

F90 read routine for DOMINO HDF-EOS5 data file

Ruud Dirksen and Folkert Boersma, KNMI, 6 May 2008

The program discussed here reads a DOMINO HDF-EOS5 data file, the standard output format on www.temis.nl. First download DOMINO_he5_datareader.tar and untar by typing

```
>tar -xvf DOMINO_he5_reader.tar.
```

Then to compile and run the fortran90 code successfully, users will need the HDF and HDF-EOS5 libraries. These can be obtained for HDF from <http://hdf.ncsa.uiuc.edu/>, then click HDF4 or DOWNLOADS, and for HDF-EOS5 from <http://hdfeos.org/>, then click SOFTWARE. This takes you to the ECS SDP Toolkit Home Page at NASA. Then click (under What's New) [SCF Toolkit 5.2.15 & associated software have been released](#) (March 12, 2008) for further instructions on how to obtain the HDF-EOS5 libraries. Once the libraries have been installed, the code can be compiled on a linux workstation by typing:

```
>make
```

Note that the paths in your makefile should point at the right locations for the libraries, our makefile only gives an idea where the libraries are at KNMI. This will produce an executable called readomino2_he5.exe. The executable can be run by typing:

```
>readomino2_he5.exe
```

The program main.f90 expects a user-defined path+filename (the one specified in the code (main.f90) should be replaced by the user). It then reads in one track of data in subroutine read_omi_tropno2 and stores the data in an object called no2data. The object no2data is a 2-dimensional array of structures, the size of the is identical to the orbit that has been read.

In the sample code we read in one track of data, and print to screen minimum and maximum values of a number of entries only. The very first print statement should tell us that the surface albedo values encountered in the particular track read in in the sample code (OMI-Aura_L2-OMDOMINO_2004m1112t1028-o01750_v003-2008m0326t190238.he5). For the example the first output line reads:

```
SurfaceAlbedo      -0.1267651E+31      0.9770000
```

Or, the albedo contains values (after applying the scale factor of 0.0001) between a fill-value and 0.977. Users can print any other fields of the structure no2data, as specified at the end of subroutine printdata in main.f90.

There are a few minor things to be aware of when using the code for reading in DOMINO data in the HE5 format. Before 1 February 2006, the DOMINO system has been using a 35-layer definition in TM4 based on interpolated ECMWF meteorological fields. For datafiles with a date past the date of 1 February 2006, the number of layers has been changed (from 35 to 34) due to the ECMWF transition to a 91-layer grid, that was optimally interpolated to 34 layers for application to TM4 (also see Product Specification Document). In the program the global parameter MAX_presslevels (Mdatastruct.f90) is set to 35 to make sure that the array where the kernel is to be stored is large enough; the value of this parameter shouldn't be altered. The subroutine read_OMI_tropNO2 returns a parameter, npressurelevels, that holds the true length of the averaging kernel.