



<http://www.pheno-eye.org/>

A stable, continuous, long-term, and multi-ecosystem ground validation network for remote sensing.

Prototype started in 1999. Now 28 sites globally (mainly in Japan). Mostly at flux towers and ILTER sites.

Main instruments:



HSSR (Hemispherical spectral radiometers) --> vegetation spectrum. VIs & radiative transfer models.

ADFC (Automatic digital fisheye cameras) --> phenology, snow cover, cloud cover, etc.

SP (Sunphotometer) --> atmospheric correction for satellite images. aerosols etc.



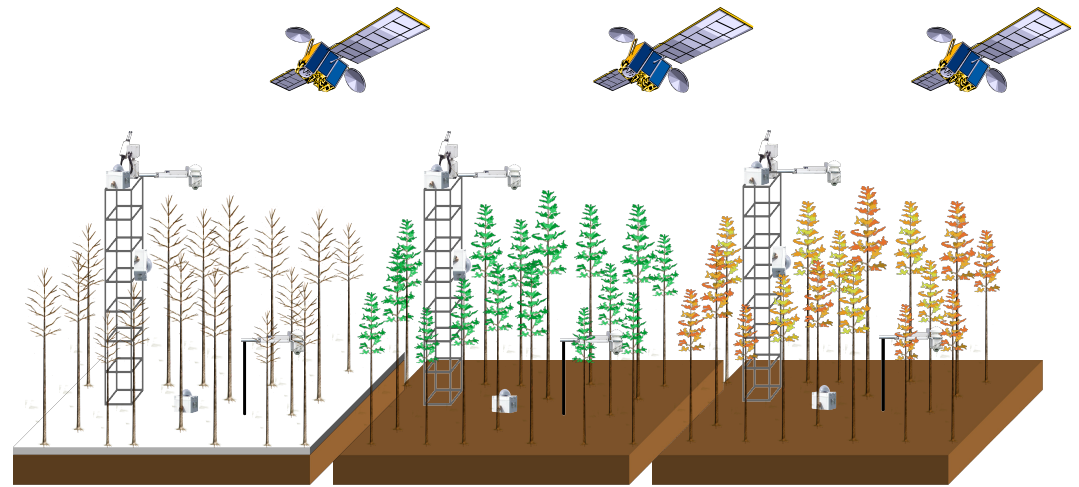
HSSR



ADFC



SP



Phenology observation with ADFC (atunomomatic digital fisheye camera)

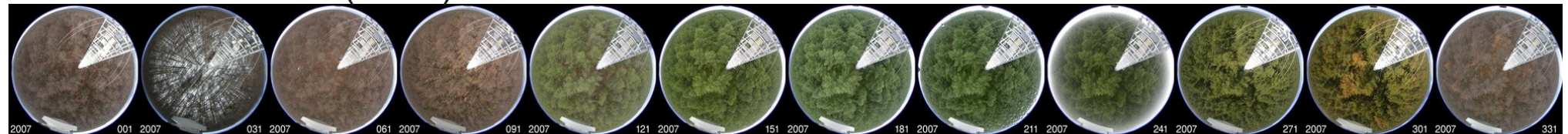


Prototype at EGAT flux tower, Thailand (1999-). Film camera.

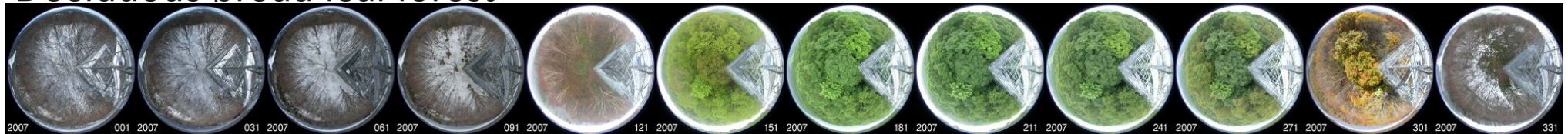
Evergreen conifer



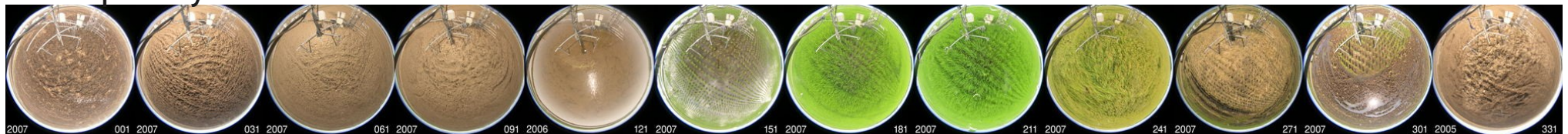
Deciduous conifer (larch)



Deciduous broad leaf forest



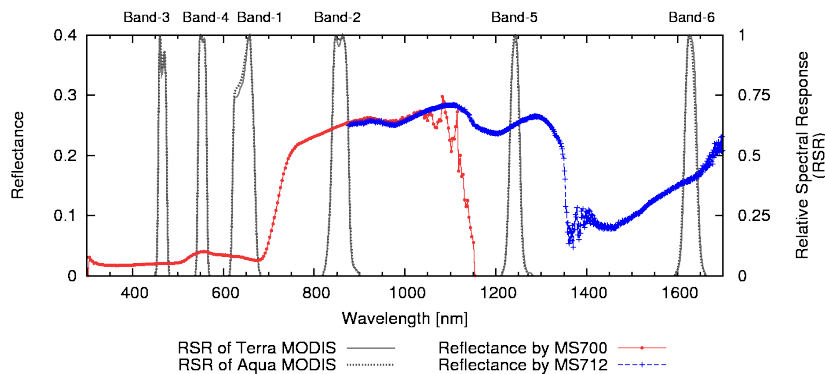
Rice paddy field



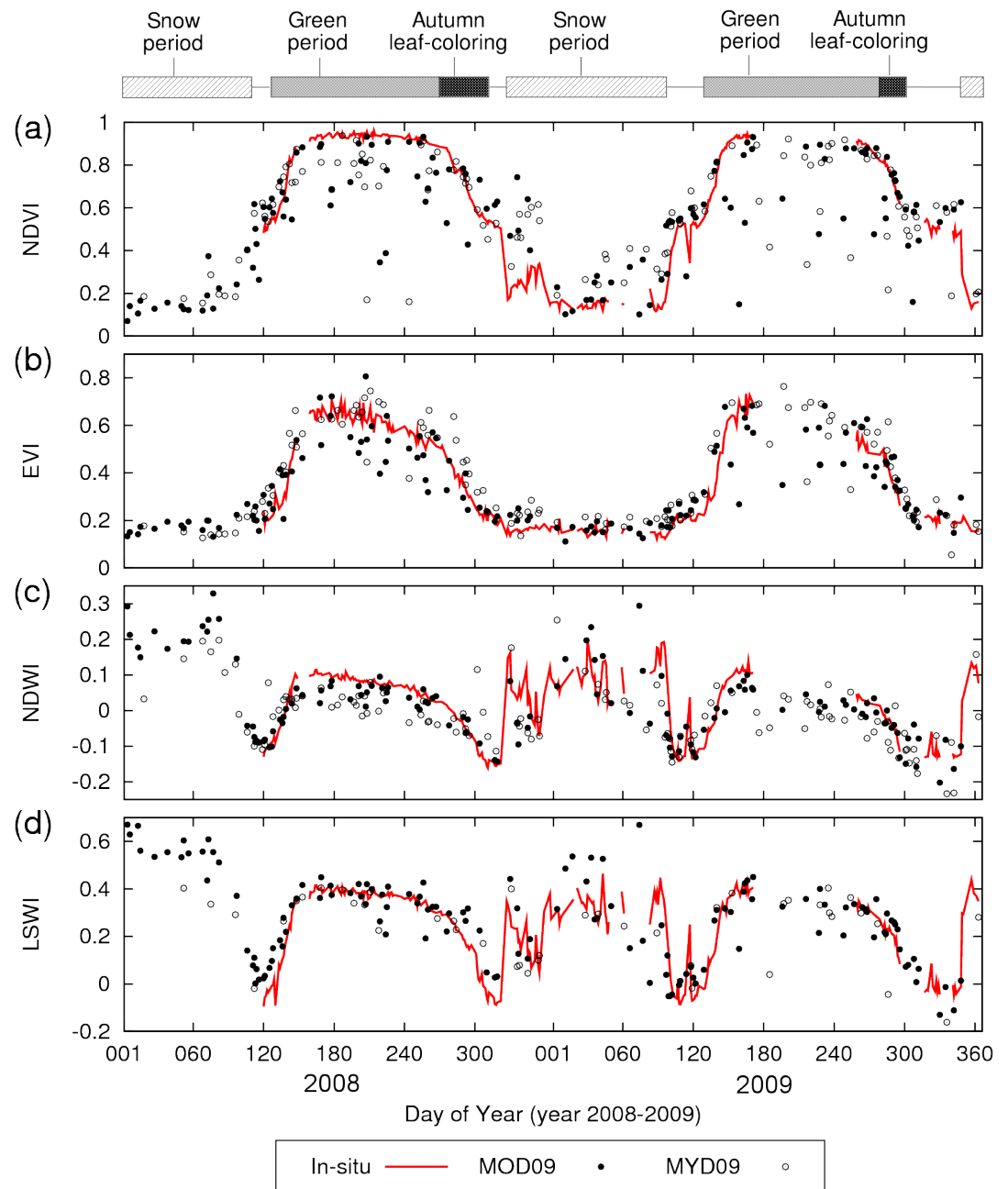
What is the best index for:

- phenology detection?
- GPP estimation?
- ... NDVI? EVI? PRI? LSWI?

Nagai et al., IJRS 2012
 Nagai et al., AGFM 2011
 Motohka et al., RemSens, 2011
 etc.



in situ spectral reflectance,
 10 min interval, VNIR & MIR.



Seasonal change of VIs in response to
 vegetation seasonality and snow cover.

List of PEN sites

ID	Country	Type	Year	Instruments

AHS	UK	DBF	2009-,	ADFC.
AI7	Japan	urban	2004 only.	Sky ADFC.
EGT	Thailand	mixed	1999-2002.	film camera.
GDK	Korea	DBF	2009-,	ADFC, HSSR
FHK	Japan	DNF	2005-,	ADFC, HSSR, SP.
FJY	Japan	ENF	2009-,	ADFC.
HVT	Hawaii	EBF	2012-,	ADFC.
JND	China	rice	2010-,	ADFC.
KBF	Germany	DBF	2010-,	ADFC.
KFS	Egypt	rice	2011-,	ADFC.
KIZ	Japan	DBF	2009-,	ADFC.
KEW	Japan	ENF	2004-,	ADFC, HSSR.
LBR	Malaysia	EBF	2009-,	ADFC.
MSE	Japan	rice	2005-,	ADFC, HSSR.
MMF	Japan	mixed	2010-,	ADFC.
MTK	Japan	mixed	2008-,	ADFC;
PFA	Alaska	ENF	2011-,	ADFC.
SSP	Russia	DNF	1997/08/25-2000/10/15	
RHN	Japan	urban	2005-2006.	Sky ADFC
SGD	Japan	grass	2005-,	ADFC.
SHA	Korea	DBF	2010-,	ADFC.
TFS	Japan	DNF	2004.	Destroyed by a typhoon.
TGF	Japan	grass	2003-,	ADFC, HSSR, SP.
TKC	Japan	ENF	2007-,	ADFC, HSSR.
TKY	Japan	DBF	2003-,	ADFC, HSSR, SP.
TSE	Japan	mixed	2010-,	ADFC.
UAK	Alaska	ENF	2010-,	ADFC.
YGT	Japan	DNF	2011-,	ADFC.

