Purpose :

This is the readme file for the POLDER -1/ADEOS-1 and POLDER -2/ADEOS-2 products extracted on areas of interest of the AMMA project.

Date:

This file was created on November 21st, 2003, and modified on October 13th 2005.

Background:

These dataset were extracted from the POLDER -1 and POLDER -2 "Land Surface" biophysical products generated from atmospherically corrected bi-directional reflectances. The original POLDER -1 and POLDER -2 products are available on the POSTEL website: http://postel.mediasfrance.org/.

LAI (m^2/m^2) is defined as half the total foliage area per unit ground surface area. It is generated using an neural network, which approximates the inversion of a radiative transfer model. First, a LAI value is estimated for each POLDER track of the synthesis period of 30 days. Then, they are merged to obtain a monthly LAI. The FVC is the fraction of ground surface covered by vegetation. It is derived from LAI using the relationship FVC=1 – exp(-0.5*LAI).

The FAPAR is the daily fraction of photosynthetically active radiation (PAR: [0.4 - 0.7µm]) absorbed by vegetation. FAPAR is dimensionless. The FAPAR is computed from an alternative vegetation index, the RDVI (Renormalized Difference Vegetation Index), for an angular configuration (sun and view zenith angle, respectively, equal to 45° and 60° in the backscattering direction in the principal plane) which minimizes the soil effect. The definition of the RDVI and its relationship with the daily FAPAR are presented by Roujean et Bréon (1995).

The bi-directional POLDER réflectances are normalized using the kernel-driven reflectance model of Maignan et al. (2004). The inversion is carried out over a synthesis period of 30 days with a sliding window of 10 days. More details on the algorithm can be found on the scientific POLDER website (http://smsc.cnes.fr/POLDER/A_produits_scie.htm). The inversion yields three coefficients: an adir-zenith ref lectance, a geometric and a volumetric coefficients. They are used with the angular kernels integrated over viewing directions and over solar directions to calculate the directional and hemispheric spectral albedos. Values of integrated kernels are specifi ed by CEA/LSCE. The NDVI is derived from the directional albedos at 670nm and 865nm. The spectral integrations over visible broadband [400 - 700nm], near-infrared broadband [700, 4000nm], and whole spectrum broadband [300 - 4000nm] are then carried out usi ng the 5 narrow bands (443, 565, 670, 765 and 865nm). The conversion coefficients are provided by CNRM/Météo-France.

The POLDER -1 products cover the period from November, 1996 to June, 1997. the POLDER-2 products cover the period from April 1 to October 2003. The temporal resolution of POLDER products is 10 days.

File name convention:

* LAI or FAPAR or FVC or NDVI or ALBEDO_VIS or ALBEDO_NIR or ALBEDO_SW: name of the parameter
*POSTEL: provider of the data
*POLDER1 or POLDER2: name of the sensor
*YYYY: year of acquisition
*MM: month of synthesis period
*DD: central day of the synthesis period, reference day.
* ATLANT or WEST_AFR: spatial coverage of the products, region of the AMMA project
*v5.0: version of the algorithm used to create the products

Data encoding:

The binary files are arrays of 1000 columns and 700 rows for the "ATLANT" area, and of 1000 columns and 150 rows for the "WEST_AFR" area. Values are coded in float on 4 bytes. For reading these files, for example, use the following IDL code:

```
openr, unit, atlant_filename, /get_lun
img=fltarr(1000,700)
readu, unit, img
free_lun, unit
```

BECAREFUL : 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 range of the parameters are:
LAI: [0, 6]
FVC : [0, 1]
FAPAR [0, 1]
NDVI : [-0.2, 1]
ALBEDO VIS, NIR and SW: [0, 1.1]

255: no data
254: undefined
253: overflow (retrieved value larger than the maximum limit of the physical range)
252: underflow (retrieved value lower than the minimum limit of the physical range)

Projection:

The original POLDER products are presented in the sinusoïdal projection at the spatial resolution of 1/18° at equator. They have been put in the geographical lat/lon projection ("plate-carrée") with a grid step equal to 0.05° and also with a grid step equal to 0.1°. The "West_Africa" area, which covers the zone from 24.98° West to 24.98° East, and from 4.98° South to 19.98° North, have been extracted from the 0.05° resolution grid. The "Atlantic-Africa" area, which covers the zone from 59.88° West to 39.88° East, and from 34.88° South to 34.88° North, have been extracted from the 0.1° resolution grid. The pixels of the grids are located by the coordinates of their center.

Contact information:

Any details about the POLDER-1 and POLDER-2 products and the Level 3 "Land surface" algorithms are available on the POSTEL website: http://postel.mediasfrance.org/.

For any questions about the POLDER products, please contact Roselyne Lacaze at roselyne.lacaze@medias.cnes.fr.

References

Maignan, F. F.M. Bréon, et R. Lacaze, Bidirectional reflectance of Earth targets: evaluation of analytical models using a large set of spaceborne measurements with emphasis on the hot spot, Remote Sensing of Environment, 90, 210-220, 2004.

Roujean, J. L. et F. M. Bréon, Estimating PAR absorbed by vegetation from bidirectional reflectances measurements, *Remote Sensing of Environment*, 51, 375-384, 1995.