Purpose :

This is the readme file for the AVHRR PATHFINDER products extracted on the "Atlantique-Afrique" area of interest of the AMMA project.

Date:

This file was created on November 21 [st], 2003.

Background:

These products are derived from the PATHFINDER AVHRR Land (PAL) dataset collected from July, 1981 to May, 2001. They have been generated at the Boston University and available to download on the site ftp://primavera.bu.edu/pub/datasets/AVHRR_DATASETS/PATHFINDER/.

NDVI is the Normalized Difference Vegetation Index computed from the atmospherically-corrected visible (580 -680nm) and NIR (730 -1100nm) reflectances. It is indicative of the abundance and energy absorption by leaf pigments such as chlorophyll. The processing of the PAL NDVI is described in Buerma et al. (2002).

LAI (m²/m²) is defined as half the total foliage area per unit ground surface area. The FAPAR is the daily fraction of photosynthetically active radiation (PAR: [0.4 -0.7µm]) absorbed by vegetation. FAPAR is dimensionless. The LAI and FAPAR are derived from atmospherically corrected monthly NDVI using relationships based on simulations of a 3D radiative model ran for 6 major continental biomes (Myneni et al., 1997). The analysis of the multiyear PAL LAI is presented in Buerma et al. (2002).

File name convention:

*LAI, FAPAR or NDVI: name of the parameter
*POSTEL: provider of the data
*AVHRR_PATHFINDER: name of the sensor
*YYYY: year of acquisition
*MM: month of synthesis period
*ATLANT: spatial coverage of the products, region of the AMMA project
*v3: version of the algorithm used to create the products
The reference day is the 15 [th] of month MM of the year YYYY.

Data encoding:

The binary files are arrays of 40 columns and 280 rows. Values are coded in single-precision signed integer on 2 bytes. For reading these files, for example, use the following IDL code:

```
openr, unit, filename, /get_lun
img=intarr(400,280)
readu, unit, img
free_lun, unit
```

BE CAREFUL: These files have been created on a LINUX platform so the byte ordering is "little endian". If you use these products on a "big endian" platform, you have to change the byte order.

The physical ranges of the parameters are:
LAI: [0, 6]
FAPAR [0 , 1]
NDVI: [0, 1]
The encoding is as follow:
- DN_LAI:
  0 - 600: range of valid LAI
  -999: fill value for non-vegetated pixels
- DN_FAPAR:
  0 – 1000: range of valid FAPAR
  -999: fill value for non-vegetated pixels
- DN_NDVI:
  0 – 1000: range of valid NDVI
  -999 : fill value for non-vegetated pixels

To convert from DN values to physical parameters, use the following scaling:
LAI=DN_LAI/100.
FAPAR=DN_FAPAR/1000.
NDVI=DN_NDVI/1000.

Projection:

The original AVHRR PATHFINDER products are presented in Goode projection at 16km of spatial resolution. They have been put in the geographical lat/lon projection ("plate-carrée") with a grid step equal to 0.25°. The pixels of the grid are located by the coordinates of their center. The "Atlantique-Afrique" area covers the zone from 59.88°West to 39.88°East, and from 34.88°South to 34.88°North.

Contact information:

Any details about the AVHRR PATHFINDER NDVI, LAI and FAPAR products and the retrieval algorithms are available on the Boston University website : http://cybele.bu.edu.

For any questions about the AVHRR PATHFINDER products provided by POSTEL to the AMMA -SAT database, please contact Roselyne Lacaze at Roselyne.Lacaze@medias.cnes.fr.

References:

Buermann, W. et al., Analysis of a multiyear global vegetation leaf area index data set, *Journal of Geophysical Research*, 107(D22), 4046, 2002.

Myneni, R.B., R.R. Nemani et S.W. Running, Estimation of global leaf area index and absorbed PAR using radiative transfer model, *IEEE Transactions on Geoscience and Remote Sensing, 35, 1380 -1393, 1997.*