second SPARC (Stratosphere-troposphere Processes And their Role in Climate) water vapor assessment (WAVAS-II), we compare measurements taken with balloon-borne frost point hygrometers (FPH) with satellite datasets that have provided retrievals of water vapor for the period 2000-2016. A crucial point in such comparisons is to account for the big differences between the vertical resolutions of the FPH and satellite data and the possible influence of a priori information. We show that, in general, the comparisons improve and are more meaningful when the averaging kernel matrix and a priori information of the satellite are used to reduce the FPH vertical resolution. Some satellite data sets do not provide the averaging kernel matrix and a priori data, so in these cases we apply a smoothing based on the proper vertical resolution. Comparisons of three types - no kernel applied, real kernel applied, or smoothing applied - will be shown and discussed. Comparison results separated by altitude and season will also be shown. Generally the deviations are <10 % in the 100-10 hPa range. However, indications for systematic biases are found for some satellites as well as for specific FPH sites. Known reasons and possible explanations for these biases will be discussed.