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A Microphysics Guide to Cirrus – Part II: Supplementary material

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1 Overview of individual field campaigns

The supplementary material contains an overview of the individual field campaigns that are compiled in the Cirrus Guide II data set. For each campaign, a plot of frequencies of occurrence in dependence on temperature, binned in 1K intervals (corresponding to Figure 6 of the Cirrus Guide II) is given for:

- Ice Water Content (IWC); in the plots the black solid/dotted lines represent the median, min/max IWC of the core IWC band, from Schiller et al. (2008)).
- Ice crystal number (N_{ice}) for ice particle sizes > 3 μm diameter; the black lines in the plots are the 25, 50, 90% N_{ice} percentiles from the Cirrus Guide II in-situ data set, see Figure 6 of Cirrus Guide II.
- Mass mean radius (R_{ice}) calculated from $\left(\frac{3 \cdot IWC}{4\pi\rho \cdot N_{ice}}\right)^{1/3}$ with ρ= 0.92 g/cm^3; black lines in the plots: 25, 50, 75% R_{ice} percentiles of the Cirrus Guide II in-situ data set, see Figure 6 of Cirrus Guide II.
- In-cloud and clear sky relative humidity wrt ice (RH_{ice}).
- Latitude - altitude distribution of IWC (as in Figure 3 of the Cirrus Guide II).

The field campaigns included in the data set are listed in Tables A1 and A2 of the Cirrus Guide II. Data evaluation methods and detection ranges of the parameters are described in Appendix A2. For each campaign, the parameters available for the respective campaign, as listed in Table A2 of the Appendix A2, are shown.

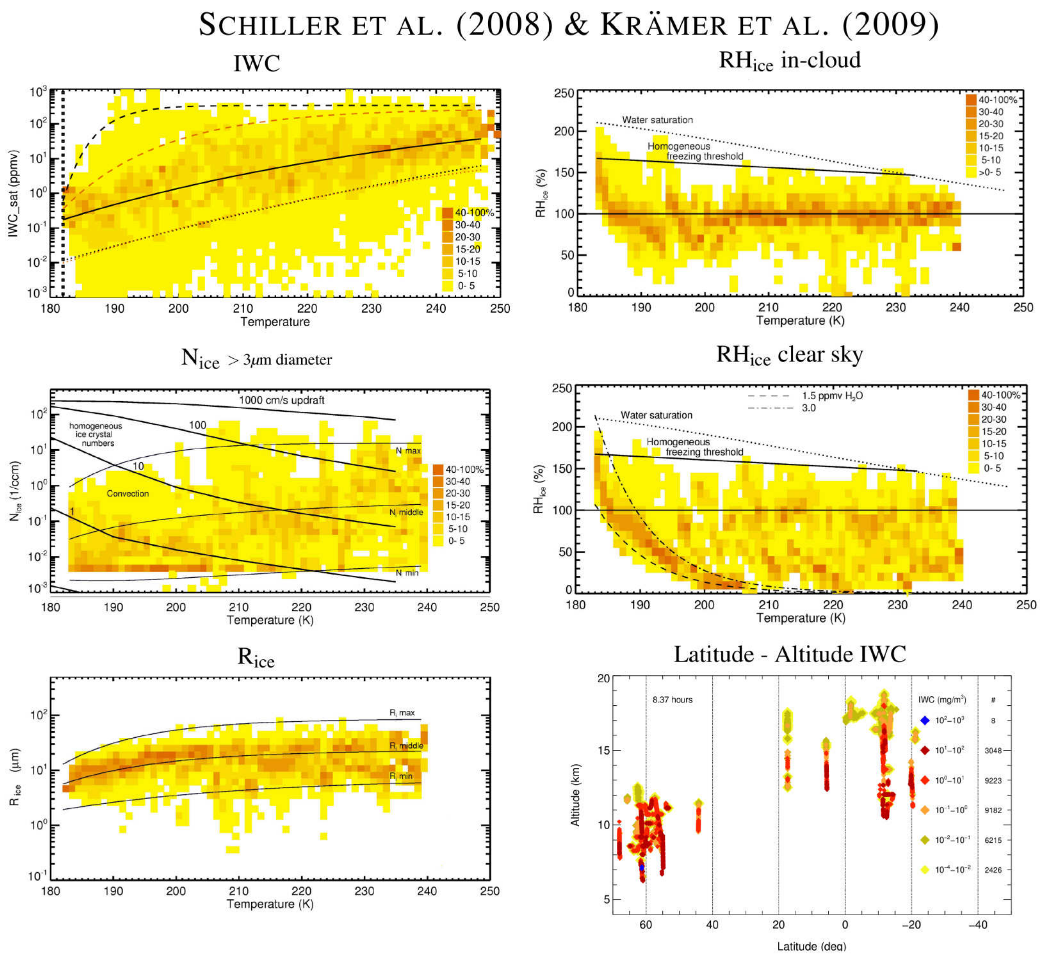

Figure 1. Summary of 10 field campaigns that are listed in the following: Ape Theseo 1999 (Geophysica), Envisat 2002-2 (Geophysica), Envisat 2003-1 (Geophysica), Envisat 2003-2 (Geophysica), Euplex 2003 (Geophysica), Cirrus 2003 (GFD Learjet), Cirrus 2004 (GFD Learjet), Scout 2005 (Geophysica), Troccinox 2005 (Geophysica), Cirrus 2006 (GFD Learjet); the frequency plots are adapted from Schiller et al. (2008) and Krämer et al. (2009); same as Figure 7 of Cirrus Guide II.

CRYSTAL-FACE 2002

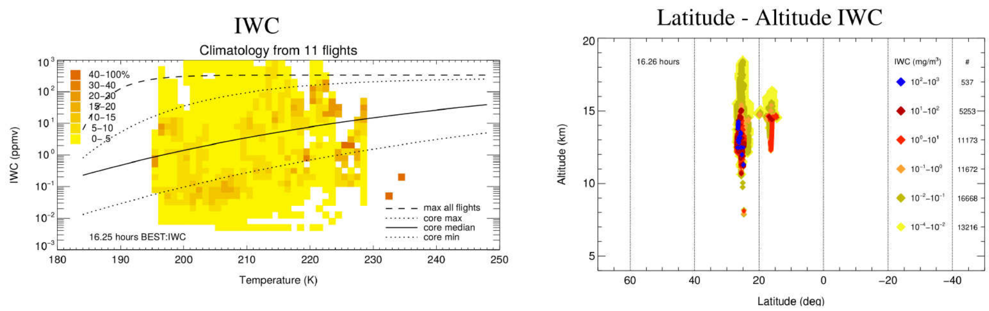

Figure 2. CRYSTAL-FACE, July - August 2002, WB-57, Florida, USA, https://espo.nasa.gov/crystalface.

MIDCIX 2004

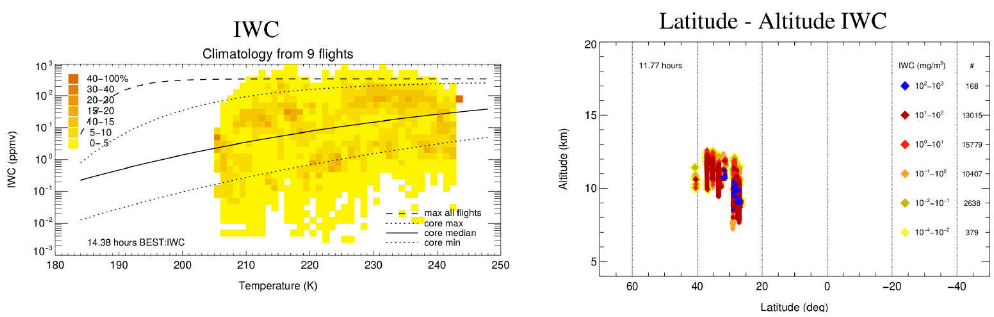

Figure 3. MidCiX, April - May 2004, WB-57, Houston, USA; https://espoarchive.nasa.gov/archive/browse/midcix/WB57; Luebke et al. (2013)

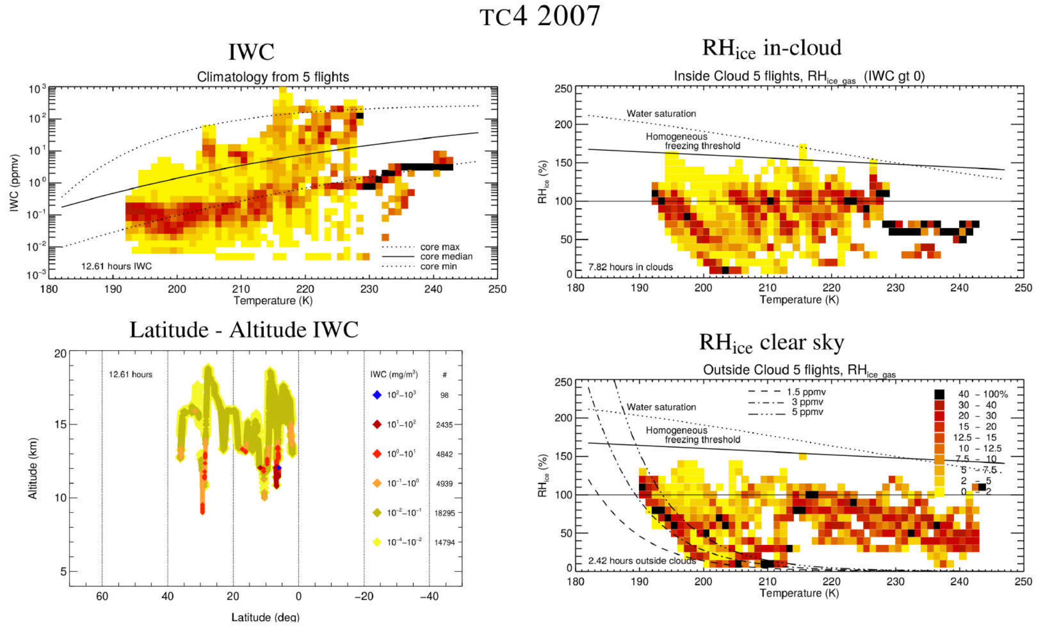

Figure 4. TC4, July 2007, WB-57, San José, Costa Rica; https://cloud1.arc.nasa.gov/tc4; Jensen et al. (2009).

START 08

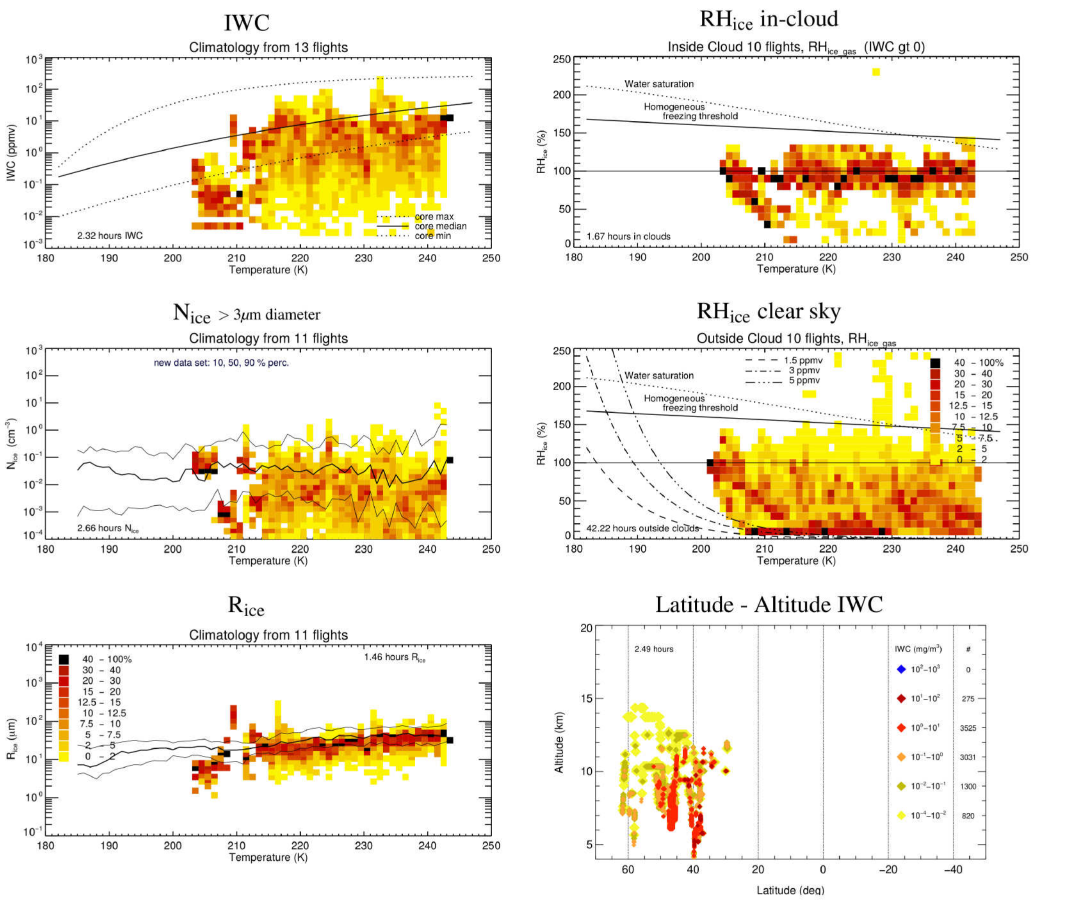

Figure 5. START 2008, April - June 2008, GV HIAPER, Boulder, USA; https://www.acom.ucar.edu/start; Pan et al. (2010).

SPARTICUS 2010

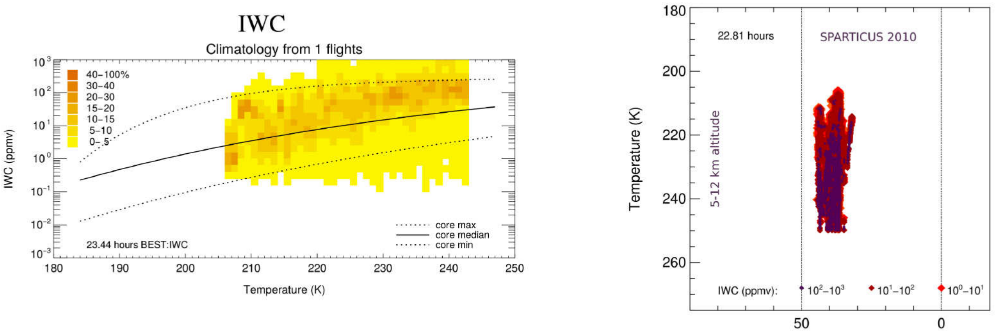

Figure 6. SPARTICUS, March - April 2010, SPEC Learjet, Boulder, USA; Muhlbauer et al. (2014); Jackson et al. (2015)

COALESC 2011

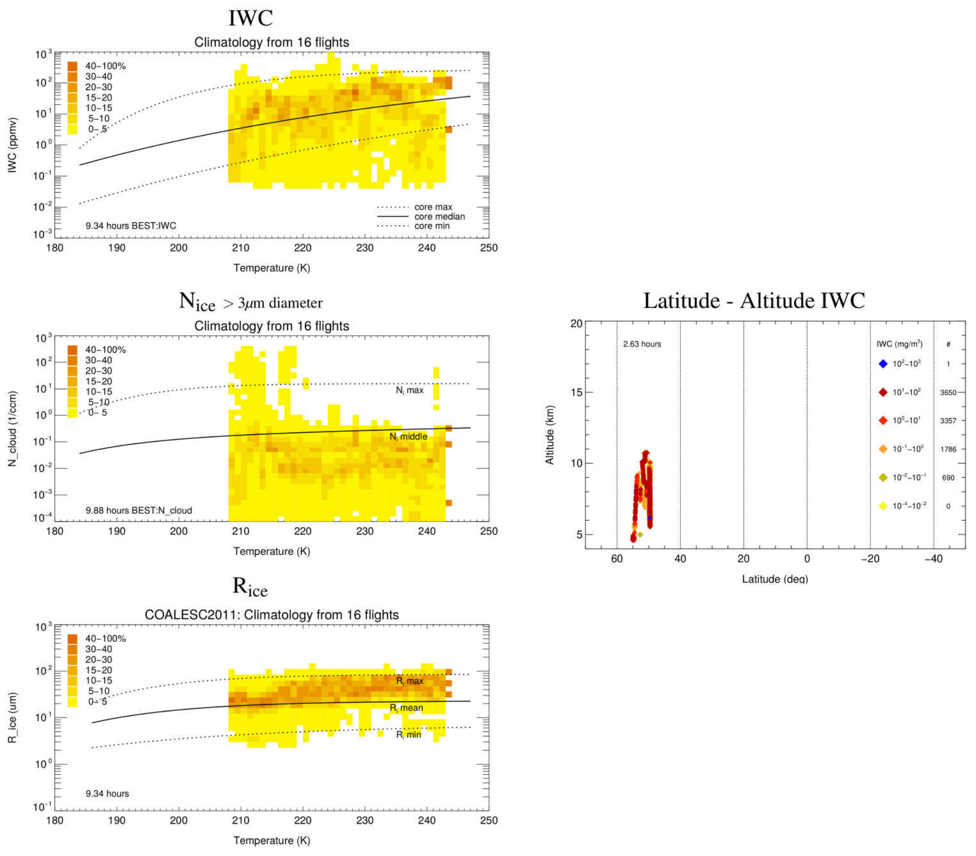

Figure 7. COALESC, February - March 2011, Exeter, UK, BAE-146; https://catalogue.ceda.ac.uk/uuid/43346eb0a2e54ef2bfb544862b38b018; Jones et al. (2012).

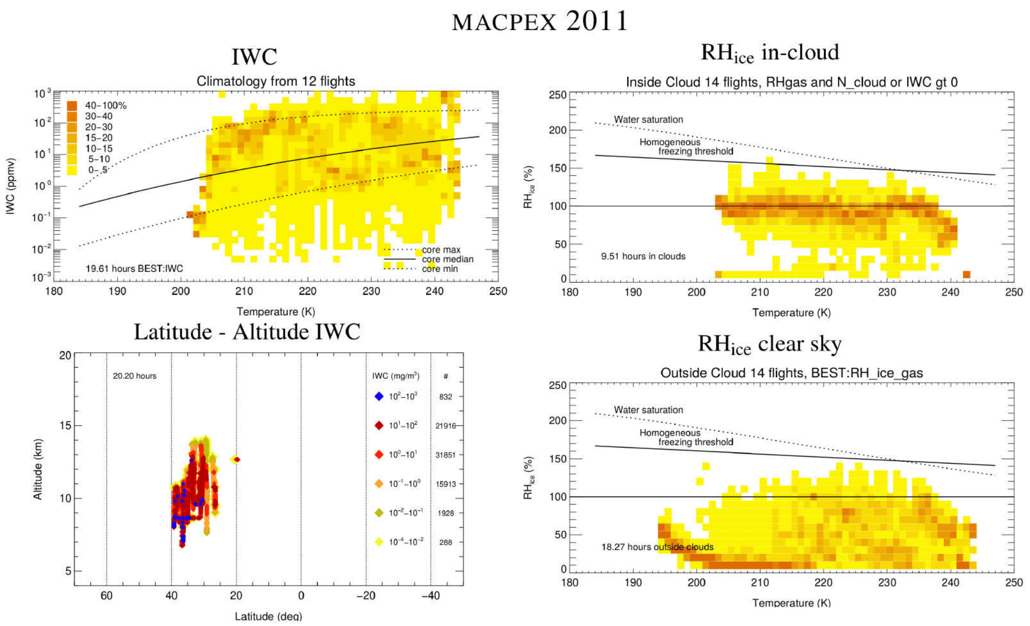

Figure 8. MACPEX, March - April 2011, WB-57, Houston, USA; https://espo.nasa.gov/macpex/content/MACPEX; Jensen et al. (2013); Luebke et al. (2013).

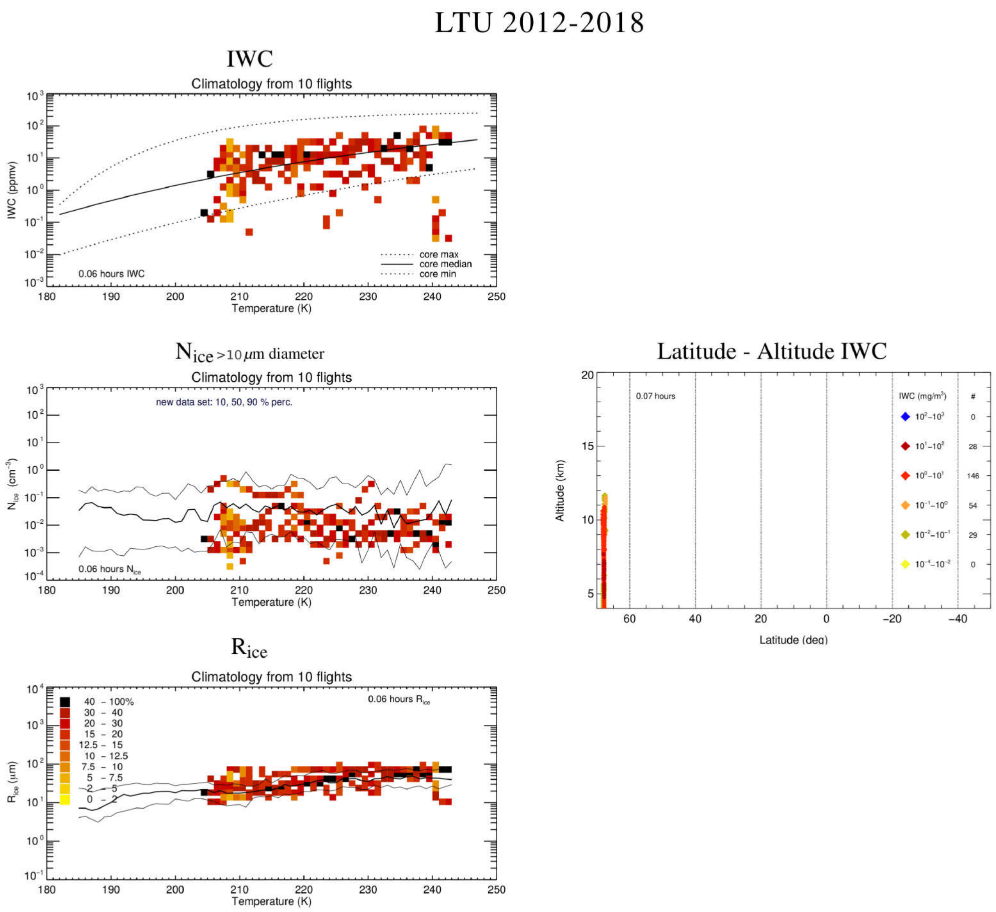

Figure 9. Balloon borne measurements 2012-2018 (Wolf et al., 2018, 2019).

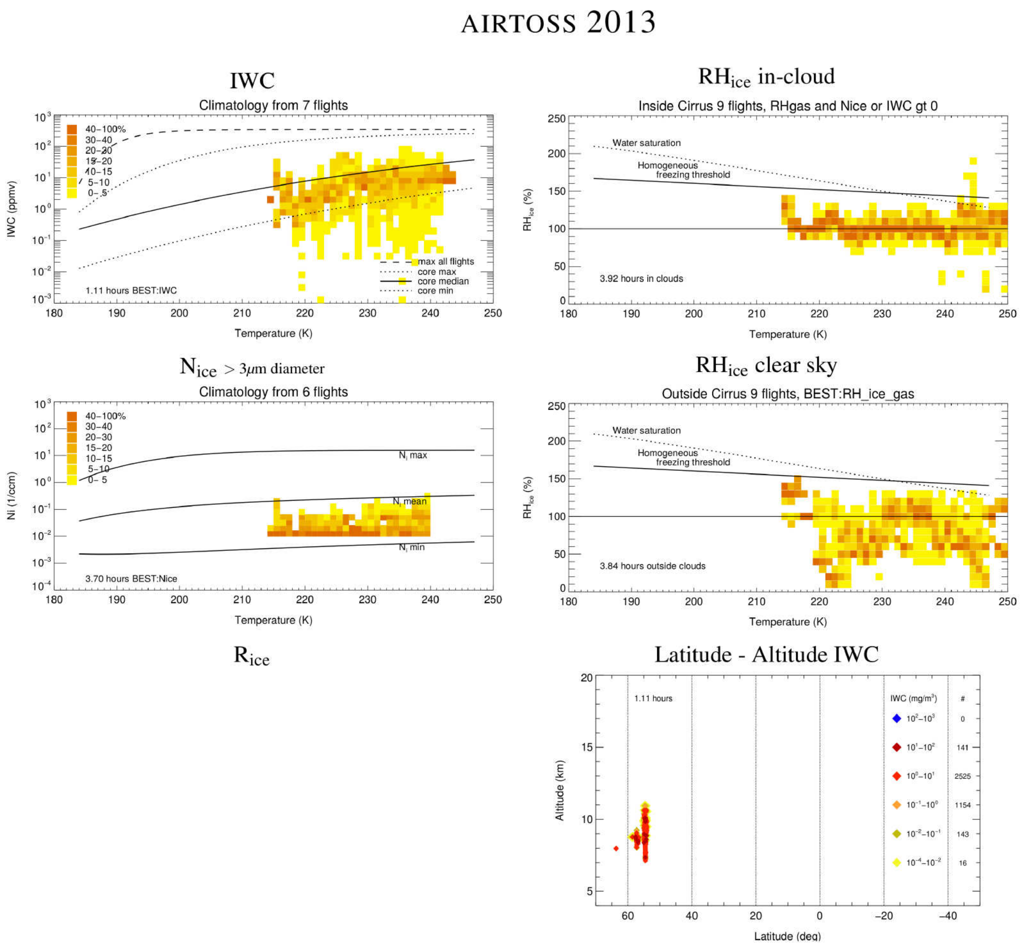

Figure 10. AIRTOSS-ICE, September 2013, GFD Learjet, Hohn, Germany; https://www.ipa.uni-mainz.de/airtoss-ice-2013; Finger et al. (2015).

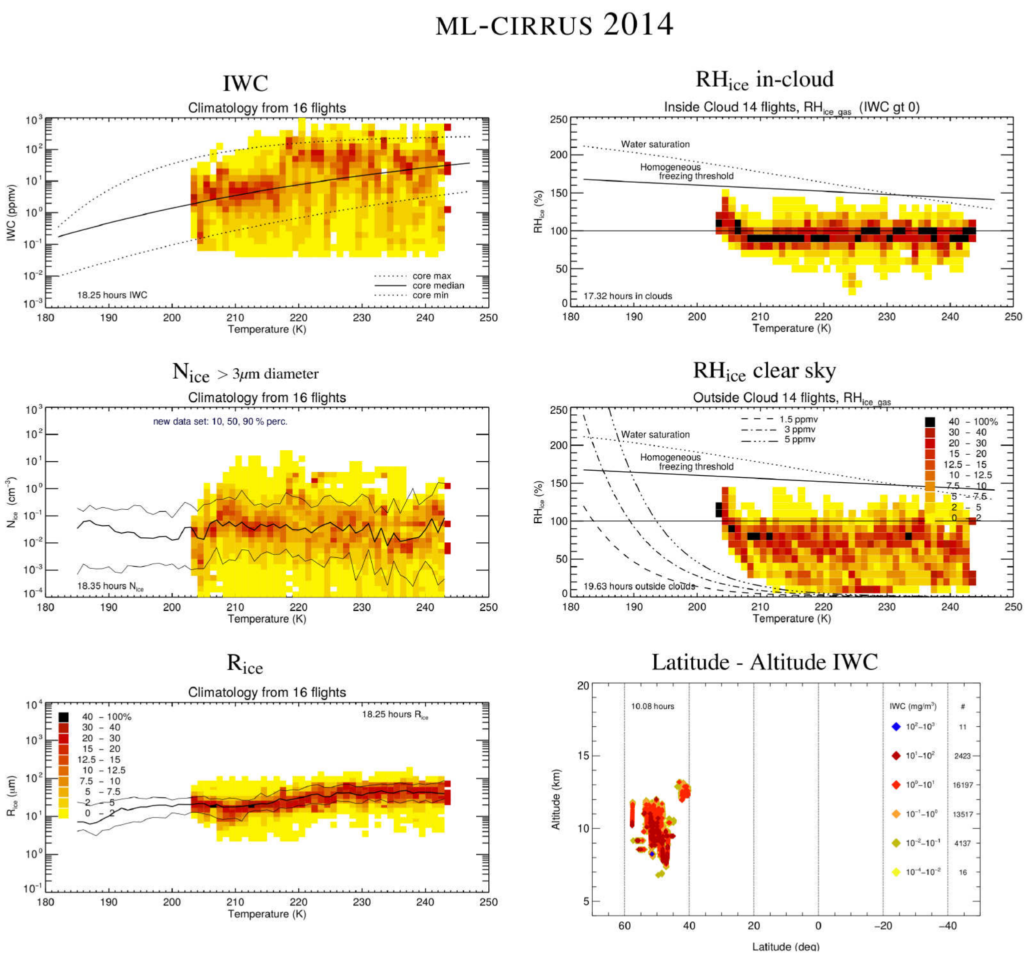

Figure 11. ML-CIRRUS, March -April 2014, Oberpfaffenhofen, Germany, HALO; http://www.pa.op.dlr.de/ML-CIRRUS; Voigt et al. (2017).

ACRIDICON 2014

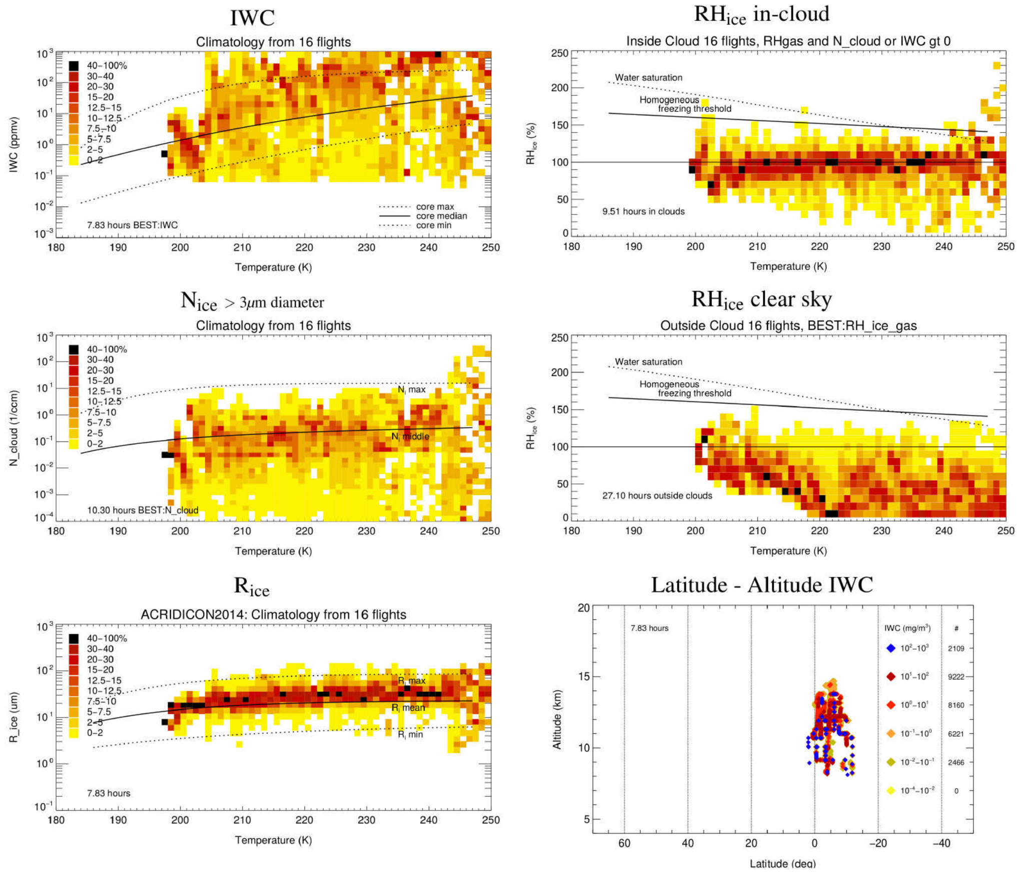

Figure 12. ACRIDICON-CHUVA, September-October 2014, Manaus, Brazil, HALO; http://meteo.physgeo.uni-leipzig.de/acridicon-chuva Wendisch et al. (2016).

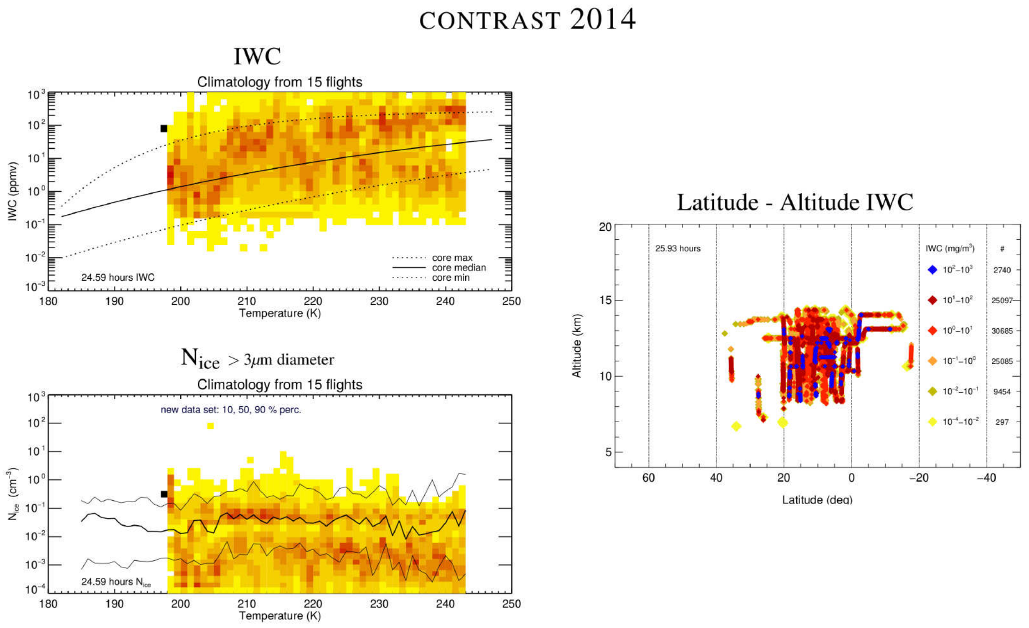

Figure 13. CONTRAST, January - February 2014, Guam, GV HIAPER; https://www2.acom.ucar.edu/contrast; Pan et al. (2017).

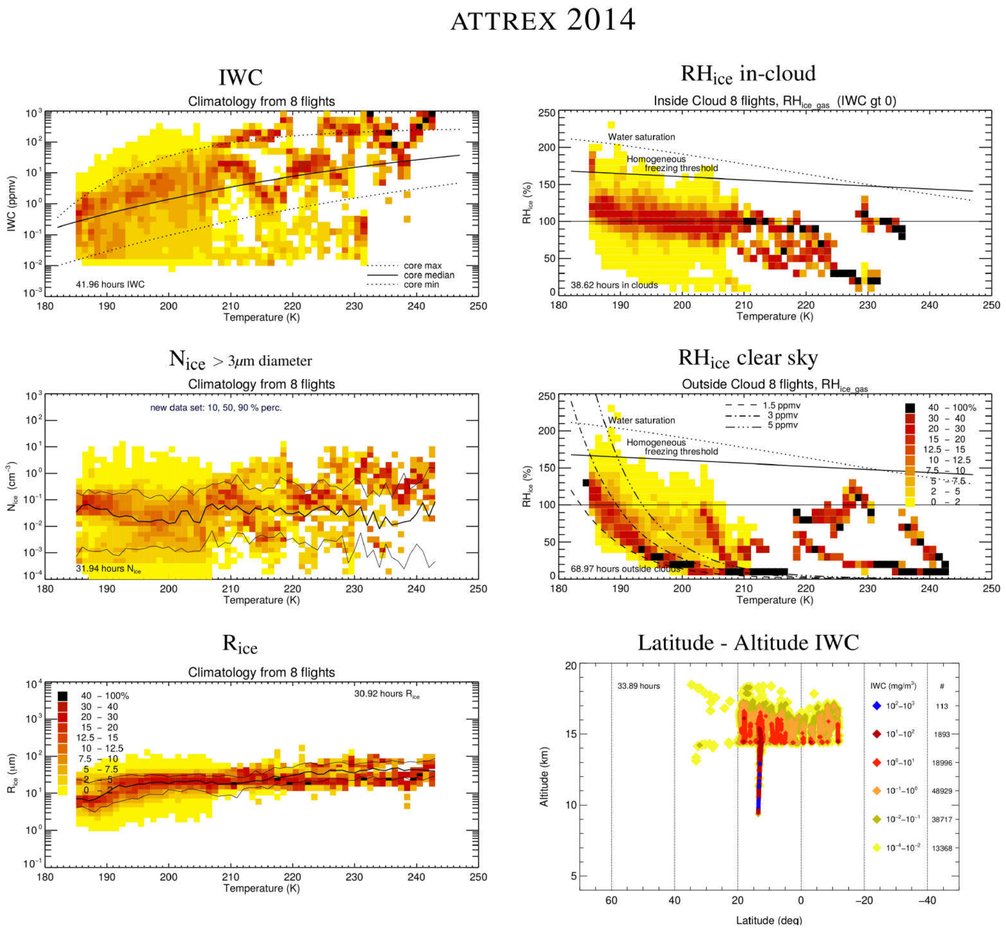

Figure 14. ATTREX, January - March 2014, Guam, Global Hawk; https://espo.nasa.gov/attrex; Jensen et al. (2017).

POSIDON 2016

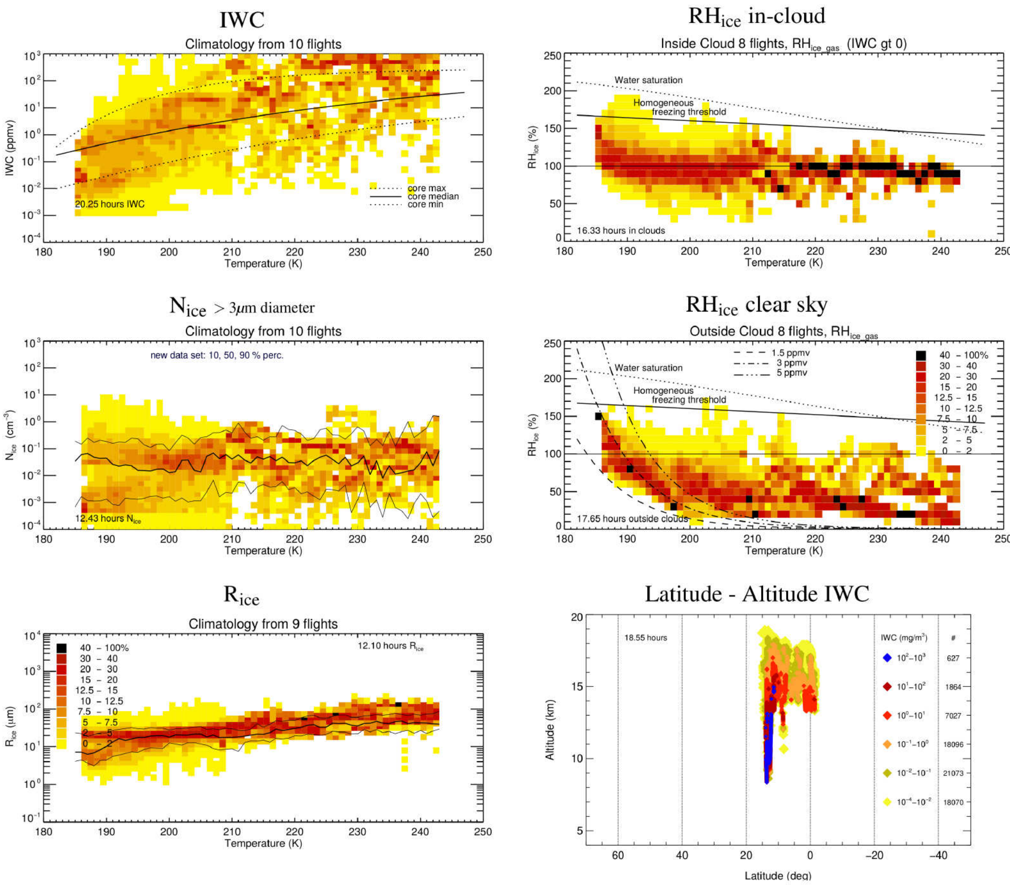

Figure 15. POSIDON, October 2016, Guam, WB-57; https://espo.nasa.gov/posidon.

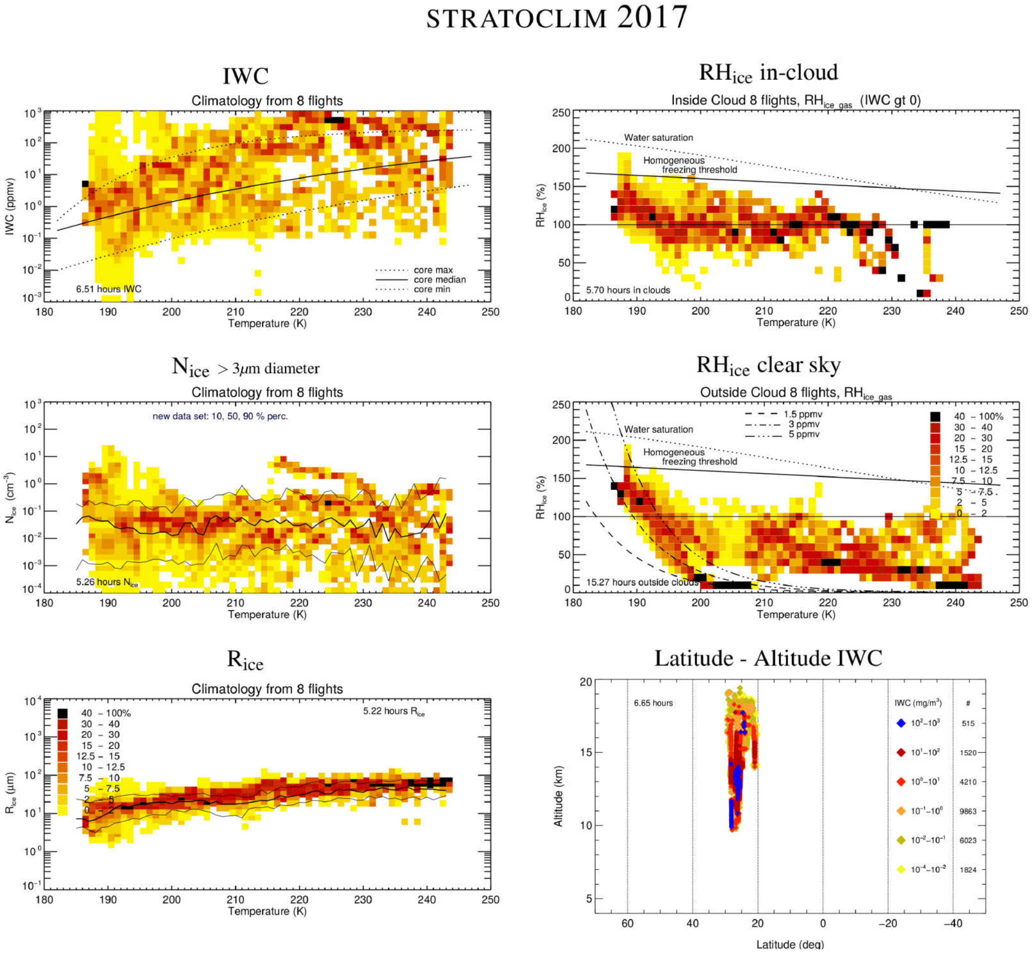

Figure 16. StratoClim, July - August 2017, Khatmandu, Nepal, Geophysica; http://www.stratoclim.org.

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