BHRPAR and DHRPAR AVAILABILITY AT PROVISIONAL QUALITY LEVEL

The BHRPAR and DHRPAR fields are now of "Provisional" quality. The software which computes these variables uses Land Surface Reflectances, BHR and DHR, in blue, green and red spectral bands as input. The performance of the MISR BHRPAR algorithm was assessed from the version 3.0 MISR BHRPAR, MISR FPAR and MISR LAI products over Africa (April-23-2002). The following tests of physics underlie the transition of the BHRPAR and BHRPAR products from beta to provisional status.

1. Positivity of the PAR absorbed by the ground beneath the canopy. The MISR FPAR product, derived with a different algorithm, defines the fraction of incident PAR absorbed by the vegetation only. Thus, from energy conservation, one can evaluate the fraction of PAR absorbed by the ground beneath the canopy (FGROUND) given BHRPAR and FPAR, i.e., FGROUND=1-BHRPAR-FPAR. This variable should take on positive values for all vegetated pixels with valid FPAR and BHRPAR. Figure 1 shows histogram of FGROUND derived from the MISR FPAR and MISR BHRPAR products. This test establishes consistency between the MISR FPAR and MISR BHR.

2. Canopy transmittance as a function of LAI. FGROUND can be treated as PAR radiation transmitted by the vegetation canopy and absorbed by the canopy ground and can be approximated by the Beer's law, i.e., FGROUND=exp(-*k*LAI) where the coefficient *k* depends on canopy structure and the SZA. The MISR LAI, MISR FPAR and MISR BHRPAR fields were used to derive regression LAI versa FGROUND curves to ascertain whether the proper relationships were obtained. The relationships between LAI and FGROUND, shown in Figure 2, conform to both theoretical and empirical expectations.

The correct partitioning of the top-of-canopy radiation into its canopy and ground absorbed portions is a key user requirement of the MISR surface product suite that includes LAI, FPAR, and PAR-integrated BHR. Results from the above tests suggest that LAI, FPAR and BHR/BHRPAR derived with different algorithms meet this requirement. We believe that the provisional product suite can be used in the Common Land Model and Climate Models.

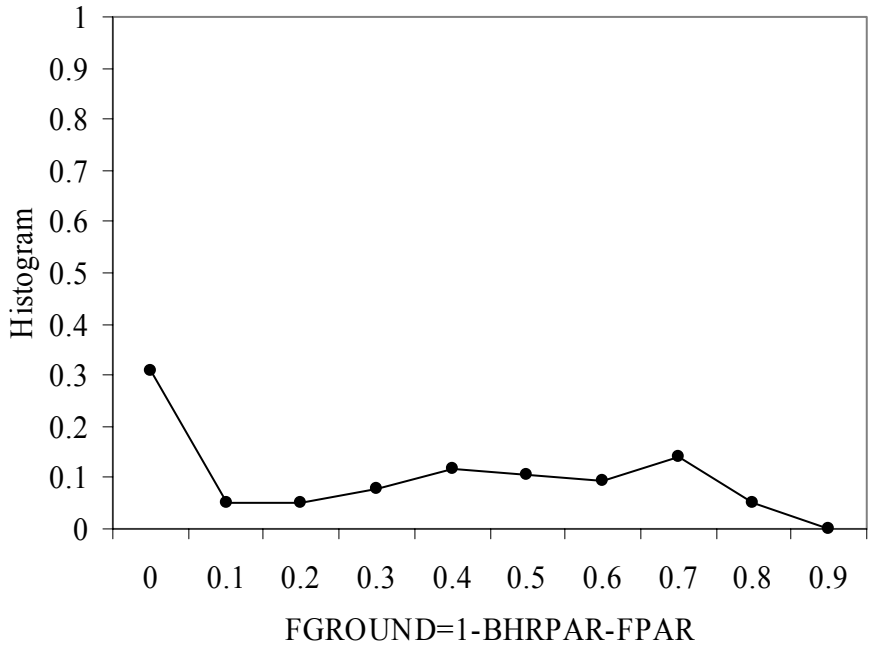

Figure 1. Histogram of the fraction of PAR absorbed by the ground beneath the canopy (FGROUND) derived from MISR FPAR and BHRPAR products. This establishes consistency between two MISR products derived with different algorithms.

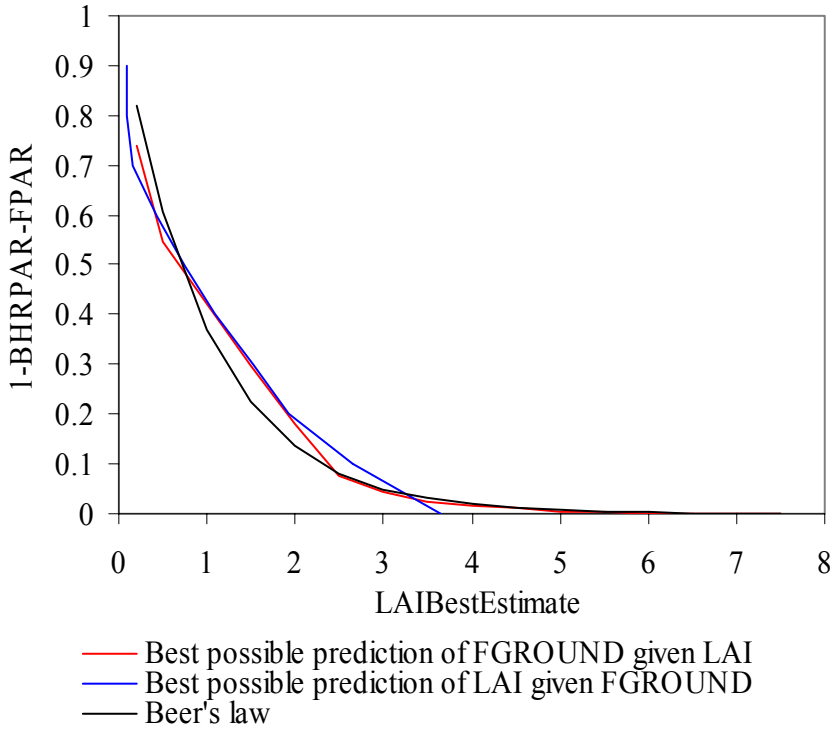

Figure 2. Best possible prediction of FGROUND given LAI and best possible prediction of LAI given FGROUND. The MISR BHRPAR, LAI and FPAR fields were used to derive the regression curves FGROUND(LAI)=*E*(fground,lai=LAI) and LAI(FGROUND)=*E*(lai,fground=FGROUND). Here *E*(fground, lai=LAI) [*E*(lai,fground=FGROUND)] is the expectation of lai values [fground values] for the condition lai [fground] takes the value LAI [FGROUND]. The Beer's law exp(-*k*LAI) with $k=1/\cos(23^o)$ is added for comparison.