Hisashi SATO,

Dr. Sc. (JAMSTEC)

SEIB-DGVM

(Spatial-Explicit-Individual-Based Dynamic-Global-Vegetation-Model)

INPUT

Climate data
(Air and soil temp, CO_2, Precipitation, humidity, Cloud, Wind)

Location data
(Altitude, Latitude, Soil properties)

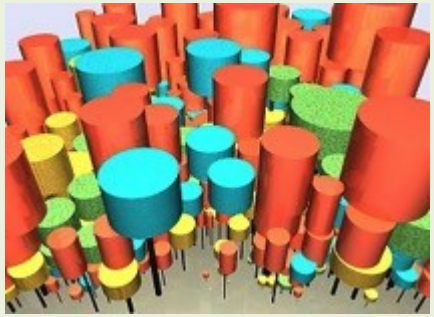
OUTPUT

Changes in
Biome type
Carbon balance
Water balance
etc..

DGVMs

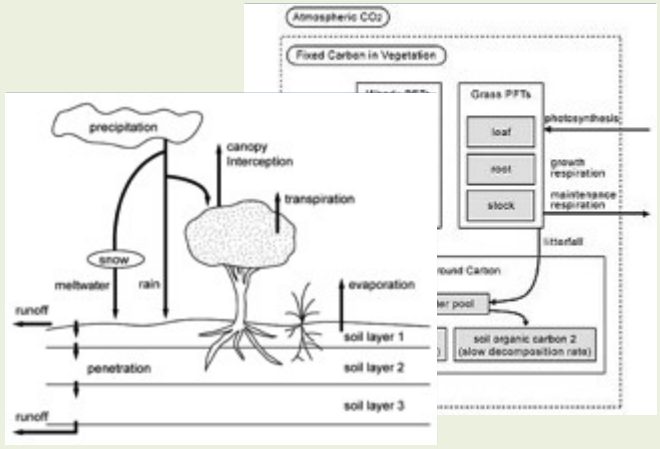
Physics	Physiology	Ecological dynamics
PAR, Albedo, Evaporation, transpiration, Interception, Runoff etc..	Photosynthesis, Respiration, Turnover, Growth, Phenology, Decomposition etc..	Establishment, Competition, Mortality, Disturbance etc..

Individual trees compete for light and space within a virtual forest



(1 ha of Tropical rain forest in Malaysia)

Such plant population dynamics works with carbon and water cycles



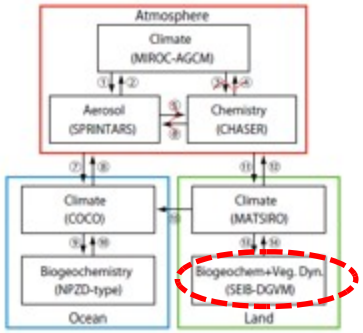


Fig. 1. Structure of MIROC-ESM. The numbers refer to the variables in Table 1.

This model works with a Japanese ESM, which contributed the IPCC's 5th assessment report

Source of the figure:
Watanabe et al. (2011) GMD4

E-mail : hsato@jamstec.go.jp (http://seib-dgvm.com/hsato/)

My goal:

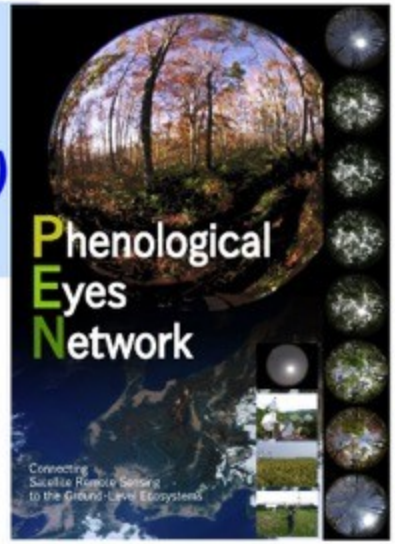
Multidisciplinary in situ and satellite observations for accurate monitoring ecosystem structure and functioning from boreal to tropical forests under climate and meteorological changes

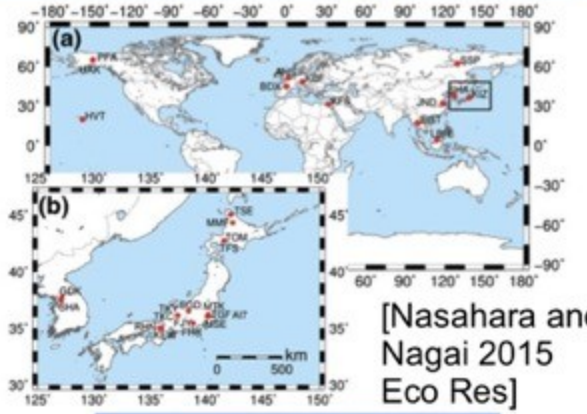
Keyword: Phenological Eyes Network (PEN), remote-sensing, biometeorology, ecology, climatology

Shin Nagai

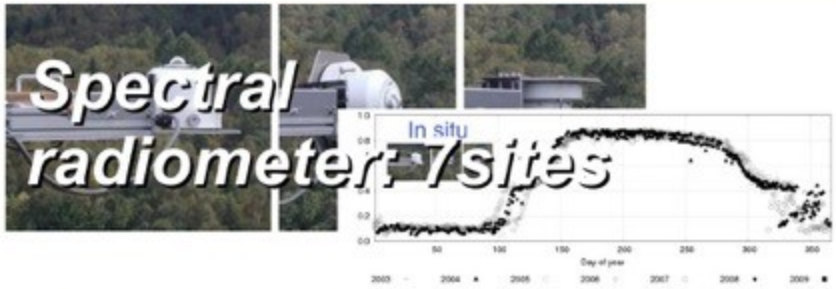
JAMSTEC 国立研究開発法人 海洋研究開発機構
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

Global, long-term and continuous camera, spectral radiometer and sunphotometer sites organised by ***Phenological Eyes Network (PEN)*** *[http://www.pheno-eye.org] since 2003.*





[Nasahara and Nagai 2015 Eco Res]

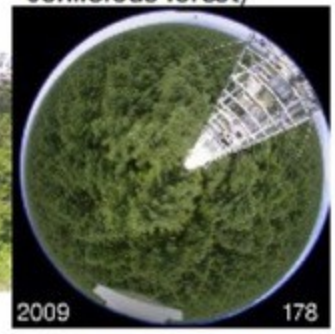


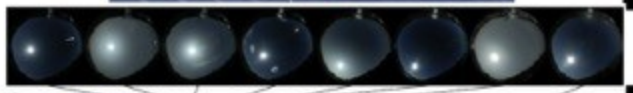
AHF (deciduous broad-leaved forest)

TKY (deciduous broad-leaved forest)

MTK (mixed forest)

FHK (deciduous coniferous forest)



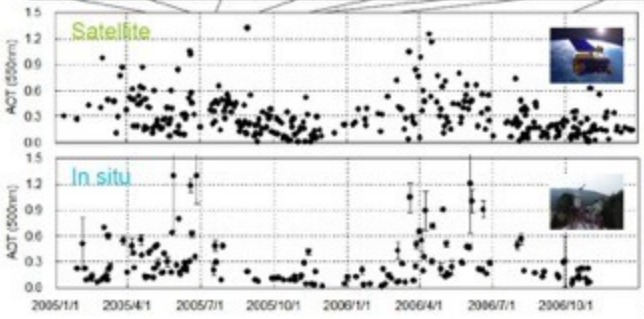


TKC (evergreen coniferous forest)

LBR (evergreen broad-leaved forest)

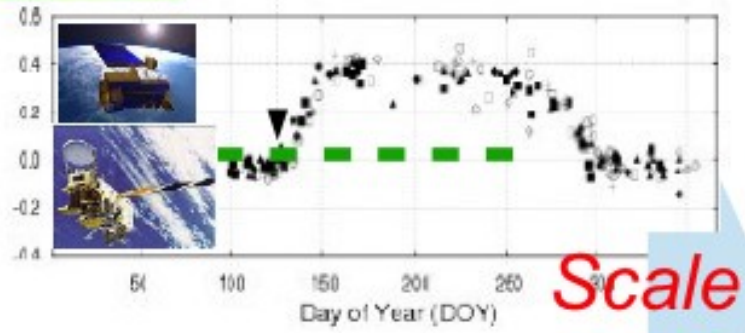
MSE (paddy)

SGD (grassland)

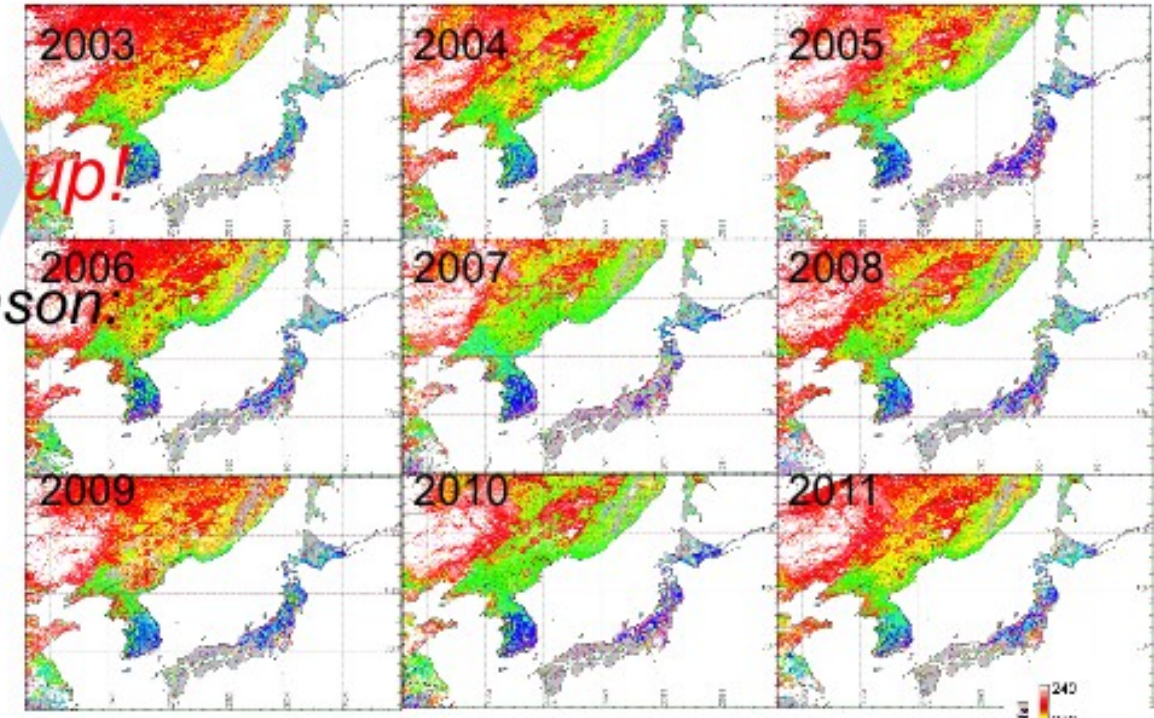


We apply the in situ based criteria of the timings of start and end of growing season in East Asia.

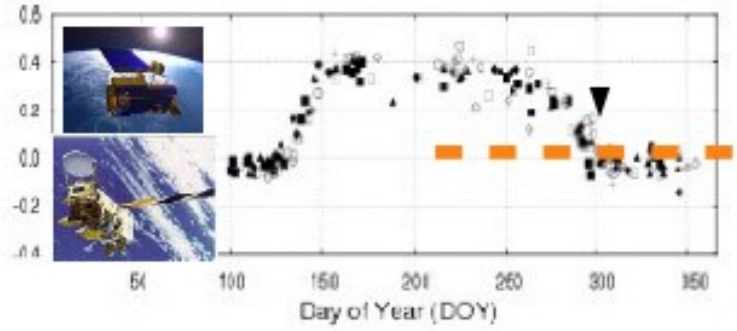
Start of growing season:
GRVI=0.0



Scale up!



End of growing season:
GRVI=0.0



[Nagai et al. 2015, IJB]

Yoshihiro Iijima （ Dr. Sci. ）
Senior Researcher
in Institute of Arctic Climate and Environment Research,
JAMSTEC

Research Interests

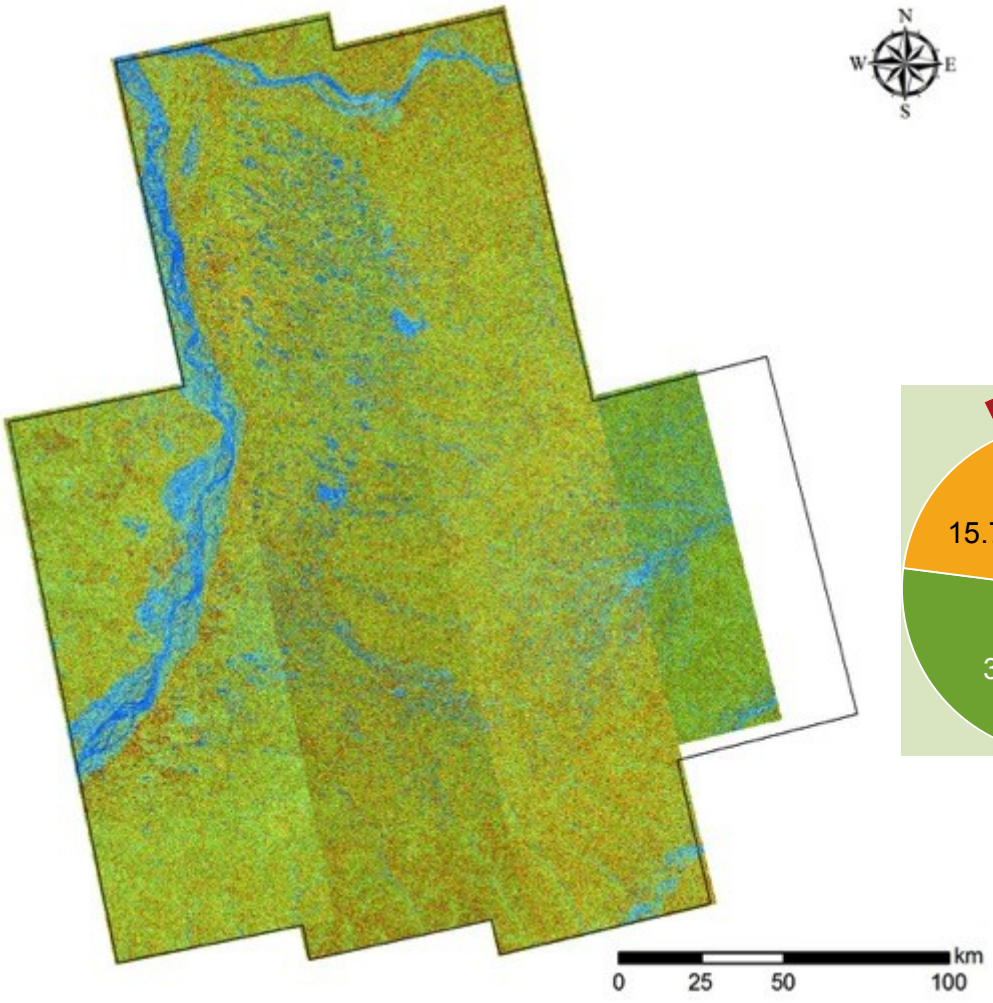
Climatology in cold region,（寒冷圏の気候学）
Ecology and Hydrology in boreal forest and grassland,（北方林、草原の生態・水文学）
Permafrost Science（永久凍土科学）

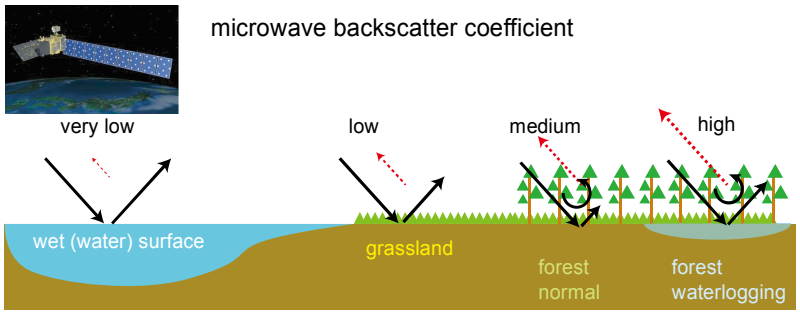
Current Research Targets

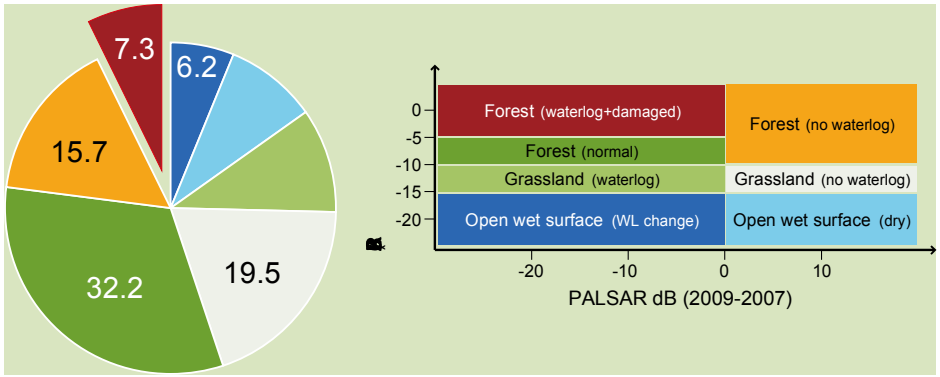
1) Permafrost degradation process in boreal region in Central Yakutia (CY) and its impacts on geomorphological, ecological, hydrological (and social) changes.
（中央ヤクーチャ（北方林）での永久凍土荒廃過程と、その地形、生態、水文、社会変化への影響）
2) Arctic climate change on precipitation regime in Eurasian continent in relation to changes in hydro-thermal properties in permafrost zone.
（北極気候変化、特に永久凍土地帯の地表面熱−水特性の変化に関係する降水レジームに注目）
3) Mapping of permafrost degradation and land cover change using multi-satellite images (ALOS, ALOS2, LANDSAT8, etc.).
（多種の衛星データを用いた永久凍土荒廃と地表面状態変化のマッピング）

Possible contribution to COPERA project

Mapping of
Land surface change detected by ALOS in CY







7.3 % of the total area may be classified as damaged boreal forest during the wet climate years in 2000s.

+ combining observational results in carbon storage in soil at various landscapes and estimation of future GHG emission by permafrost degradation (by biogeophysical modeling) (JAMSTEC, Hokkaido Univ., IBPC, PI)