NCAR
UCAR

Ben Foster <foster@ucar.edu>

Number density from TIEGCM

4 messages

Alex Chartier <alex.chartier@outlook.com> Tue, Mar 10, 2015 at 12:52 PM
Reply-To: alex.chartier@outlook.com
To: Ben Foster <foster@ucar.edu>

Hi Ben,

What is the definition of mass mixing ratios in TIEGCM?

For atomic oxygen, is this the quantity stored:
MMR_O = N_O *16 / (N_O2 * 32 + N_N2 * 28)

Or is it this:
MMR_O = N_O *16 / (N_O *16 + N_O2 * 32 + N_N2 * 28)

(MMR_O is the mass mixing ratio of O and N_O is the number density of O)

Thanks,

Alex

Alex Chartier <alex.chartier@outlook.com> Tue, Mar 10, 2015 at 12:59 PM
Reply-To: alex.chartier@outlook.com
To: Ben Foster <foster@ucar.edu>

I should have mentioned I am trying to calculate the number density of each species from the mass mixing ratios that are provided by the model.

From: alex.chartier@outlook.com
To: foster@ucar.edu
Subject: Number density from TIEGCM
Date: Tue, 10 Mar 2015 14:52:14 -0400
[Quoted text hidden]

Ben Foster <foster@ucar.edu> Tue, Mar 10, 2015 at 3:25 PM
To: Alex Chartier <alex.chartier@outlook.com>

Alex, I believe the answer to the first question is the 2nd equation for atomic oxygen: o*16/(o*16+o2*32+n2*28). We solve for o2 and o, then define n2 mmr = 1-o2-o (although we have recently added he).

For converting to cm3 number density, I've attached a short subroutine that summarizes how we convert a 3d field "f" from mmr to cm^3. Hope this helps. (actually, now that I look at this, I'm not sure why I defined dlev and zp instead of simply using zlev(k))

--Ben
[Quoted text hidden]
--
Ben Foster
National Center for Atmospheric Research (NCAR)
High Altitude Observatory (HAO)
303-497-1595

denconv.src
2K

Alex Chartier <alex.chartier@outlook.com> Wed, Mar 11, 2015 at 1:59 PM
Reply-To: alex.chartier@outlook.com
To: Ben Foster <foster@ucar.edu>

Thanks Ben. In that case, I think they should be referred to as mass mixing fractions, rather than ratios. I guess the units would be 'mmf' or 'mass mixing fraction' rather than 'mmr'.

Alex

From: foster@ucar.edu
Date: Tue, 10 Mar 2015 15:25:42 -0600
Subject: Re: Number density from TIEGCM
To: alex.chartier@outlook.com
[Quoted text hidden]