Validation of the MODIS MOD17 Algorithms for Estimating global Net Primary Production

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MOD17 algorithm
- GPP = APAR * ε
- GPP = \( (R * 0.45 * Fpar) \) \( \epsilon_{\text{max}} \times [m_{\text{Tmin}}/m_{\text{Tped}}] \)
- NPP = \( \sum GPP - R_n - R_p \)

MOD17 data flow
- MOD12Q1 (land cover)
- MOD15A2 (Fpar & Lai)
- MOD17A2 (8-day GPP & PSNnet)
- DAO (daily meteorological data)
- MOD17A3 (annual NPP)

UMD landcover map from MOD12Q1
Mean Lai in growing season for 2001 from MOD15A2
Maximum LAI for 2001 from MOD15A2
NPP from MOD17A3
DAO daily average solar radiation, VPD(vapor pressure deficit) and temperature for 2001

EMDI NPP sites distribution
MODIS NPP against EMDI NPP

Zonal-average GPP(blue line) & NPP(pink line) for different vegetation types for 2001 compare with EMDI NPP

Conclusion: except for some tropical regions, MODIS NPP effectively captures the spatial distribution of ground-based measurements of NPP. In tropical regions MODIS NPP results show generally larger differences relative to field based measurements. MOD17 daily radiation and humidity inputs from the NASA Data Assimilation Office (DAO) weather forecast model may be one factor responsible for these differences; another factor may be due to uncertainty in direct comparison between field data and coarse resolution MODIS data. This may be the reason that class C is better than class A and class B.

Acknowledgement: The authors would like to acknowledge the Oak Ridge National Laboratory Distributed Active Archive Center's (ORNL DAAC) for providing Net Primary Productivity (NPP) Database.