Supplementary information of "TransCom model simulations of CH_4 and related species: Linking transport, surface flux and chemical loss with CH_4 variability in troposphere and lower stratosphere"

Table S1: List of responsible scientists and e-mail addresses for different chemistry-transport model simulations.

Model Name	Institution	Modeler Name
ACCESS	CSIRO Marine and Atmospheric Research, Australia	K. D. Corbin <kdcorbin@atmos.colostate.edu >, R. M. Law <Rachel.Law@csiro.au>
ACTM	Research Institute for Global Change, Japan	R. Saito <rsaito@jamstec.go.jp>, A. Ito <itoh@nies.go.jp>, P. K. Patra<prabir@jamstec.go.jp>
CAM-Chem	Cornell University, USA	L. Meng <meng2000@gmail.com>, P. G. Hess <pgh25@cornell.edu>
CCAM	CSIRO Marine and Atmospheric Research, Australia	Z. Loh <Zoe.Loh@csiro.au>, R. M. Law <Rachel.Law@csiro.au>
GEOS-Chem	University of Edinburg, UK	A. Fraser <ac.fraser@ed.ac.uk>, P. I. Palmer <pip@ed.ac.uk>
IMPACT	Lawrence Livermore National Laboratory, USA	D. Bergmann <Bergmann1@llnl.gov>, P. Cameron-Smith <pjc@llnl.gov>
LMDZ	Institut Pierre Simon Laplace des sciences de l'environnement, France	A. Fortems-Cheiney <audrey.fortems@lsce.ipsl.fr>, P. Bousquet <bousquet@lsce.ipsl.fr>
MOZART	Massachusetts Institute of Technology, USA	M. Rigby <mrigby@mit.edu>, R. G. Prinn <rprinn@mit.edu>
NIES08i	National Institute for Environmental Studies, Japan	D. Belikov <dmitry.belikov@nies.go.jp>, S. Maksyutov <shamil@nies.go.jp>,
PCTM	NASA Goddard Space Flight Center, USA	H. Bian <huisheng.bian-1@nasa.gov> S. R. Kawa <stephan.r.kawa@nasa.gov>
TM5	SRON Netherlands Institute for Space Research, The Netherlands	S. Houweling <s.houweling@uu.nl>, M. Krol <M.C.Krol@uu.nl>
TOMCAT	University of Leeds	C. Wilson <c.wilson@see.leeds.ac.uk> E. Gloor <E.Gloor@leeds.ac.uk> M. P. Chipperfield <martyn@env.leeds.ac.uk>

Table S2: Details of data sources and responsible organizations for taking measurements of CH_4, MCF and SF_6 at 8 different baseline monitoring stations under the AGAGE [Cunnold et al., 2002; Prinn et al., 2005] and NOAA [Dlugokencky et al., 1998; Butler et al., 2004] networks.

Station name & location	**Data network & managing institution**
ALT, Alert, Canada; 62°W, 82°N, 210m	NOAA: Global Monitoring Division, ESRL (Edward Dlugokencky; James Elkins)
BRW, Point Barrow, USA; 157°W, 71°N, 11m	NOAA: Global Monitoring Division, ESRL (Edward Dlugokencky; James Elkins)
MHD, Mace Head, Ireland; 10°W, 53°N, 25m	AGAGE: University of Bristol (Simon O'Doherty; Peter Simmonds)
MLO, Mauna Loa, Hawaii, USA; 156°W, 20°N, 3397m	NOAA: Global Monitoring Division, ESRL (Edward Dlugokencky; James Elkins)
RPB, Ragged Point, Barbados; 59°W, 13°N, 45m	AGAGE: University of California, San Diego (Ray Weiss)
SMO, Samoa, USA; 171°W, 14°S, 42m	AGAGE: University of California, San Diego (Ray Weiss)
CGO, Cape Grim, Australia; 145°E, 41°S, 94m	AGAGE: Commonwealth Scientific and Industrial Research Organization (Paul Fraser, Paul Steele; Paul Krummel)
SPO, South Pole, Antarctica; 25°W, 90°S, 2810m	NOAA: Global Monitoring Division, ESRL (Edward Dlugokencky; James Elkins)

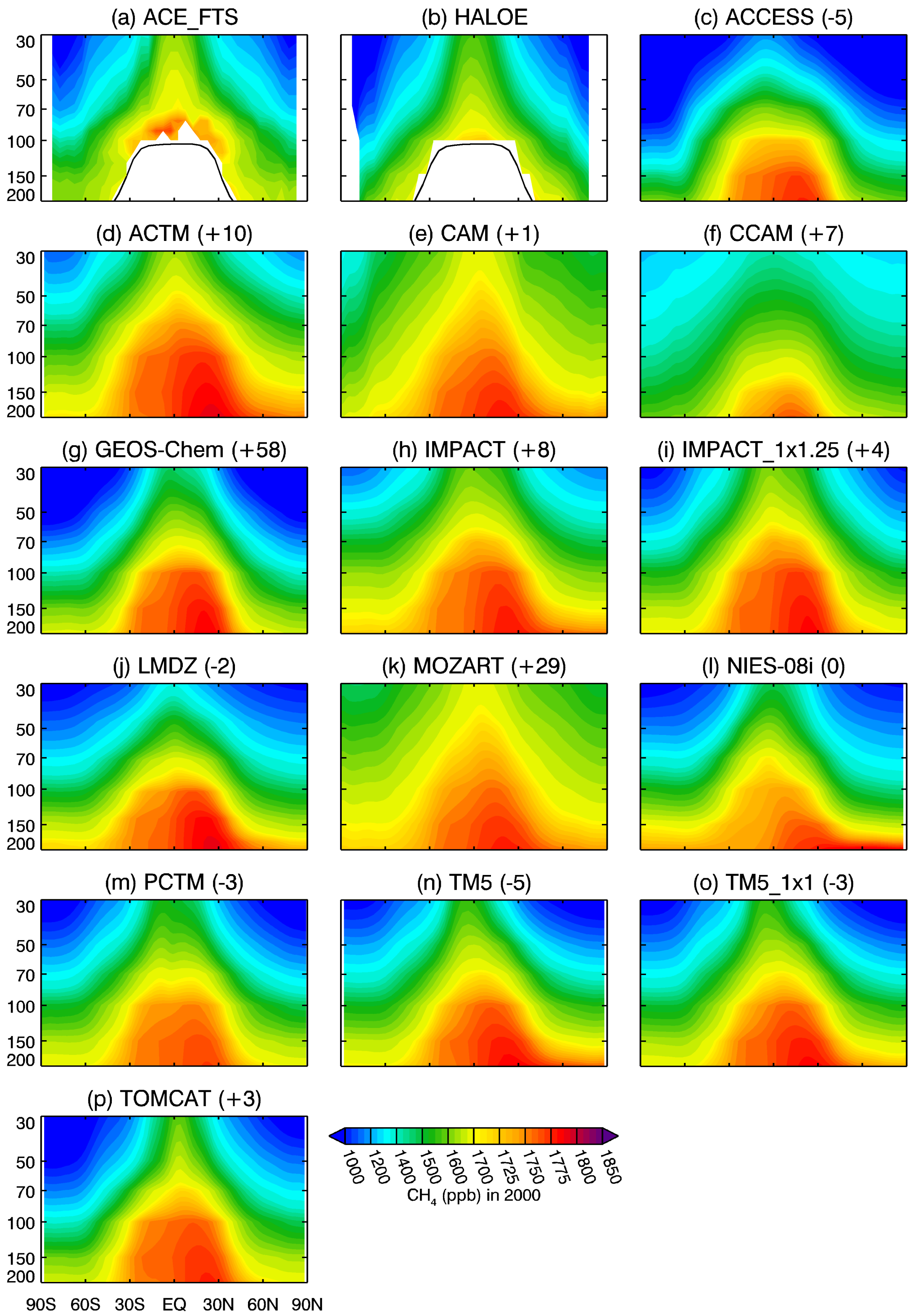

Figure S1: Latitude-pressure of ACE-FTS, HALOE/UARS and TransCom simulated CH_4 in the upper troposphere and lower stratosphere. This plot is similar to Fig. 3, but focus is given for the stratospheric altitudes and HALOE observation is include while ACTM_OH (similar distribution as the ACTM) is not shown.

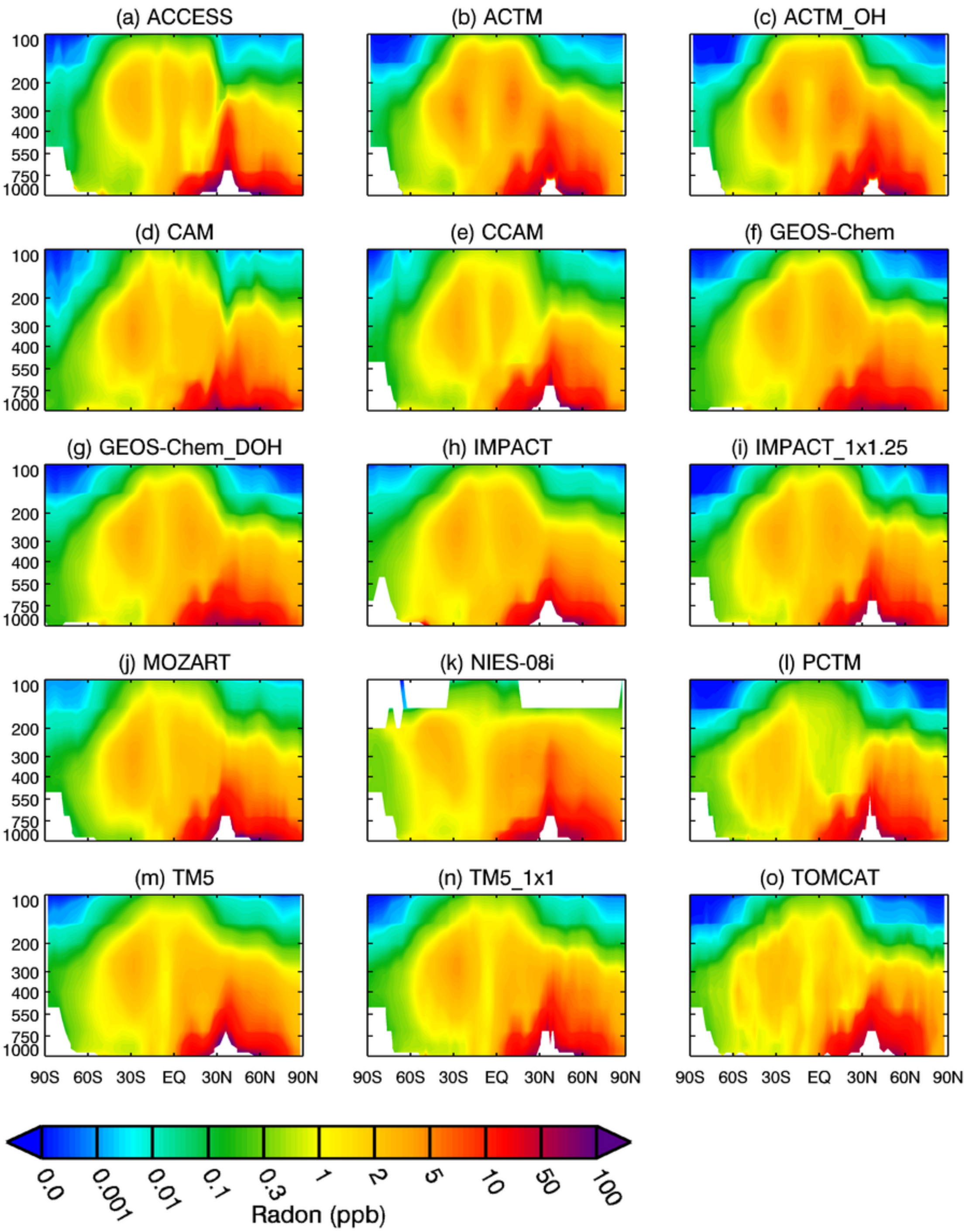

Figure S2: Latitude-pressure ^{222}Rn distribution along the 70^{o}E longitude (South Asian monsoon domain) for the averages during Dec-Jan-Feb (DJF) months of the year 2003-2004. Note the unequal colour bar. LMDZ model did not submit ^{222}Rn simulation results.

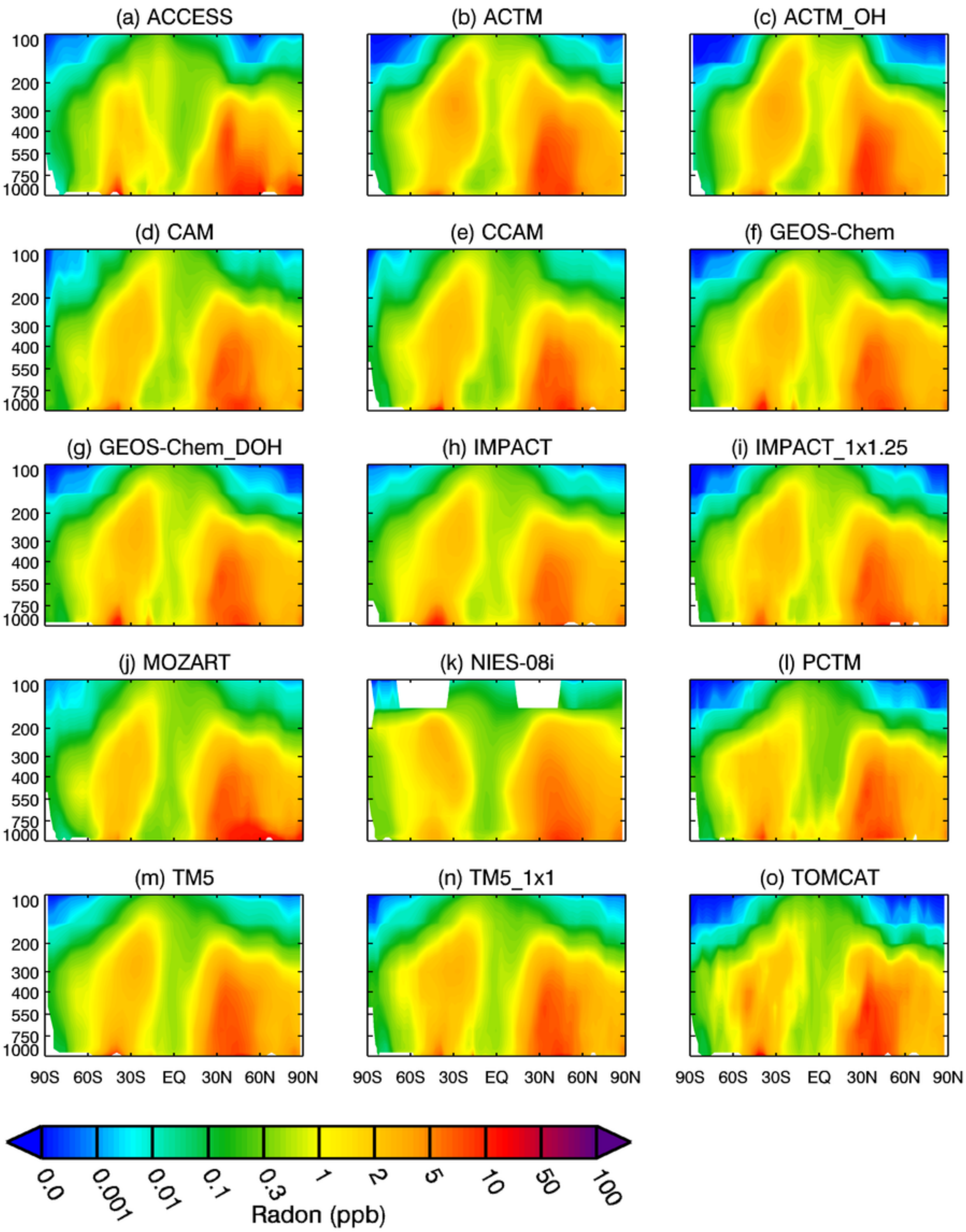

Figure S3: Latitude-pressure ^{222}Rn distribution along the 180^{o}E longitude (over the central Pacific Ocean) for the averages during DJF months of the year 2003-2004. Note the unequal colour bar.

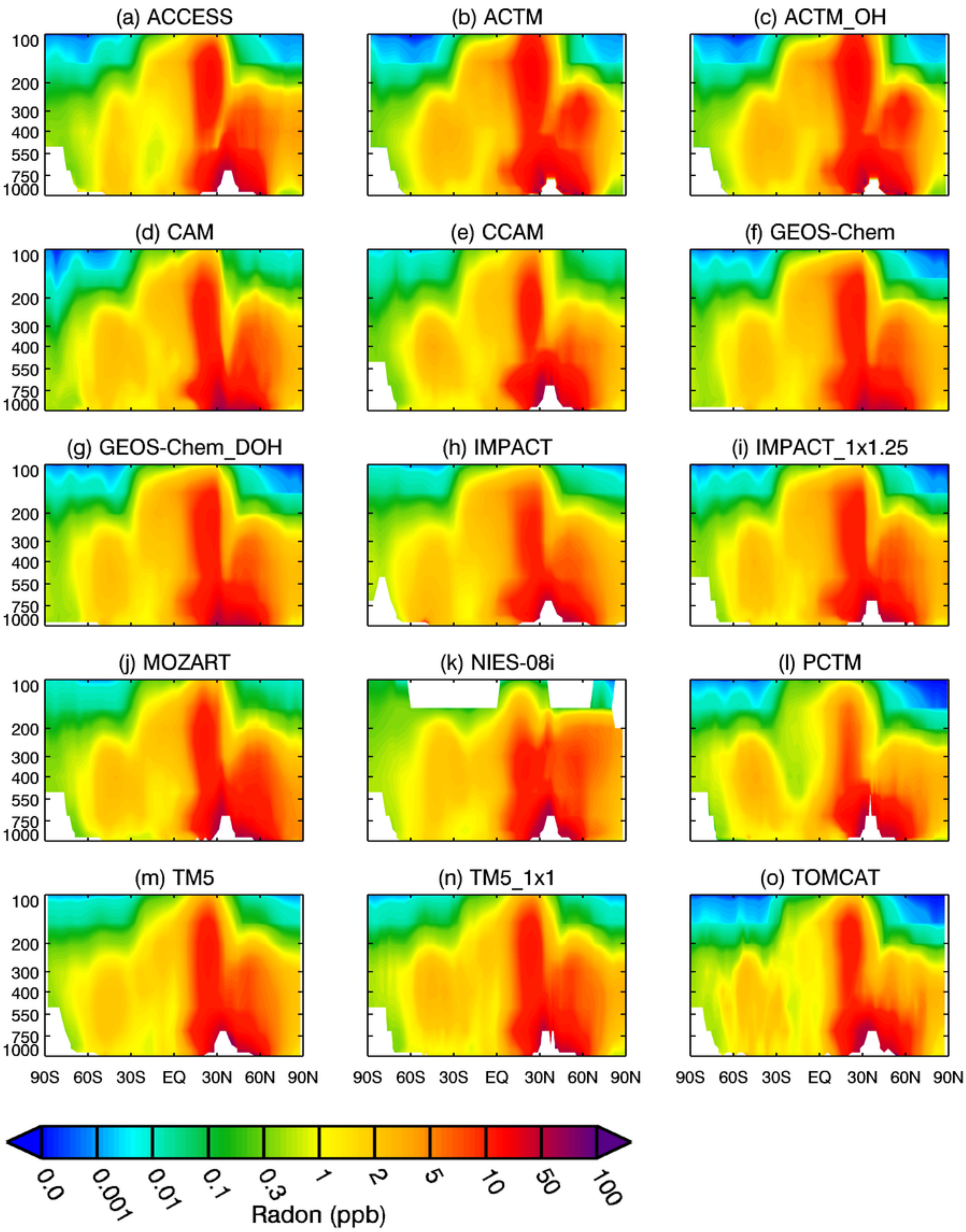

Figure S4: Latitude-pressure ^{222}Rn distribution along the 70^{o}E longitude for the averages during Jun-Jul-Aug (JJA) months of the year 2003. Note the unequal colour bar.

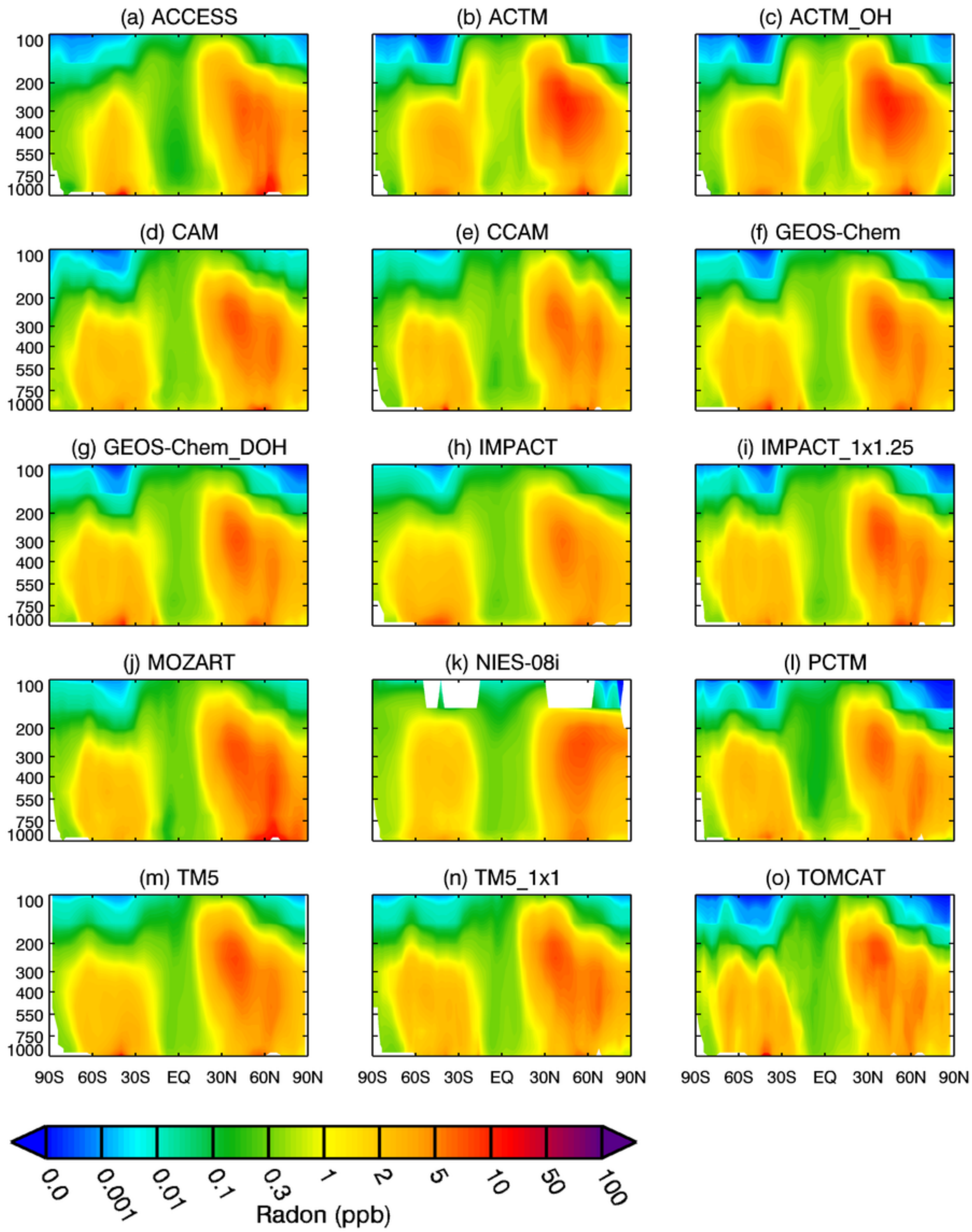

Figure S5: Latitude-pressure ^{222}Rn distribution along the 180^{o}E longitude for the averages during JJA months of the year 2003. Note the unequal colour bar.

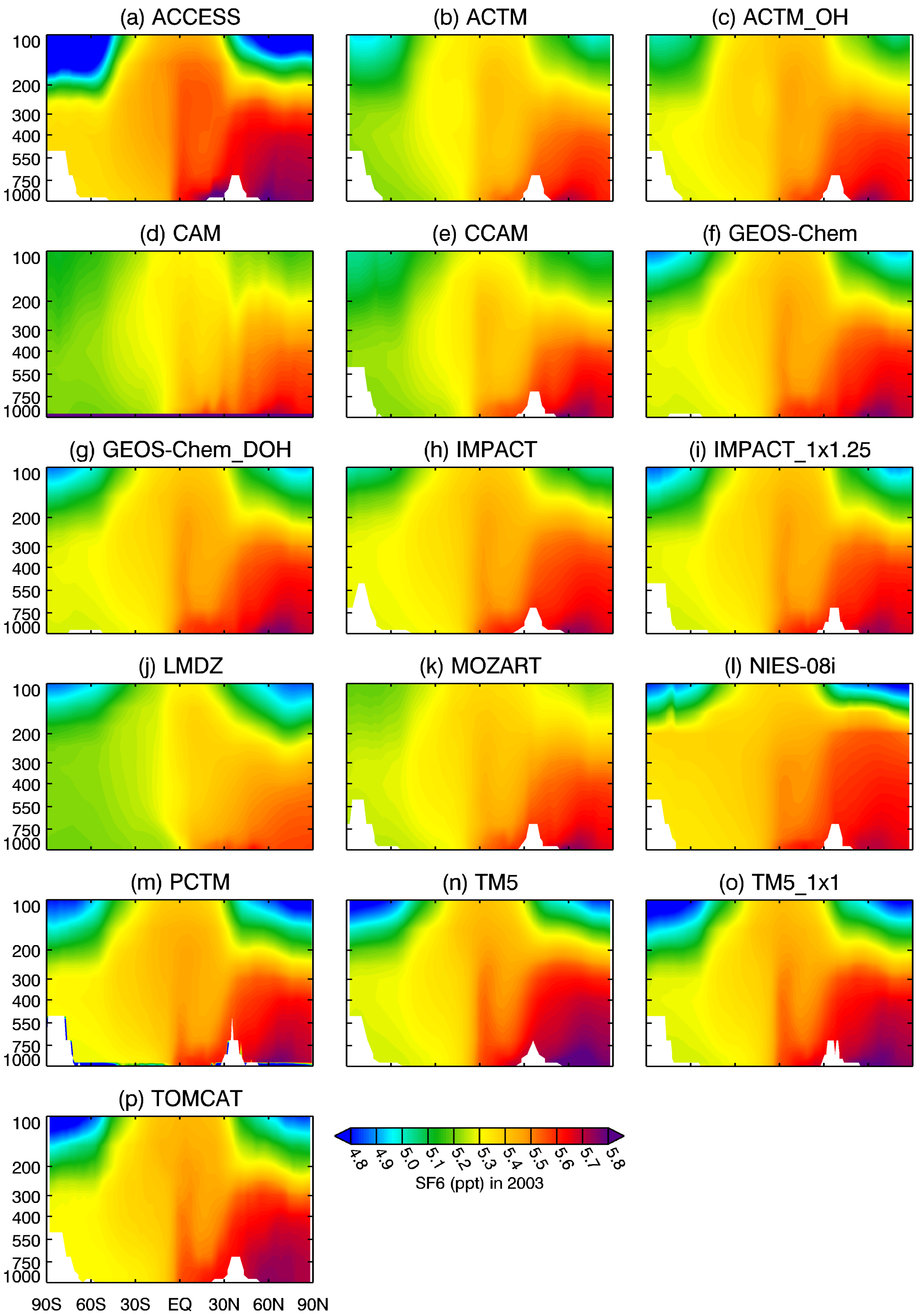

Figure S6: Latitude-pressure SF_6 distribution along the 70°E longitude for the averages during DJF months of the year 2003-2004.

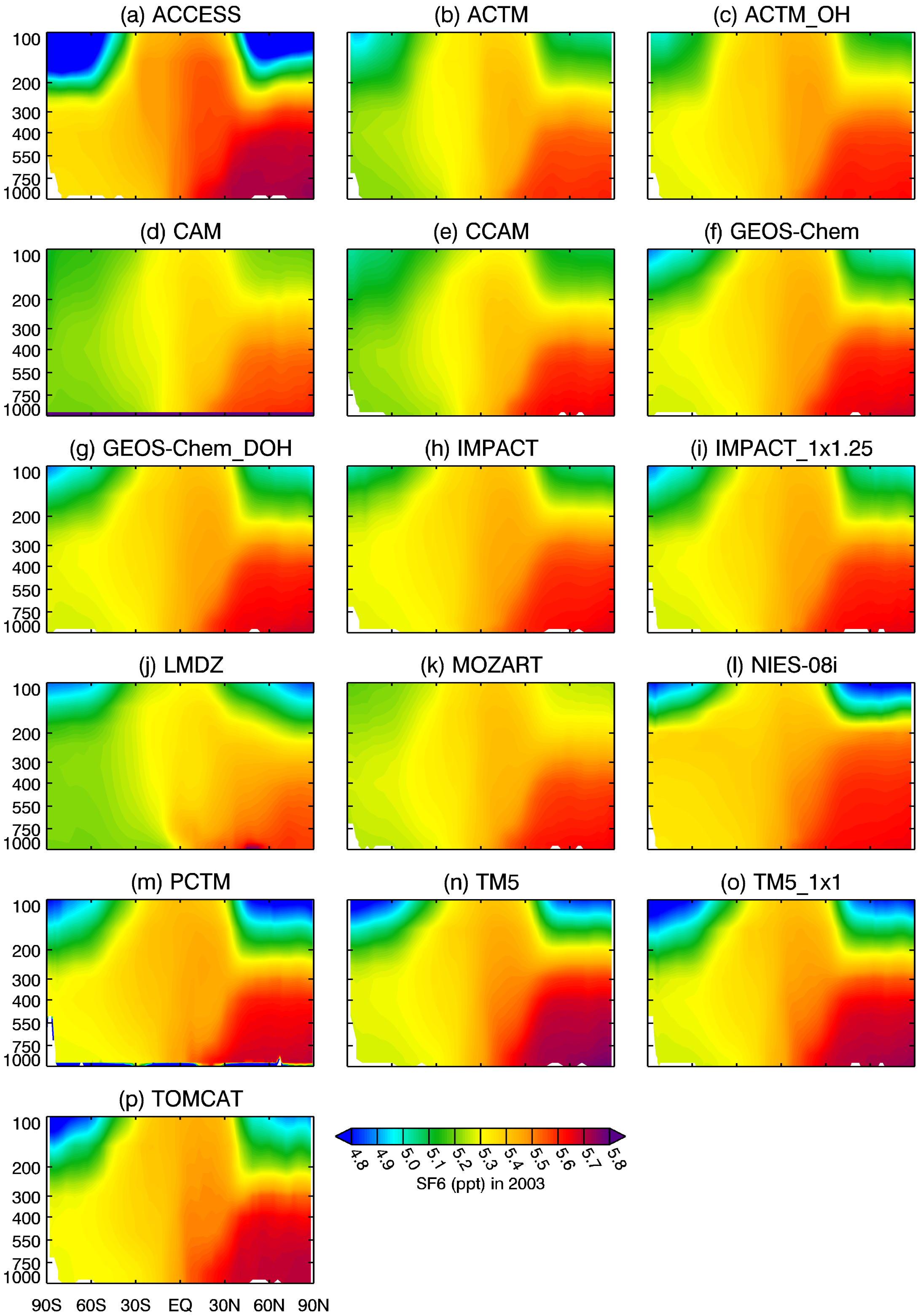

Figure S7: Latitude-pressure SF_6 distribution along the 180°E longitude for the averages during DJF months of the year 2003-2004.

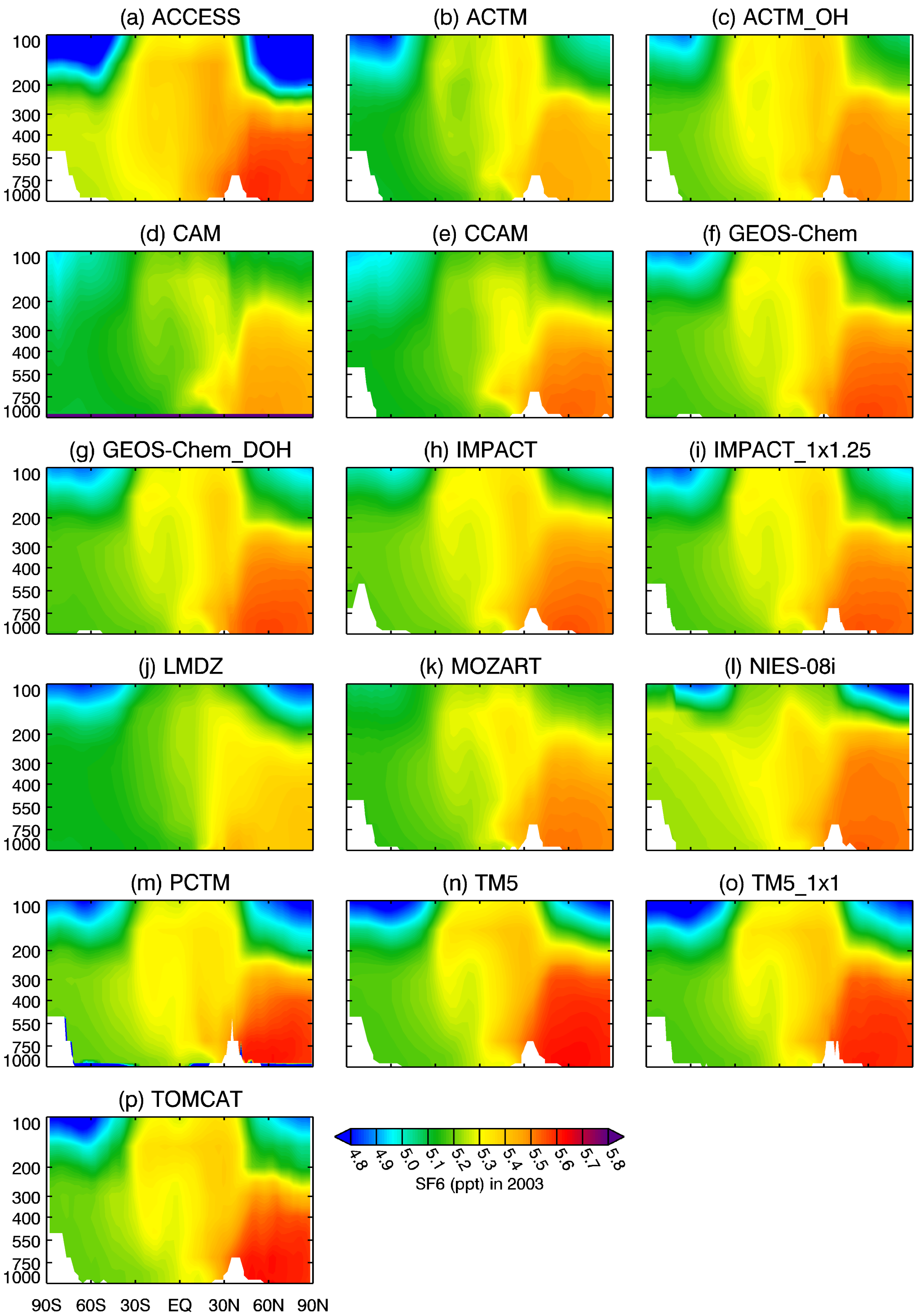

Figure S8: Latitude-pressure SF_6 distribution along the 70°E longitude for the averages during JJA months of the year 2003.

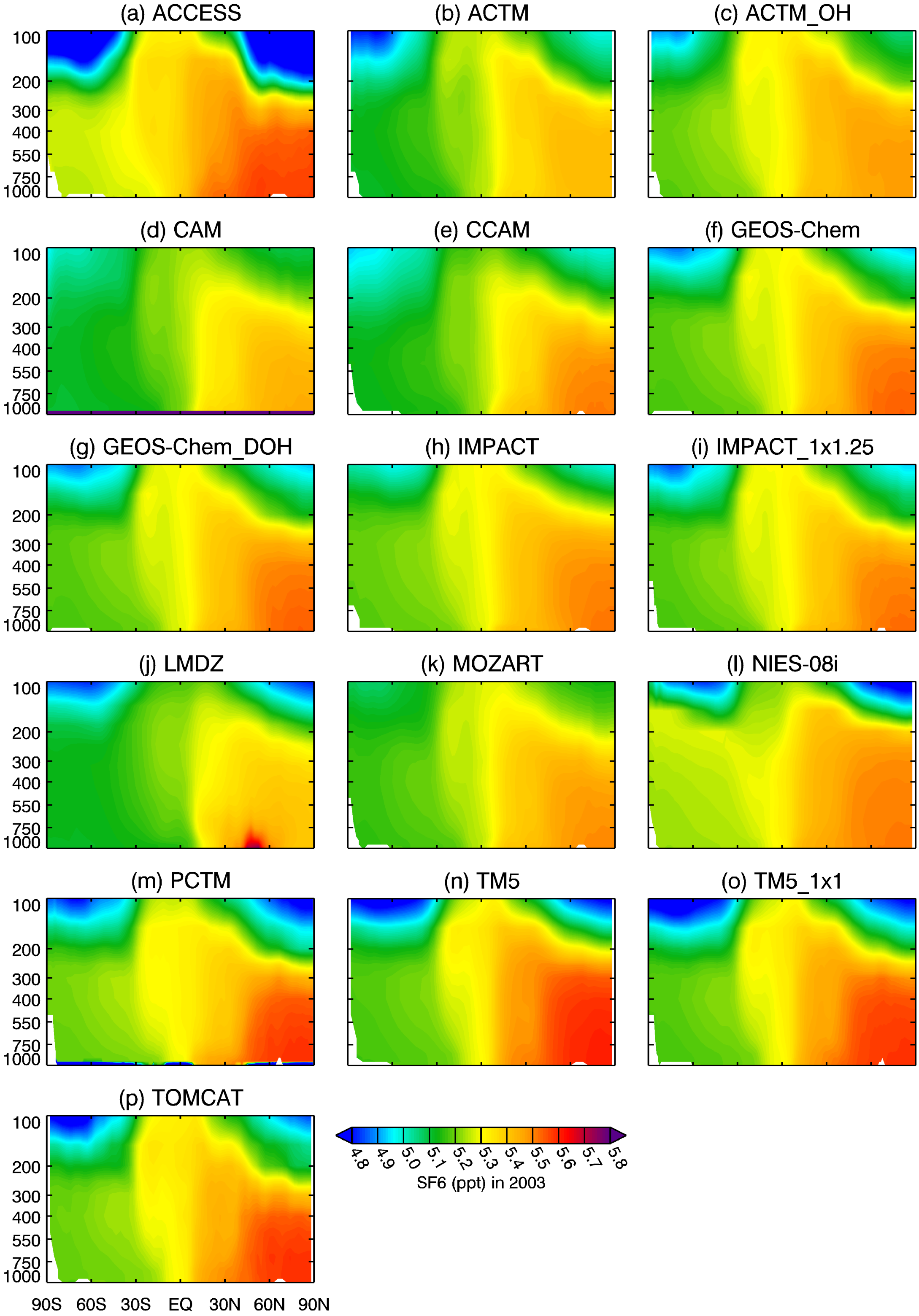

Figure S9: Latitude-pressure SF_6 distribution along the 180°E longitude for the averages during JJA months of the year 2003.

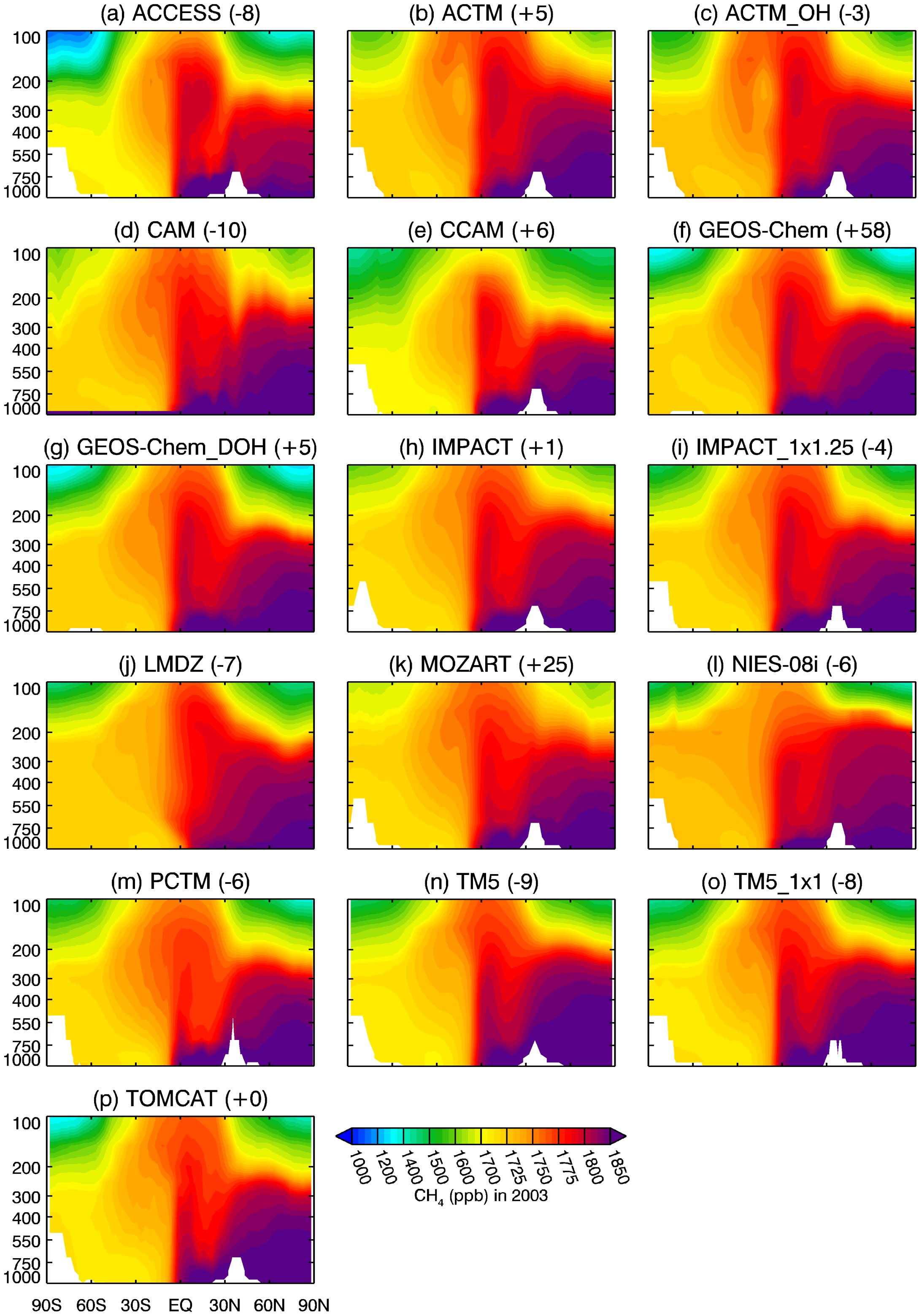

Figure S10: Latitude-pressure CH_4 distribution along the 70°E longitude for the averages during DJF months of the year 2003-2004. Note the unequal colour bar.

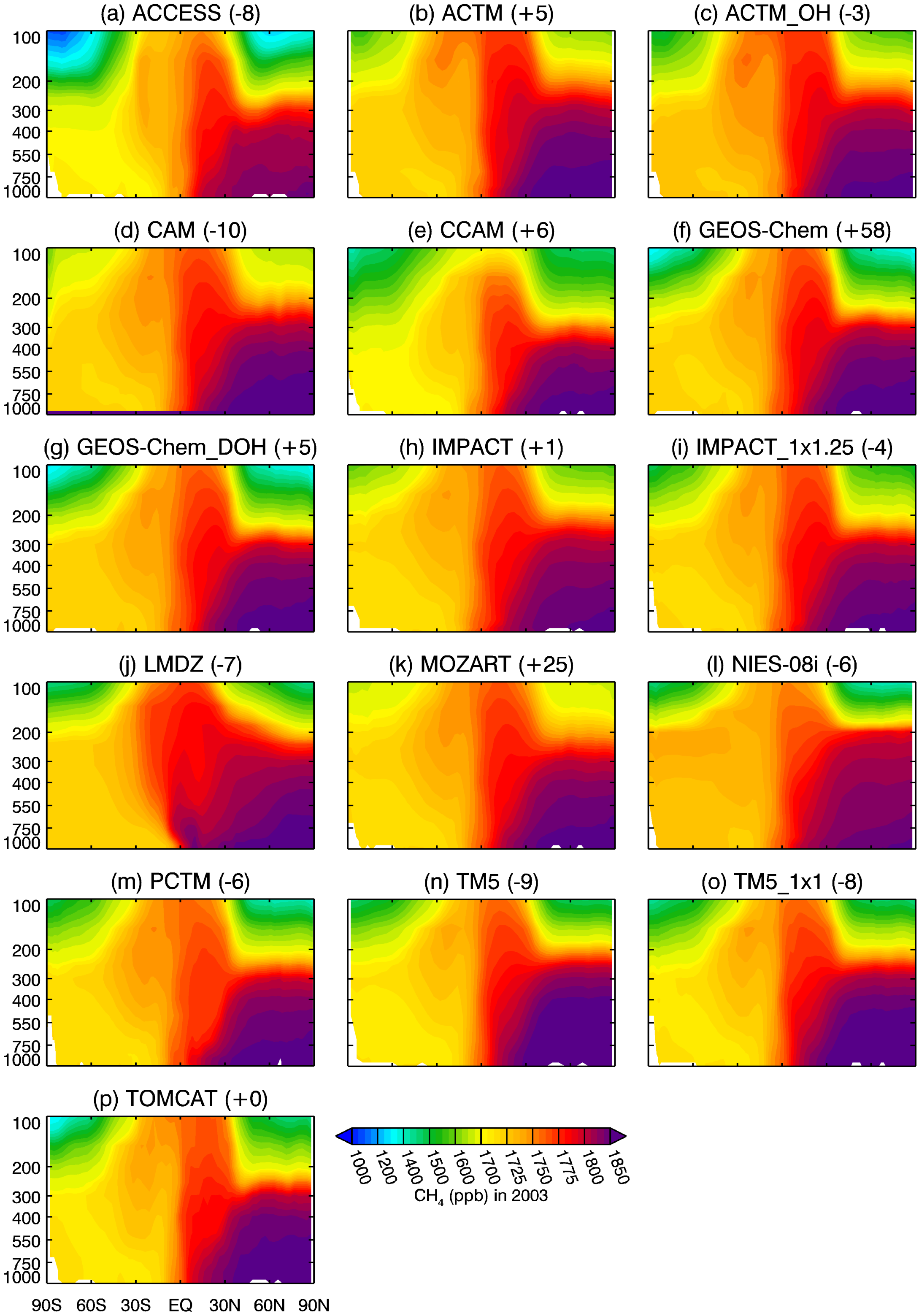

Figure S11: Latitude-pressure CH_4 distribution along the 180°E longitude for the averages during DJF months of the year 2003-2004. Note the unequal colour bar.

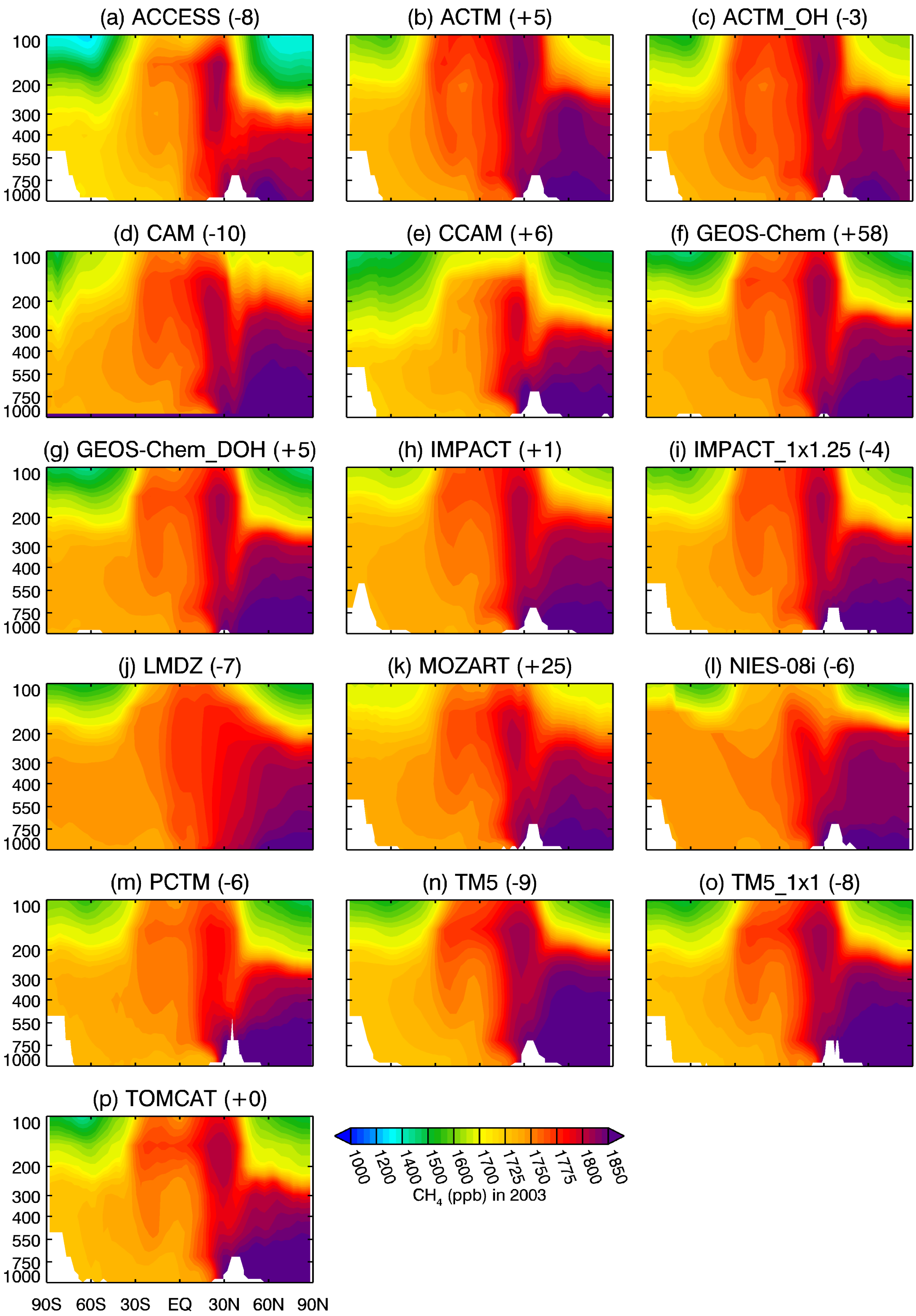

Figure S12: Latitude-pressure CH_4 distribution along the 70°E longitude for the averages during JJA months of the year 2003. Note the unequal colour bar.

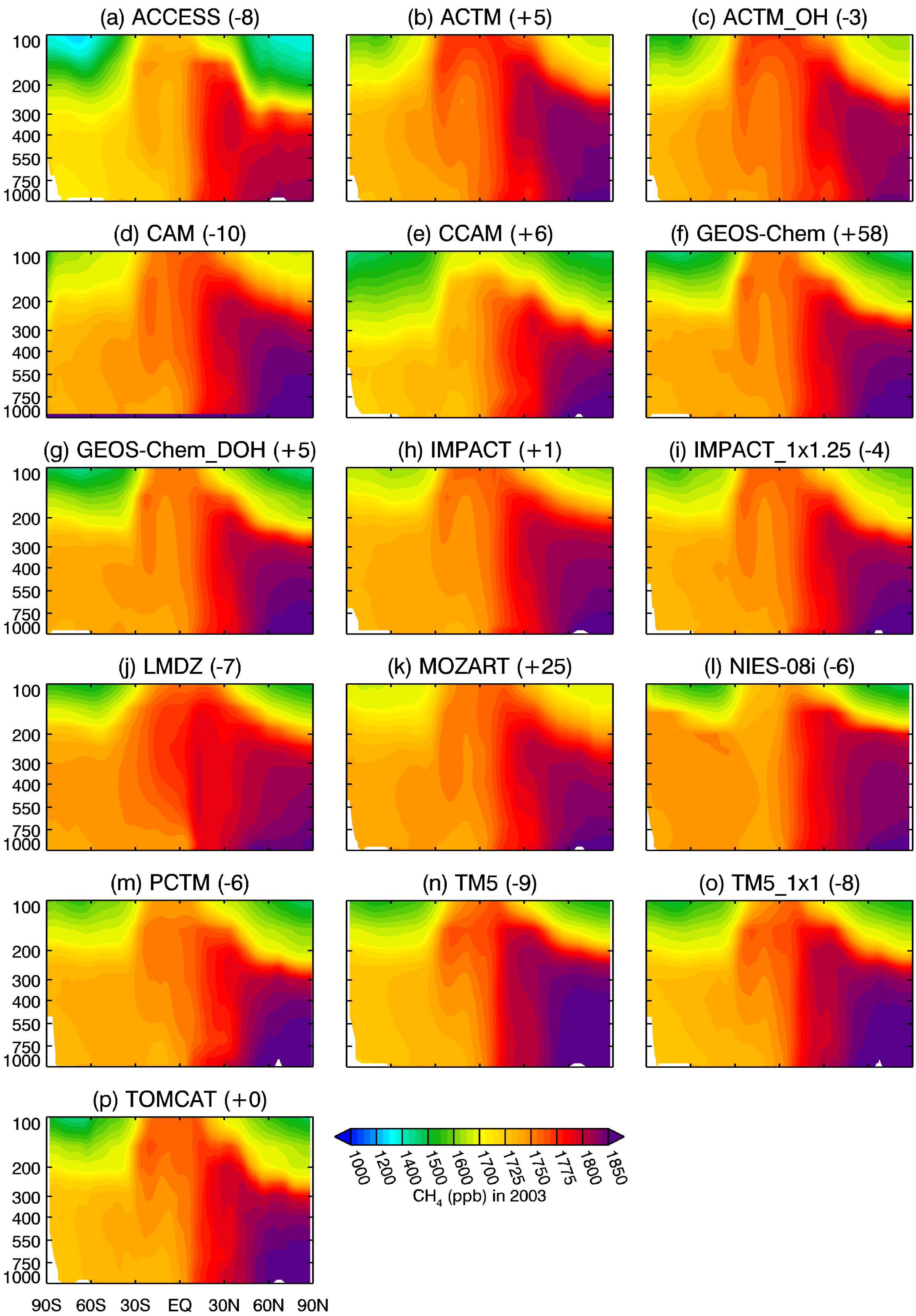

Figure S13: Latitude-pressure CH_4 distribution along the 180°E longitude for the averages during JJA months of the year 2003. Note the unequal colour bar.

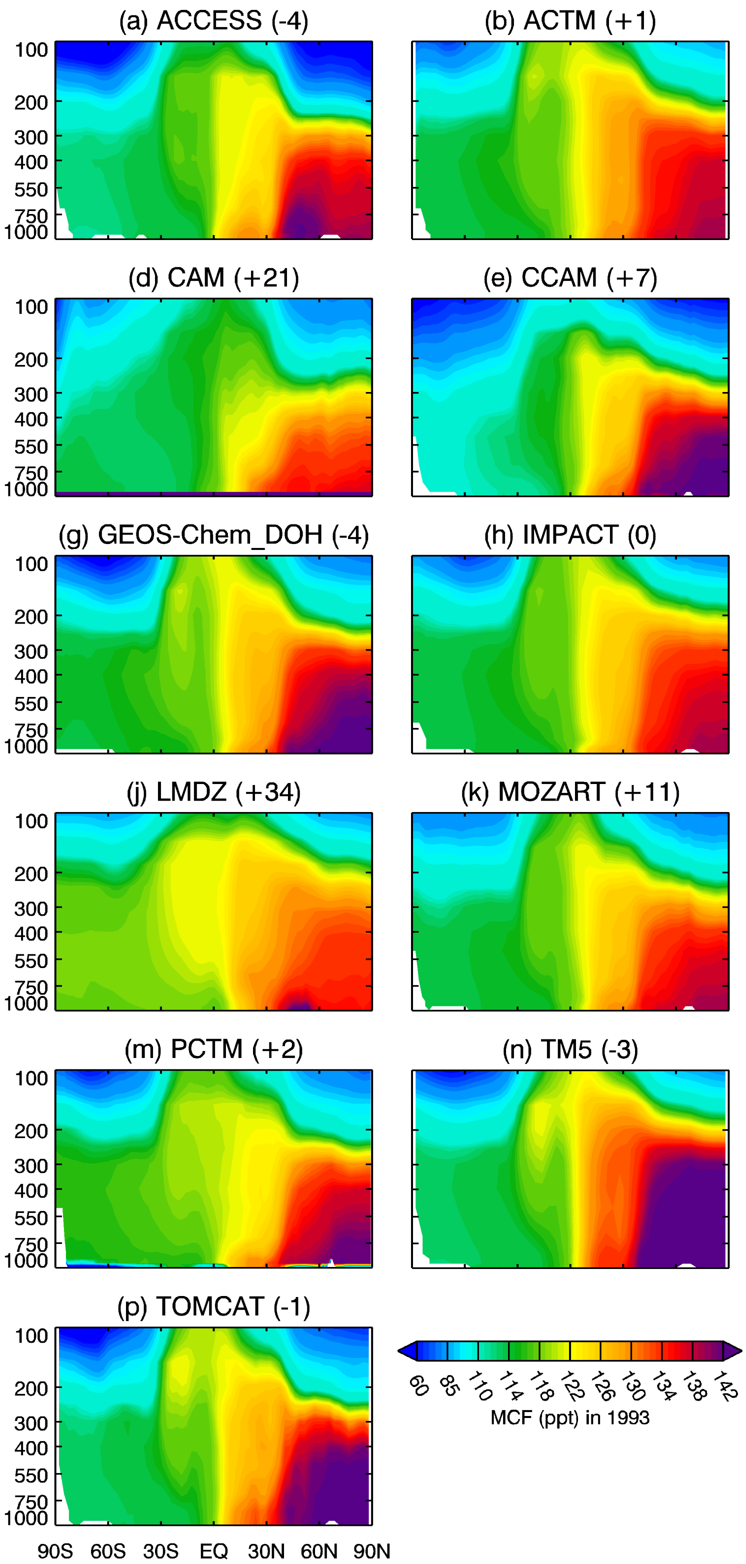

Figure S14: Latitude-pressure CH_3CCl_3 distribution along the 180°E longitude for the averages during JJA months of the year 1993. Note the unequal colour bar.

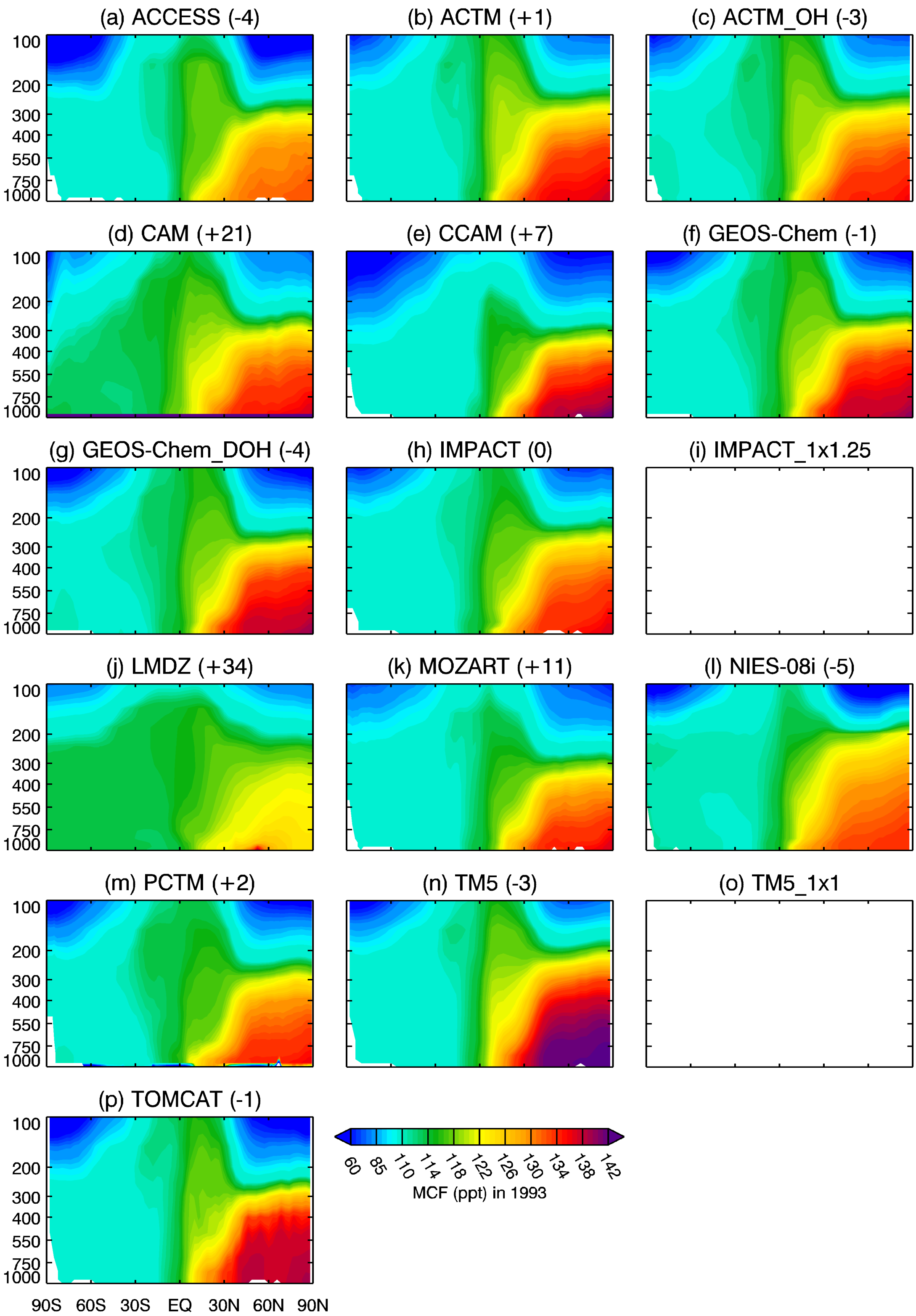

Figure S15: Latitude-pressure CH_3CCl_3 distribution along the 180°E longitude for the averages during DJF months of the year 1993-1994. Note the unequal colour bar.

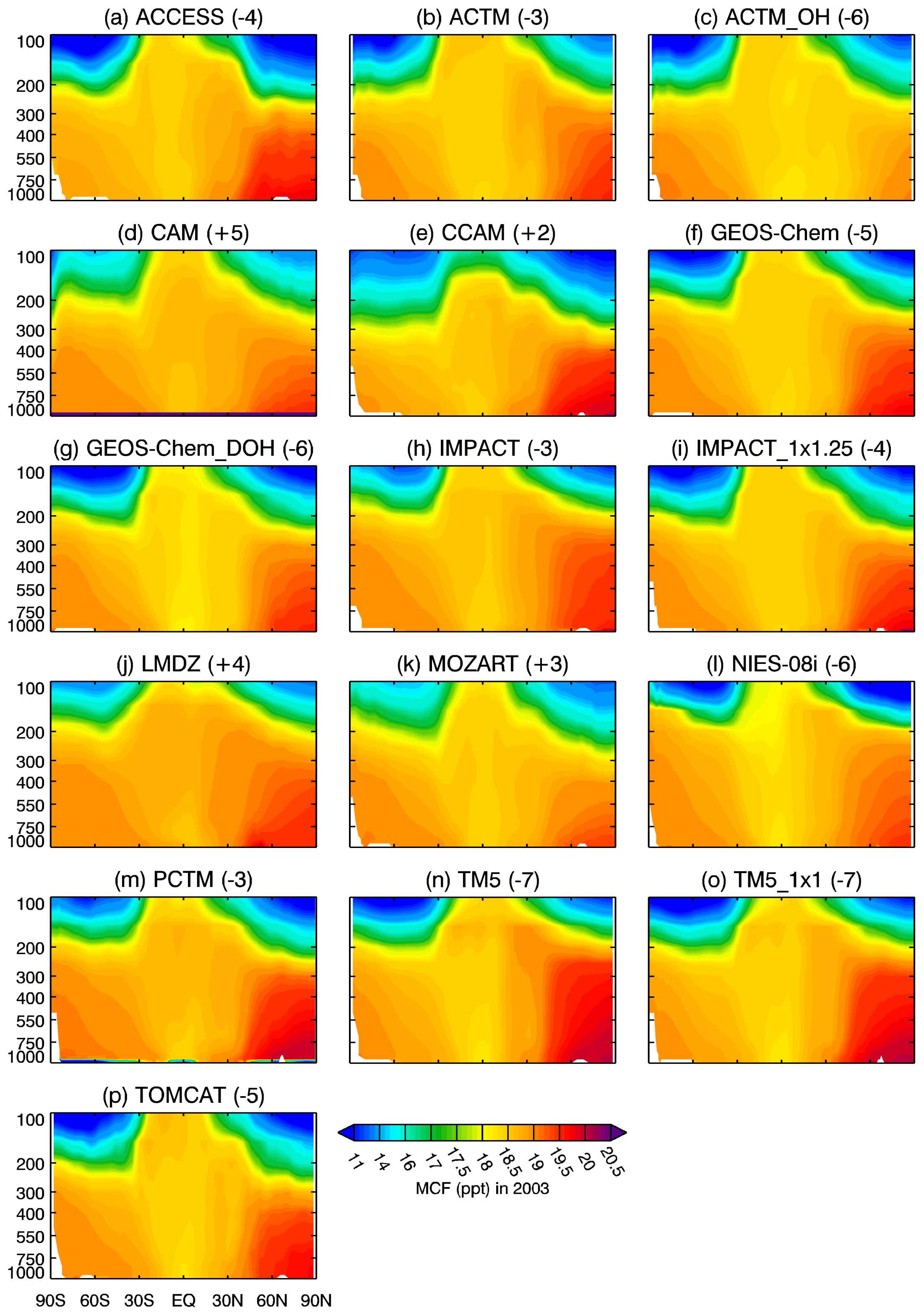

Figure S16: Latitude-pressure CH_3CCl_3 distribution along the 180°E longitude for the averages during JJA months of the year 2003. Note the unequal colour bar.

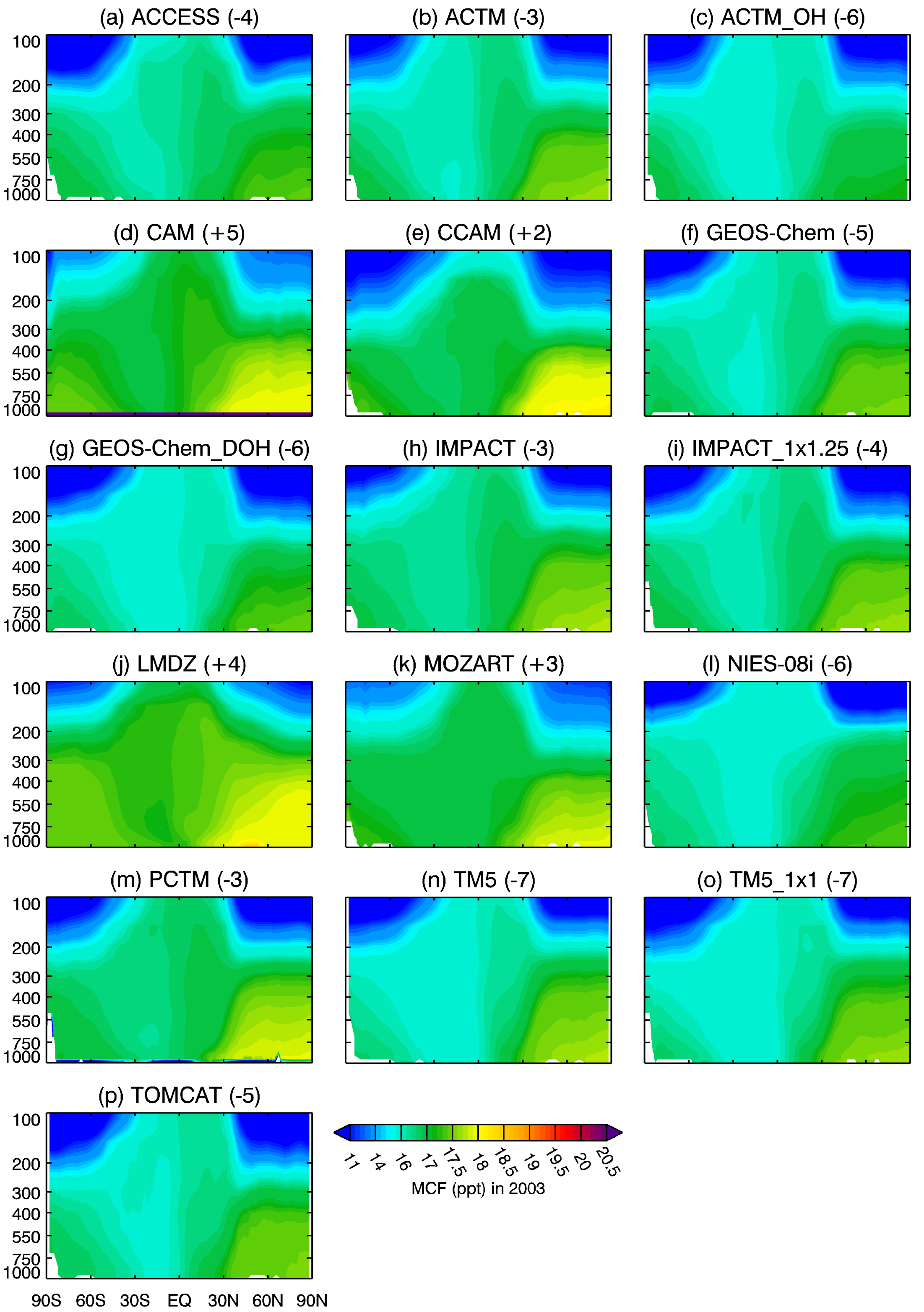

Figure S17: Latitude-pressure CH_3CCl_3 distribution along the 180°E longitude for the averages during DJF months of the year 2003-2004. Note the unequal colour bar.

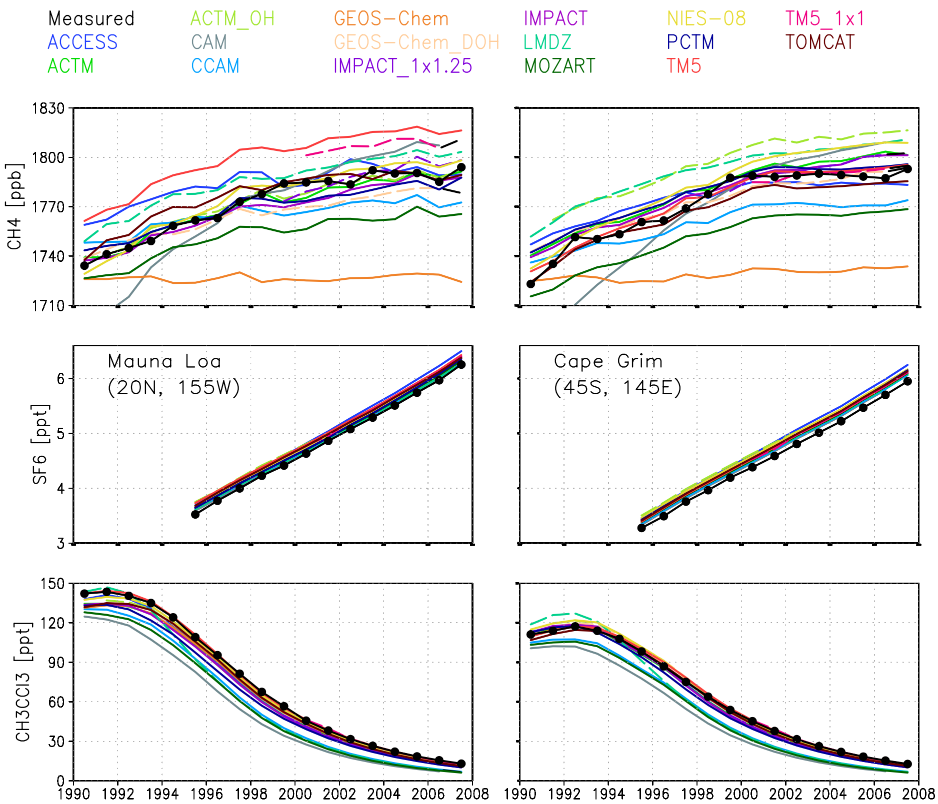

Figure S18: Annual mean timeseries at MLO and CGO suggesting that all models started with relatively similar initial conditions for CH4, but drifted away with time depending on the model behaviour. Fig. S19 shows the simulated time series integrated for the whole troposphere at monthly time intervals.

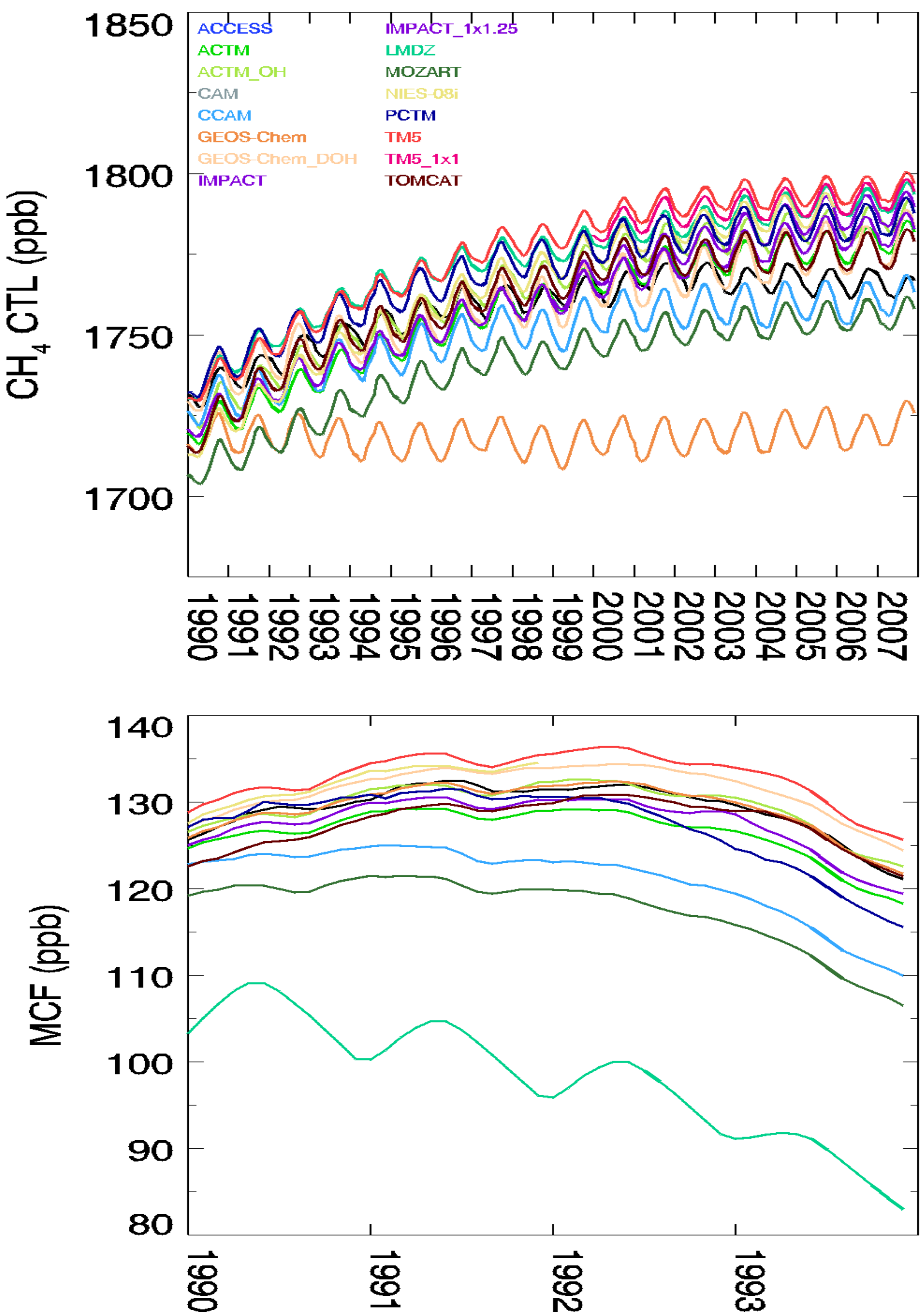

Figure S19: Monthly-mean model values integrated for the troposphere (850-200 mb) for CH_4_CLT (top) and CH_3CCl_3 (bottom). This is also to show that the initial values of model played relatively minor role for the CH_4 and CH_3CCl_3 model-to-model differences. Note the model spread increased significantly from 1990 to 1993 for CH_3CCl_3 or to the end of the simulation for CH_4.

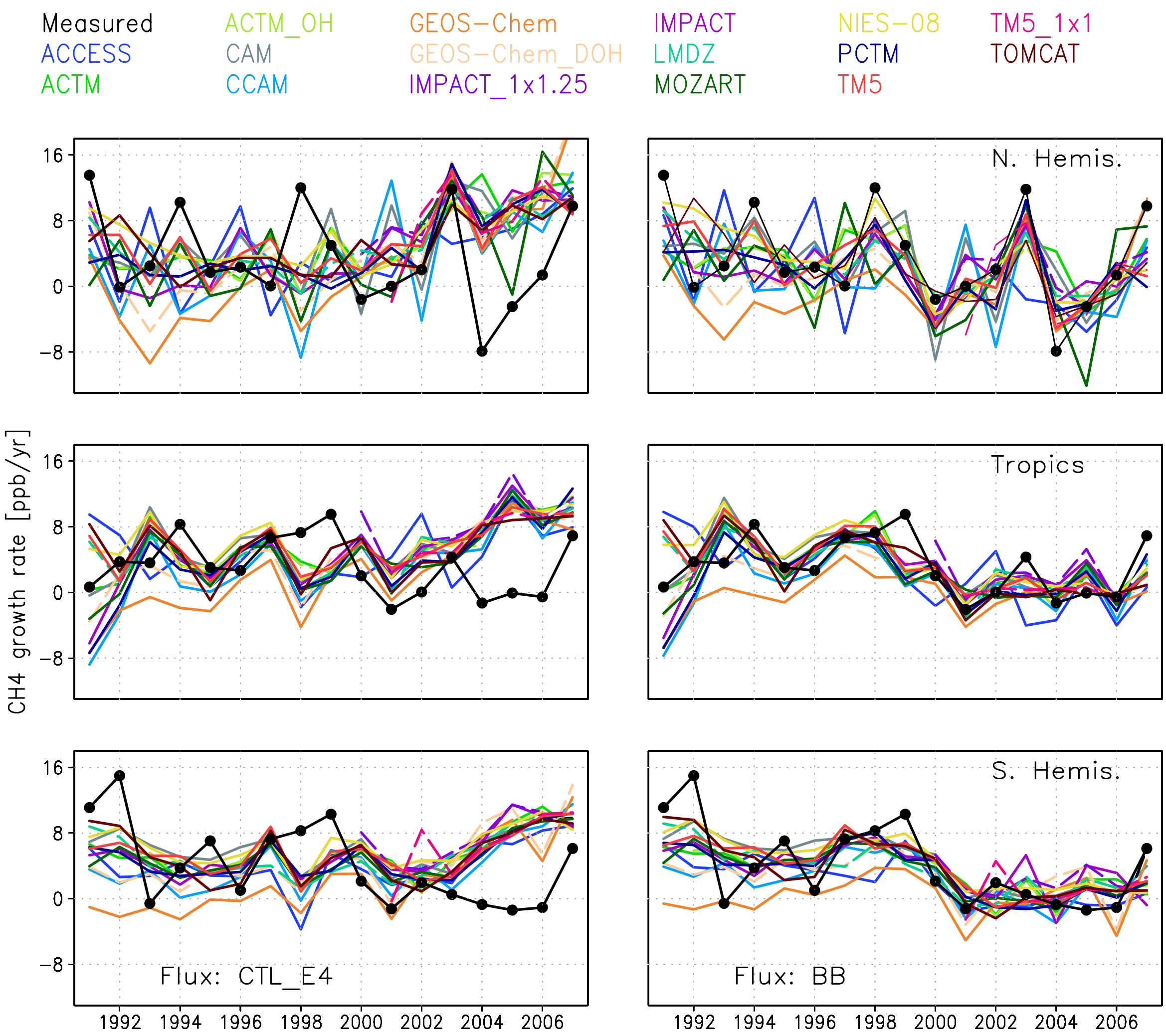

Figure S20: Same as Figure 6, but for CH_4_CTL_E4 (left column) and CH_4_BB (right column) tracers.

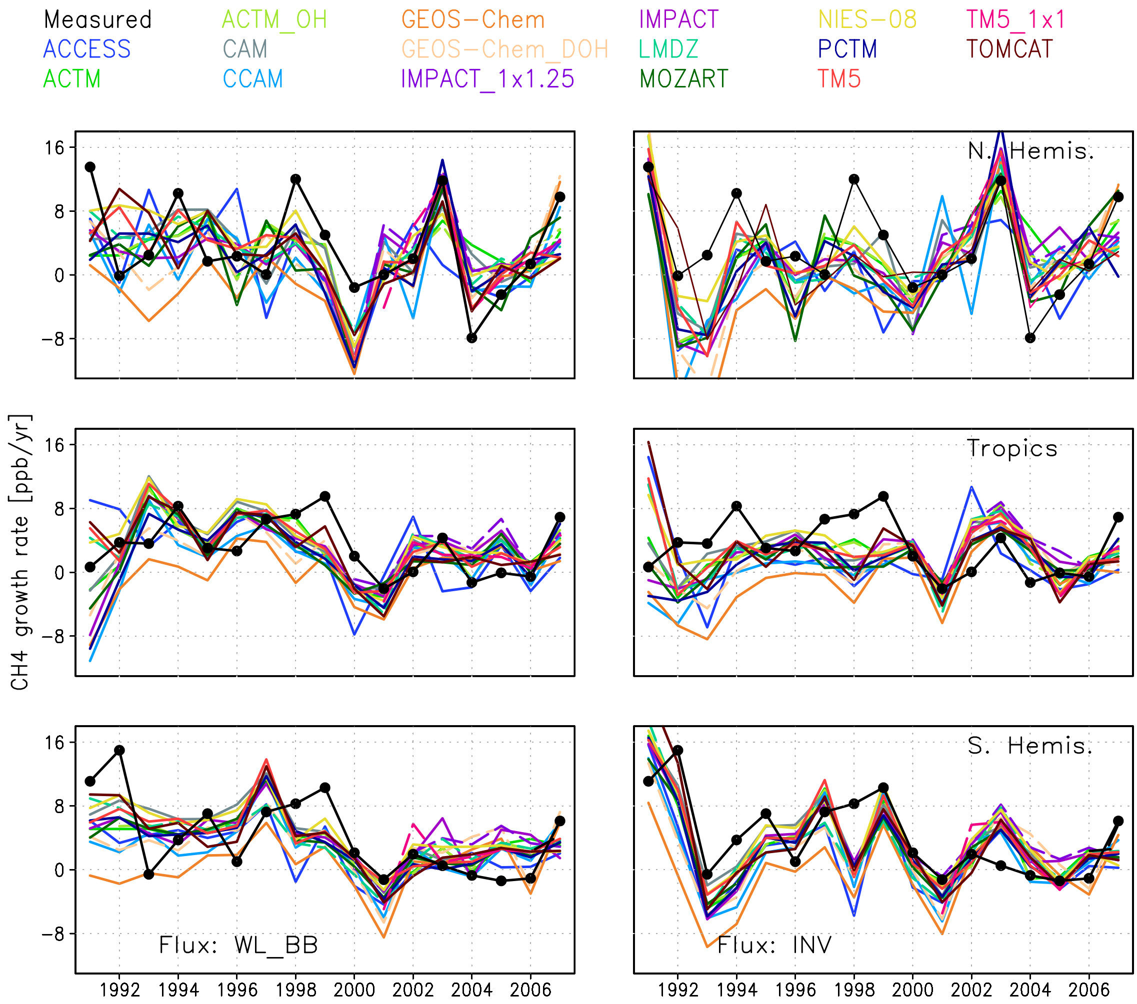

Figure S21: Same as Figure 6, but for CH_4_WL_BB (left column) and CH_4_INV (right column) tracers.

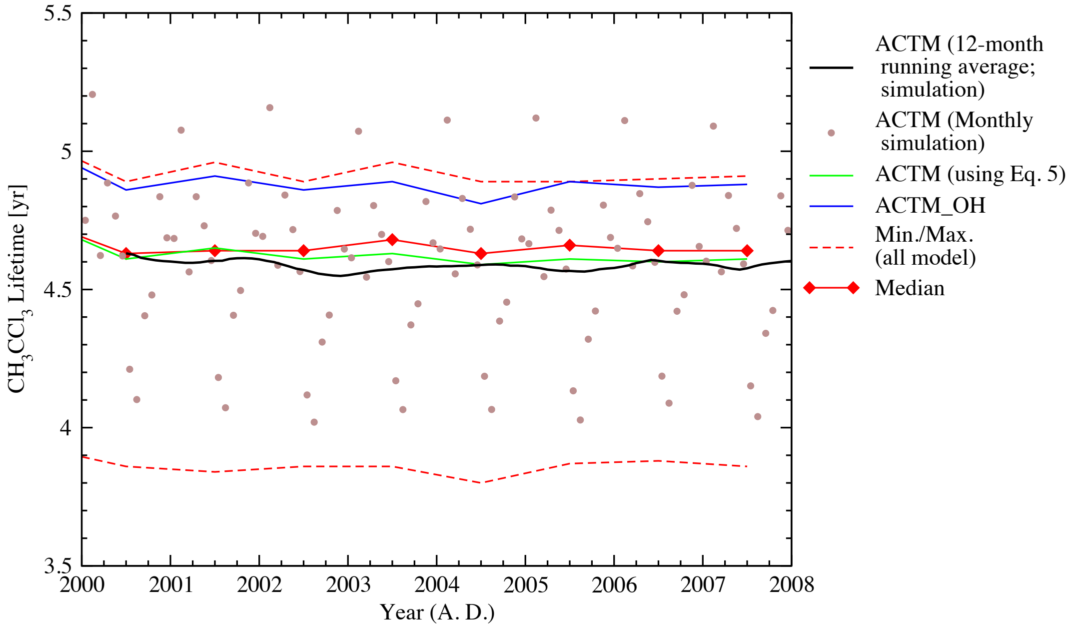

Figure S22: Comparison of CH_3CCl_3 lifetimes calculated using ACTM photochemical loss rate at each model grid (black line; symbols) and Eqn. 5 of the main text for ACTMs (green & blue lines). The median and range of all models are also shown for a reference (red lines). The average lifetimes over the 2000-2007 period using Eq. 5 and aggregating grided ACTM loss rates are 4.60 and 4.59, respectively.