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Title Can satellite snapshots at morning or afternoon be upscaled to 8-day integrated evapotranspiration?

Outline One issue to hydrology remote sensing group is how to upscale snapshot ET to daily or longer time integrated one. There were several approaches (e.g. constant evaporative fraction during daytime), but not accurate and impractical at global scale. One plausible method is to use the linear regression between instantaneous values and 8-day mean values (e.g. Sims *et al.* 2005 for GPP). Global Fluxnet database covers broad climatic and plant functional types across several years, so it is a good opportunity to apply and test this method to evapotranspiration. In this study, the linear regression between 1-hour (10:00 to 11:00 for MODIS Terra and 13:00 to 14:00 for MODIS Aqua) averaged ET vs 8-day integrated ET will be investigated for diverse plant functional types and climatic zones. The results would produce a look up table for upscaling factors for each plant functional types or a convergent value, if any. This approach can avoid criticism for energy imbalance issue because the slope of linear regression would be less sensitive to systematic underestimation, if any, of ET.

Reference

Sims D.A., Rahman A.F., Cordova V.D., Baldocchi D.D., Flanagan L.B., Goldstein A.H., Hollinger D.Y., Misson L., Monson R.K., Schmid H.P., Wofsy S.C. & Xu L.K. (2005) Midday values of gross CO_2 flux and light use efficiency during satellite overpasses can be used to directly estimate eight-day mean flux. *Agricultural and Forest Meteorology*, 131, 1-12

Co-authorship plans
All data providers are invited to give intellectual inputs to this study and significant intellectual inputs will lead co-authorship. If any data provider wants to lead co-authorship without intellectual input, I may consider marking the “Author contributions” information at the end of the paper, if possible with the journal.

Tentative sites that will be used

'AU-Wac'	'CN-Cha'	'ES-ES2'	'IT-Cpz'	'US-Aud'	'US-Ne2'
'BE-Bra'	'CN-Do1'	'ES-LMa'	'IT-Lav'	'US-Bkg'	'US-Ne3'
'BE-Lon'	'CN-Do3'	'ES-VDA'	'IT-MBo'	'US-Blo'	'US-SO2'
'BE-Vie'	'CN-HaM'	'FI-Hyy'	'IT-Non'	'US-Bo1'	'US-SO3'
'BW-Ma1'	'CN-Xfs'	'FI-Sod'	'IT-PT1'	'US-FPe'	'US-SO4'
'CA-Ca1'	'DE-Bay'	'FR-Gri'	'IT-Ren'	'US-Ho1'	'US-SP1'
'CA-Ca2'	'DE-Geb'	'FR-Hes'	'IT-Ro1'	'US-IB1'	'US-SP2'
'CA-Ca3'	'DE-Gri'	'FR-LBr'	'IT-SRo'	'US-IB2'	'US-SP3'
'CA-Oas'	'DE-Hai'	'FR-Lq1'	'JP-Mas'	'US-KS2'	'US-SRM'

'CA-Obs'	'DE-Har'	'FR-Lq2'	'JP-Tom'	'US-MOz'	'US-Ton'
'CA-Ojp'	'DE-Kli'	'FR-Pue'	'NL-Ca1'	'US-Me3'	'US-Var'
'CA-Qcu'	'DE-Meh'	'HU-Bug'	'NL-Loo'	'US-NC1'	'US-WCr'
'CA-Qfo'	'DE-Tha'	'IE-Dri'	'PT-Mi2'	'US-NC2'	'US-Wkg'
'CA-TP4'	'DE-Wet'	'IL-Yat'	'RU-Fyo'	'US-NR1'	'US-Wrc'
'CH-Oe1'	'ES-ES1'	'IT-BCi'	'US-ARM'	'US-Ne1'	