

CCM Data Request Version 1 August 2011

Model output (except for 3D instantaneous data described in Section 1.1) is requested for every year, on **CCMVal standard pressure levels**:

- 1000 850 700 500 400 300 250 200 170 150 130 115 100 90 80 70 50 30 20 15 10 7 5 3 2 1.5 1 0.5 0.3 0.2 0.1

1. Monthly Mean Data

1.1 Fields T3M: 3D monthly mean fields (Latitude-Longitude-Pressure)

Dynamical fields

- Temperature
- Z (Geopotential height)
- U (zonal wind), V (meridional wind), Omega (pressure vertical velocity)
- Potential Vorticity

Chemical fields

- O₃, H₂O, OH, HCl
- Age of Air, idealized age tracers
- CFCl₃, CF₂Cl₂, CCl₄, CH₃CCl₃, CHClF₂, N₂O, CH₄ (**Priority 1**)
- Halon-1211, Halon-1301, CFC-113, CFC-115, HFC-134a, HFC-143a, HFC-23 (**Priority 2**)
- CFC-114, HCFC-141b, HCFC-142b, CH₃Cl, CH₃Br, Halon-1202, Halon-2402, HFC-32, HFC-125, HFC-152a, HFC-227ea, HFC-245fa (**Priority 3**)
- Mass conservation tracer
- CFCl₃_FBC, CF₂Cl₂_FBC, CH₃CCl₃_FBC, CHClF₂_FBC
- CFCl₃_Const, CF₂Cl₂_Const, CH₃CCl₃_Const, N₂O_Const, CH₄_Const

J-rate fluxes (J x[X]):

- J_CFCl₃, J_CF₂Cl₂, J_CCl₄, J_N₂O, J_CH₃CCl₃ (**Priority 1**)
- J_Halon-1211, J_Halon-1301, J_CFC-113, J_CFC-115 (**Priority 2**)
- J_CFC-114, J_HCFC-141b, J_HCFC-142b, J_CH₃Cl, J_CH₃Br, J_Halon-1202, J_Halon-2402 (**Priority 3**)
- J_CFCl₃_FBC, J_CF₂Cl₂_FBC, J_CH₃CCl₃_FBC
- J_CFCl₃_Const, J_CF₂Cl₂_Const, J_N₂O_Const, J_CH₃CCl₃_Const

Thermal reaction rate fluxes :

- **Priority 1 species:**
 - CFCl₃: k[CFCl₃][O(¹D)]
 - CF₂Cl₂: k[CF₂Cl₂][O(¹D)]
 - CH₃CCl₃: k[CH₃CCl₃][OH]

- HCFC-22: k[HCFC-22][OH], k[HCFC-22][O(¹D)]
- N₂O: k[N₂O][O(¹D)]
- CH₄: k[CH₄][OH], k[CH₄][O(¹D)]
- **Priority 2 species:**
 - Halon-1211: k[Halon-1211][O(¹D)]
 - Halon-1301: k[Halon-1301][O(¹D)]
 - CFC-113: k[CFC-113][O(¹D)]
 - CFC-115: k[CFC-115][O(¹D)]
 - HFC-134a: k[HFC-134a][OH], k[HFC-134a][O(¹D)]
 - HFC-143a: k[HFC-143a][OH], k[HFC-143a][O(¹D)]
 - HFC-23: k[HFC-23][OH], k[HFC-23][O(¹D)]
- **Priority 3 species:**
 - CFC-114: k[CFC-114][O(¹D)]
 - HCFC-141b: k[HCFC-141b][OH], k[HCFC-141b][O(¹D)]
 - HCFC-142b: k[HCFC-142b][OH], k[HCFC-142b][O(¹D)]
 - CH₃Cl: k[CH₃Cl][OH], k[CH₃Cl][O(¹D)], k[CH₃Cl][Cl]
 - CH₃Br: k[CH₃Br][OH], k[CH₃Br][O(¹D)], k[CH₃Br][Cl]
 - Halon-1202: k[Halon-1202][O(¹D)]
 - Halon-2402: k[Halon-2402][O(¹D)]
 - HFC-32: k[HFC-32][OH], k[HFC-32][O(¹D)], k[HFC-32][Cl]
 - HFC-125: k[HFC-125][OH], k[HFC-125][O(¹D)], k[HFC-125][Cl]
 - HFC-152a: k[HFC-152a][OH], k[HFC-152a][O(¹D)], k[HFC-152a][Cl]
 - HFC-227ea: k[HFC-227ea][OH], k[HFC-227ea][O(¹D)], k[HFC-227ea][Cl]
 - HFC-245ea: k[HFC-245ea][OH], k[HFC-245ea][O(¹D)], k[HFC-245ea][Cl]
- **FBC species:**
 - CFCl₃_FBC: k[CFCl₃_FBC][O(¹D)]
 - CF₂Cl₂_FBC: k[CF₂Cl₂_FBC][O(¹D)]
 - CH₃CCl₃_FBC: k[CH₃CCl₃_FBC][OH]
 - HCFC-22_FBC: k[HCFC-22_FBC][OH], k[HCFC-22_FBC][O(¹D)]
- **Ideal Constant species:**
 - CFCl₃_Const: k[CFCl₃_Const][O(¹D)]
 - CF₂Cl₂_Const: k[CF₂Cl₂_Const][O(¹D)]
 - CH₃CCl₃_Const: k[CH₃CCl₃_Const][OH]
 - N₂O_Const: k[N₂O_Const][O(¹D)]
 - CH₄_Const: k[CH₄_Const][OH], k[CH₄_Const][O(¹D)]

1.2 Fields T2Ms and T02Ms: 2D monthly mean fields (Latitude-Longitude)

- Surface pressure, sea surface temperature
- Tropopause pressure, temperature and altitude
- Total column O₃

1.3 Fields T2Mz: 2D monthly zonal mean fields (Latitude-pressure)

(Similar to CCMVal data request)

2D monthly zonal mean dynamical fields

- Temperature
- U (zonal wind), V (meridional wind)
- Geopotential height.

2D monthly zonal mean chemical fields

- O₃, H₂O, Age of Air
- CFCl₃, CF₂Cl₂, CCl₄, CH₃CCl₃, CHClF₂, N₂O, CH₄ (**Priority 1**)
- Halon-1211, Halon-1301, CFC-113, CFC-115, HFC-134a, HFC-143a, HFC23 (**Priority 2**)
- CFC-114, HCFC-141b, HCFC-142b, CH₃Cl, CH₃Br, Halon-1202, Halon-2402, HFC-32, HFC-125, HFC-152a, HFC-227ea, HFC-245fa (**Priority 3**)
- CFCl₃_FBC, CF₂Cl₂_FBC, CH₃CCl₃_FBC, CHClF₂_FBC
- HNO₃, HCl, ClONO₂
- Cl, ClO, Cl₂O₂, HOCl, ClONO₂, OClO, Cl_y
- OH, HO₂, H₂O₂, H₂
- N, NO, NO₂, HNO₃, N₂O₅, HNO₄, NO_y
- Br, BrO, BrCl, HBr, HOBr, BrONO₂, Br_y
- All other Cl/Br species so we can calculate total vmr

2D monthly zonal mean latitude-height fields for the EP-flux (F_y, F_z), acceleration from the EP-flux divergence (D), residual meridional circulation (v^*/w^*).

2D monthly zonal mean latitude-height fields for the **westerly acceleration from the total (orographic + non-orographic) gravitywave drag (GWD)** derived either from daily means or 6hr fields (use instantaneous daily fields or 12 hr fields if the 6 hr data are not available). Use the accelerations as applied in your model (Units: m/s per day).

2. Annual Mean Data

(Similar to CCMVal data request with the addition of implied surface fluxes)

Fields TOAs: 0D (global, annual average) fields

For each year of simulations the following information is requested for lifetime calculations:

2.1 Total yearly average burden, B (in total # of molecules) for:

- CFCl₃, CF₂Cl₂, CCl₄, CH₃CCl₃, CHClF₂, N₂O, CH₄ (**Priority 1**)
- Halon-1211, Halon-1301, CFC-113, CFC-115, HFC-134a, HFC-143a, HFC23 (**Priority 2**)
- CFC-114, HCFC-141b, HCFC-142b, CH₃Cl, CH₃Br, Halon-1202, Halon-2402, HFC-32, HFC-125, HFC-152a, HFC-227ea, HFC-245fa (**Priority 3**)
- CFCl₃_FBC, CF₂Cl₂_FBC, CH₃CCl₃_FBC, CHClF₂_FBC

2.2 Total yearly implied surface fluxes for:

- CFCl₃, CF₂Cl₂, CCl₄, CH₃CCl₃, CHClF₂, N₂O, CH₄ (**Priority 1**)
- Halon-1211, Halon-1301, CFC-113, CFC-115, HFC-134a, HFC-143a, HFC23 (**Priority 2**)
- CFC-114, HCFC-141b, HCFC-142b, CH₃Cl, CH₃Br, Halon-1202, Halon-2402, HFC-32, HFC-125, HFC-152a, HFC-227ea, HFC-245fa (**Priority 3**)

3. Instantaneous Daily Data

Requested for every 1st and 15th day of the month for:

- Every 3 years prior to 1990
- Every year between 1990-2010
- Every year in TS2000 and TS2100

These data should be on the actual model vertical levels (i.e. pressure, sigma or hybrid levels).

Dynamical fields

- Pressure
- Temperature
- Z (Geopotential height)
- U (zonal wind), V (meridional wind), Omega (pressure vertical velocity)
- Potential vorticity

Chemical fields

- O₃, HCl, H₂O
- O(³P), O(¹D), OH
- CFCl₃, CF₂Cl₂, CCl₄, CH₃CCl₃, CHClF₂, N₂O, CH₄ (**Priority 1**)
- Halon-1211, Halon-1301, CFC-113, CFC-115, HFC-134a, HFC-143a, HFC-23 (**Priority 2**)
- CFC-114, HCFC-141b, HCFC-142b, CH₃Cl, CH₃Br, Halon-1202, Halon-2402, HFC-32, HFC-125, HFC-152a, HFC-227ea, HFC-245fa (**Priority 3**)
- CFCl₃_FBC, CF₂Cl₂_FBC, CH₃CCl₃_FBC, CHClF₂_FBC
- CFCl₃_Const, CF₂Cl₂_Const, CH₃CCl₃_Const, N₂O_Const, CH₄_Const
- Cl, ClO, Cl₂O₂, HOCl, ClONO₂, OClO, Cl_y
- OH, HO₂, H₂O₂, H₂
- N, NO, NO₂, HNO₃, N₂O₅, HNO₄, NO_y
- Br, BrO, BrCl, HBr, HOBr, BrONO₂, Bry
- Age of air, idealized age tracers

I-rate fluxes (I x[X]):

- J_O₂, J_Cl₂O₂
- J_CFCl₃, J_CF₂Cl₂, J_CCl₄, J_N₂O (**Priority 1**)
- J_Halon-1211, J_Halon-1301, J_CFC-113, J_CFC-115 (**Priority 2**)

- J_CFC-114, J_HCFC-141b, J_HCFC-142b, J_CH3Cl, J_CH3Br, J_Halon-1202, J_Halon-2402 (**Priority 3**)
- J_CFCl₃_FBC, J_CF₂Cl₂_FBC, J_CH₃CCl₃_FBC
- J_CFCl₃_Const, J_CF₂Cl₂_Const, J_N₂O_Const, J_CH₃CCl₃_Const

Thermal reaction rate fluxes :

- **Priority 1 species:**
 - CFCl₃: k[CFCl₃][O(¹D)]
 - CF₂Cl₂: k[CF₂Cl₂][O(¹D)]
 - CH₃CCl₃: k[CH₃CCl₃][OH]
 - HCFC-22: k[HCFC-22][OH], k[HCFC-22][O(¹D)]
 - N₂O: k[N₂O][O(¹D)]
 - CH₄: k[CH₄][OH], k[CH₄][O(¹D)]
- **Priority 2 species:**
 - Halon-1211: k[Halon-1211][O(¹D)]
 - Halon-1301: k[Halon-1301][O(¹D)]
 - CFC-113: k[CFC-113][O(¹D)]
 - CFC-115: k[CFC-115][O(¹D)]
 - HFC-134a: k[HFC-134a][OH], k[HFC-134a][O(¹D)]
 - HFC-143a: k[HFC-143a][OH], k[HFC-143a][O(¹D)]
 - HFC-23: k[HFC-23][OH], k[HFC-23][O(¹D)]
- **Priority 3 species:**
 - CFC-114: k[CFC-114][O(¹D)]
 - HCFC-141b: k[HCFC-141b][OH], k[HCFC-141b][O(¹D)]
 - HCFC-142b: k[HCFC-142b][OH], k[HCFC-142b][O(¹D)]
 - CH₃Cl: k[CH₃Cl][OH], k[CH₃Cl][O(¹D)], k[CH₃Cl][Cl]
 - CH₃Br: k[CH₃Br][OH], k[CH₃Br][O(¹D)], k[CH₃Br][Cl]
 - Halon-1202: k[Halon-1202][O(¹D)]
 - Halon-2402: k[Halon-2402][O(¹D)]
 - HFC-32: k[HFC-32][OH], k[HFC-32][O(¹D)], k[HFC-32][Cl]
 - HFC-125: k[HFC-125][OH], k[HFC-125][O(¹D)], k[HFC-125][Cl]
 - HFC-152a: k[HFC-152a][OH], k[HFC-152a][O(¹D)], k[HFC-152a][Cl]
 - HFC-227ea: k[HFC-227ea][OH], k[HFC-227ea][O(¹D)], k[HFC-227ea][Cl]
 - HFC-245ea: k[HFC-245ea][OH], k[HFC-245ea][O(¹D)], k[HFC-245ea][Cl]
- **FBC species:**
 - CFCl₃_FBC: k[CFCl₃_FBC][O(¹D)]
 - CF₂Cl₂_FBC: k[CF₂Cl₂_FBC][O(¹D)]
 - CH₃CCl₃_FBC: k[CH₃CCl₃_FBC][OH]
 - HCFC-22_FBC: k[HCFC-22_FBC][OH], k[HCFC-22_FBC][O(¹D)]
- **Ideal Constant species:**
 - CFCl₃_Const: k[CFCl₃_Const][O(¹D)]
 - CF₂Cl₂_Const: k[CF₂Cl₂_Const][O(¹D)]
 - CH₃CCl₃_Const: k[CH₃CCl₃_Const][OH]
 - N₂O_Const: k[N₂O_Const][O(¹D)]
 - CH₄_Const: k[CH₄_Const][OH], k[CH₄_Const][O(¹D)]