



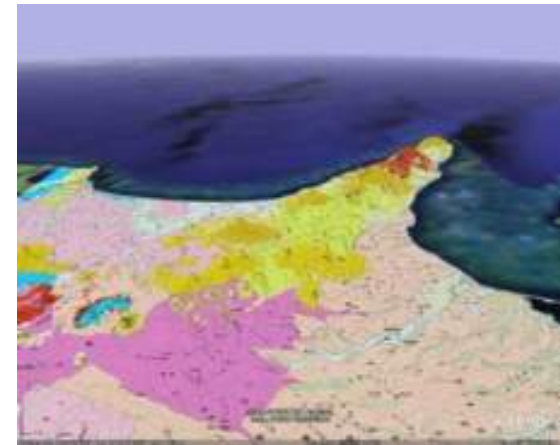
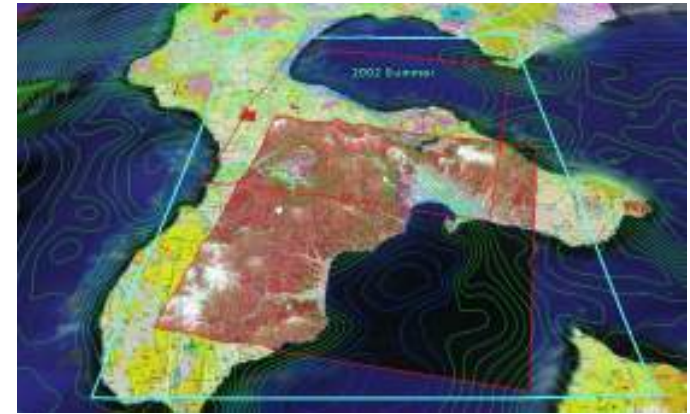
Yoshio Tanaka

Information Technology Research Institute

AIST, Japan

Objectives of the GEO Grid

- Help Geo-^{*} scientists to understand
 - ▶ Global warming, inventory of carbon dioxide
 - ⊗ Kyoto protocol, environmental burden
 - ▶ Alternate energy
 - ⊗ Biomass
 - ⊗ Wind-power generator network
 - ▶ Harvest yield prediction/estimation
 - ⊗ Weather, Soil, temperature, humidity, sunshine, etc.
- Help decision makers to plan
 - ▶ Hazard mitigation
 - ⊗ Earthquake, Landslide, Flood, Volcano eruption, Tsunami
 - ▶ Exploration of natural resources
 - ⊗ Oil, natural gas, mineral
- Unbeknown applications
 - ▶ Games, Amusements, Personal geo record/history, etc.
 - ▶ Social science apps



GEO Grid Service Examples

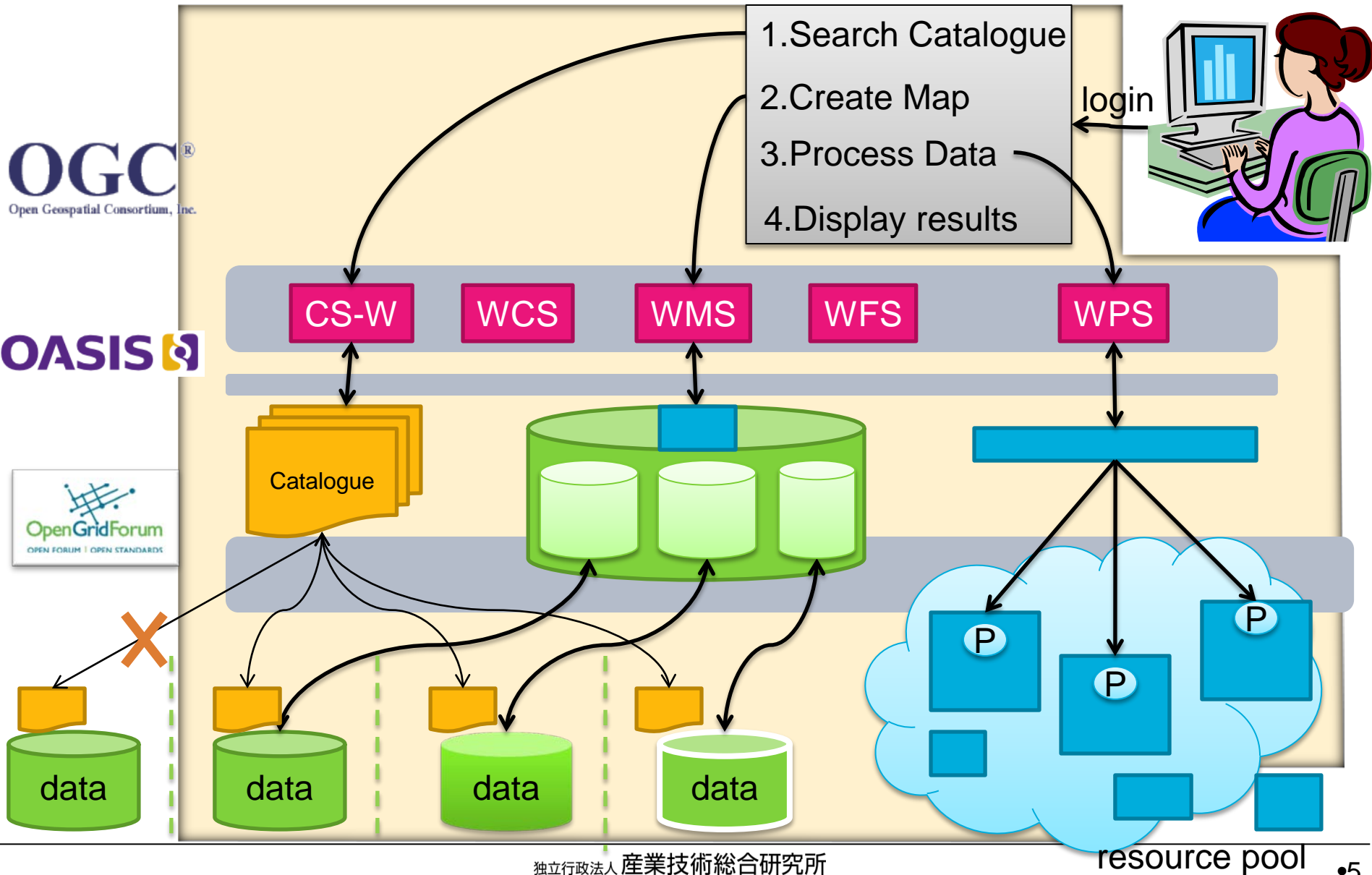
- Satellite data archive and processing
 - ▶ ASTER, PALSAR, MODIS, etc.
- Satellite data application
 - ▶ Application of Satellite-Field data Integrator (SFI) for aerosol monitoring Description
<http://fon.geogrid.org/aerosol/>
 - ▶ SDCP (Science Degree Confluence Project) – Community validation tool for global land-cover & digital elevation models <http://eco.geogrid.org/sdcp/>
- Hazard information
 - ▶ QuiQuake (Quick Estimation System for Earthquake Maps Triggered by Observation Records)
<http://qq.ghz.geogrid.org/QuakeMap/index.en.html>
 - ▶ Volcanic Gravity Flow Simulations on Volcanic Area
<http://volcano.geogrid.org/applications/EnergyCone/>
- Geoscience data
 - ▶ Geological maps, Active fault data, etc.

GEO Grid Enhanced Architecture

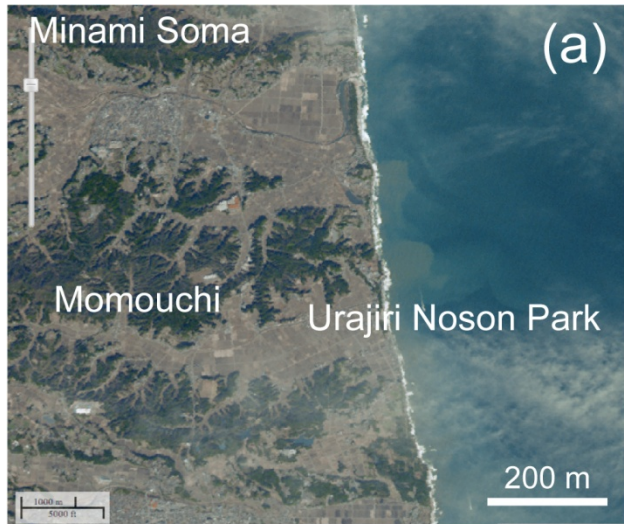
OGC[®]
Open Geospatial Consortium, Inc.

OASIS

OpenGridForum
OPEN FORUM | OPEN STANDARDS



ASTER Comparison Before and After Tsunami

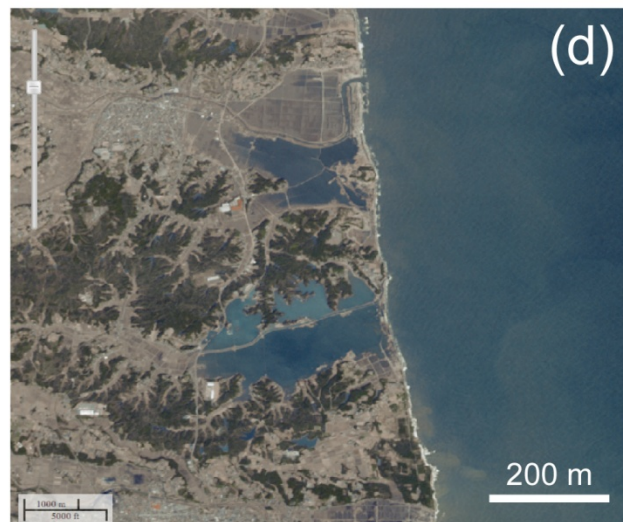
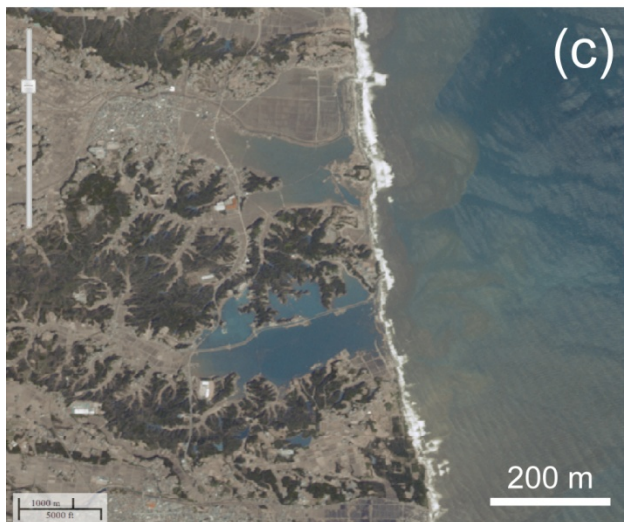


(a) 2008/12/25

(b) 2011/3/14

(c) 2011/3/19

(d) 2011/3/28



Minami-Soma
— erosion greatly and
the water remains
even after two days of
the earthquake

QuiQuake

QuiQuake/QuakeMap - 地震動マップ

powered by GEO Grid, AIST

0.2

日時 2011-03-11T15:06

震央 (経度, 緯度) (142.4, 39)

マグニチュード M6.4

震源の深さ 26 [km]

画像範囲 UL:(139,44) - LR:(146,36.66666667)

GeoTIFF ダウンロード [PGV, INT \(...ファイルフォーマットについて\)](#)

Main shock

180< 50 20 5 0.2

日時 2011-03-11T14:46

震央 (経度, 緯度) (142.9, 38)

マグニチュード M9.0

震源の深さ 24 [km]

画像範囲 UL:(131,46) - LR:(146,32.66666667)

GeoTIFF ダウンロード [PGV, INT \(...ファイルフォーマットについて\)](#)

QuiQuake/QuakeMap - Quick Estimation System for Earthquake Maps Triggered by Observation Records -

QuickMap Abstract Method Home RSS | Japanese

QuiQuake / QuakeMap

Quick Estimation System for Earthquake Maps Triggered by Observation Records -

Recent big earthquake Recent processed earthquake

2011-06-09T19:38+09:00 MSJ

High-resolution Image

Download KML (How-to)

180< 50 20 5 0.2

Peak Ground Velocity (PGV) [cm/s]

Date and Time 2011-06-09T19:38

Epicenter (lon, lat) (140.9, 36.5)

Magnitude M5.7

Depth 0 [km]

Image Area UL:(137,40) - LR:(142,34.66666667)

download GeoTIFF [PGV, INT \(...about Data Format\)](#)

QuiQuake (Quick estimation system for earthquake maps triggered by observation records) provides wide and detail strong ground motion maps such as peak ground

from Map

No. of earthq. from Calendar (March, 2011)

March 2011

<<< << Today >> >>>

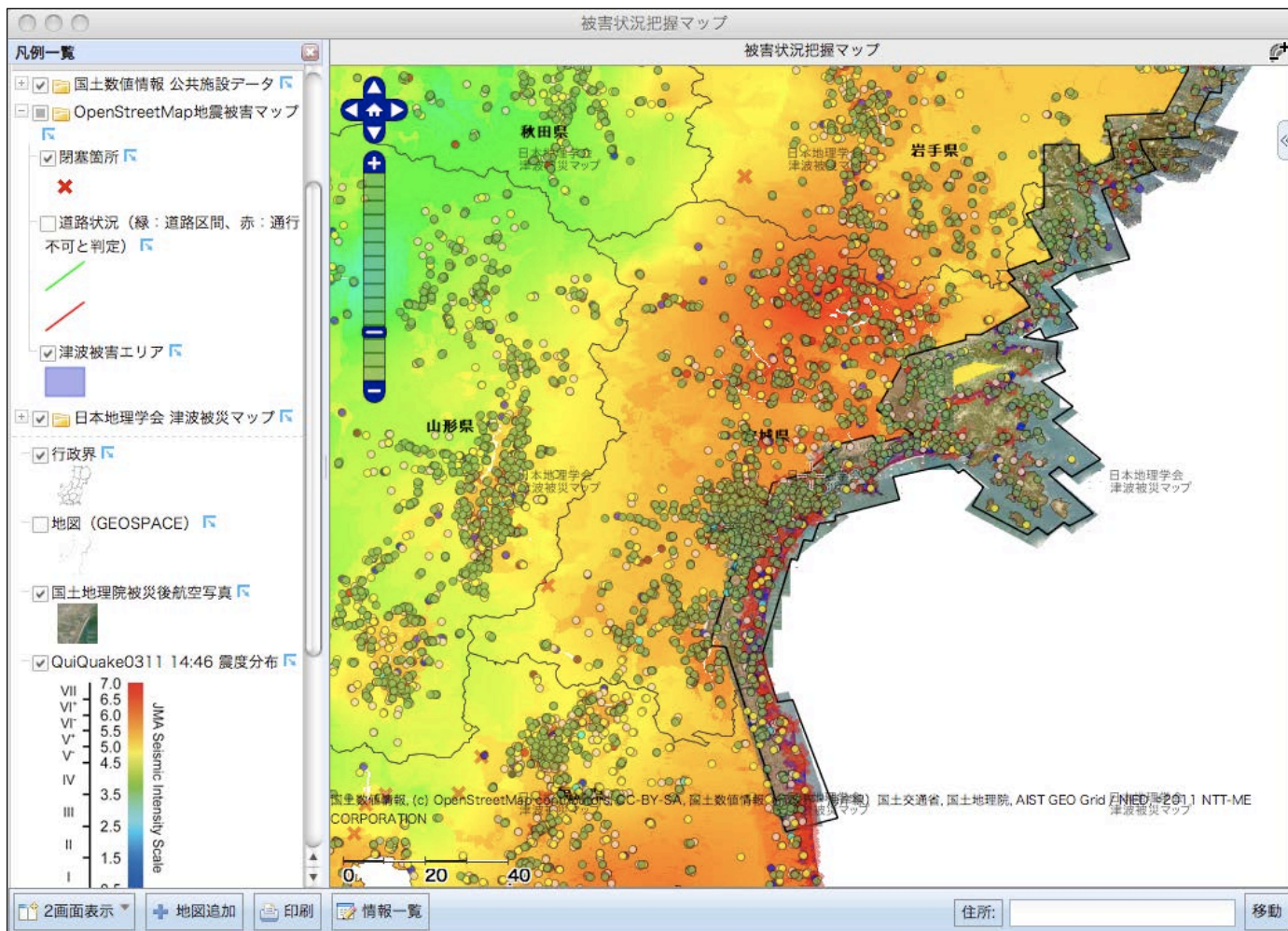
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7 (1)	8	9 (4)	10 (3)	11 (11)	12 (20)
13 (5)	14 (5)	15 (2)	16 (5)	17 (3)	18 (1)	19 (3)
20 (2)	21 (1)	22 (4)	23 (4)	24 (3)	25 (1)	26 (3)
27 (1)	28 (1)	29 (1)	30 (1)	31 (1)		

Latest 10 Events

Magnitude Top 10

<http://qq.ghz.geogrid.org/index.en.html>

Utilization of GEO Grid Contents by Other Portal



ALL311 activity operated by NIED (<http://all311.ecom-plat.jp/>) utilizes GEO Grid and other contents through WMS.

Must be good idea to combine Satellite RS & Ground-observed (in-situ) data

● Benefit of satellite RS:

- ▶ Wide spatial coverage with cheaper cost
- ▶ Regional coverage and broadly spectral resolution
- ▶ Continuous acquisition of data
- ▶ Archive of historical data

● Limitation of satellite RS:

- ▶ Interference of atmospheric gaseous and particles
 - ⊗ Absorbing (H₂O, O₃ etc.) and Scattering (mainly by aerosol particles such as dust, ash and smoke)
- ▶ Not direct sample of the phenomenon

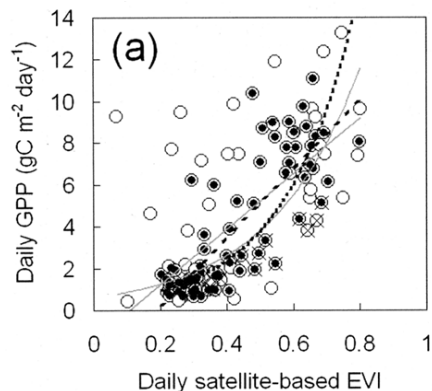
● Ground-based observation:

- ▶ Direct or similar sample of the phenomenon
- ▶ Real-time or Near Real-time observation
- ▶ High temporal resolution
- ▶ Expensive for wide area observation

Asia GEO Grid Initiative Project

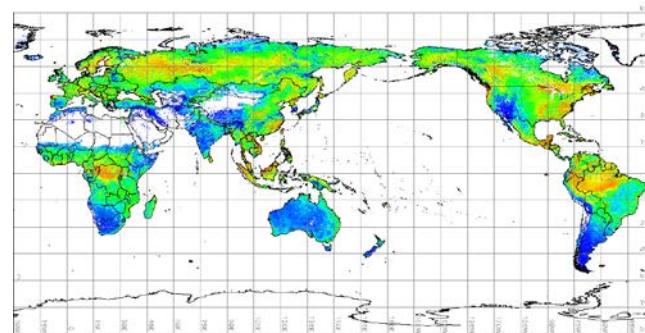
Combining CO₂ Flux data and Satellite data by collaboration with Asia Flux Network

Calibration of Satellite Data
using In-situ Observation Data



Apply to the similar
vegetation area

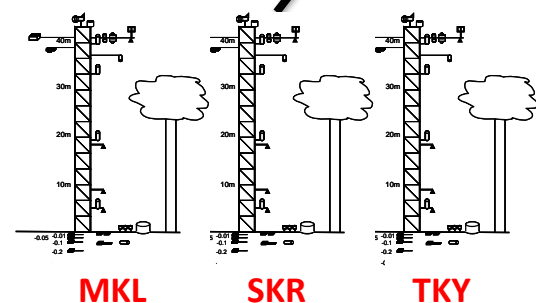
**Global CO₂ Map generated from In-situ
data and Satellite data**



Research Issues and approach

(1) Development of IT infrastructure
which federates distributed and
heterogeneous Earth observation data.
**Approach: Integration of Grid and OGC
standards**

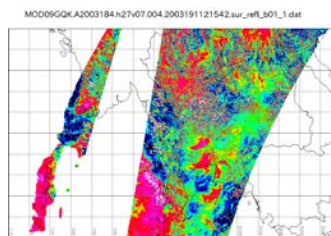
(2) Establishment of multi-disciplinary
and cross boundary scientific
community
**Approach: Linking IT and application
networks**



Flux Tower





Digital
Camera




Satellite data

Satellite Field Integrator (SFI)

-  The SFI framework is designed to reduce the onerous tasks of data gathering, manipulating, and processing
 - ▶ Supports heterogeneous data formats in both remote sensing and sensor observation data
 - ▶ Scalability to handle the increasing number of datasets currently available.
 - ▶ Offers a robust, on-demand processing service

-  The development is based on various open standards of OGC Web Service specifications such as
 - ▶ Web Mapping Service (WMS)
 - ▶ Web Coverage Service (WCS)
 - ▶ Sensor Observation Service (SOS)
 - ▶ Web Processing Service (WPS)

-  A Prototype for Proof of Concept

SFI Framework

GetObservation 

GetFeatureInfo 

GetCoverage 

GetFeatureOfInterest 



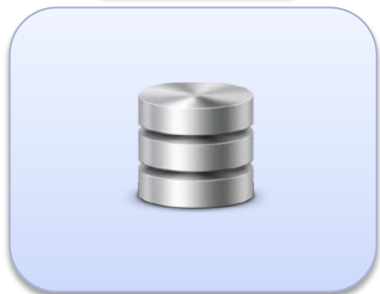
Client

Execute

JSON/PNG/CSV

GetMap

SOS



Node

LiveE! Sensor Node

WPS

- Evaluation of Relationship process
- Least Squares Fitting process
- Calculating Estimated Air Temperature process

R

rpy2

GRASS
GIS

GDAL

...

...

...

...

WMS, WCS

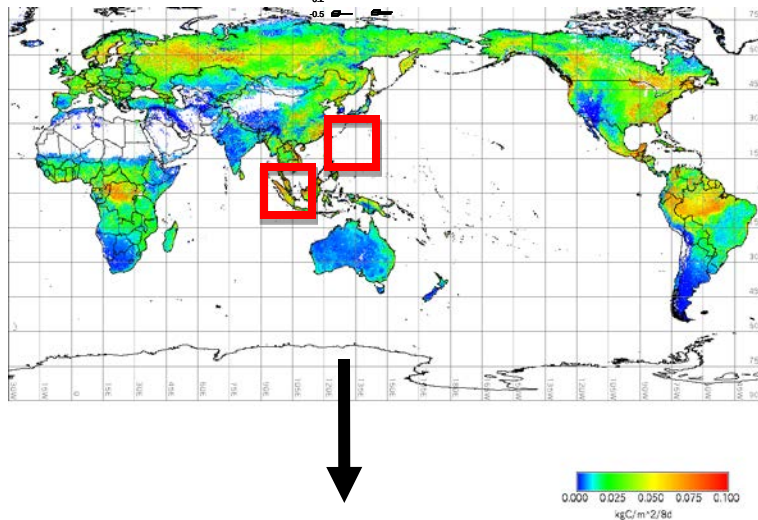
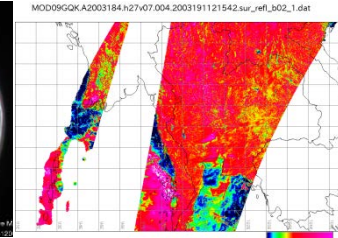
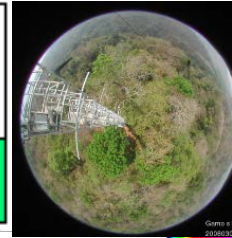
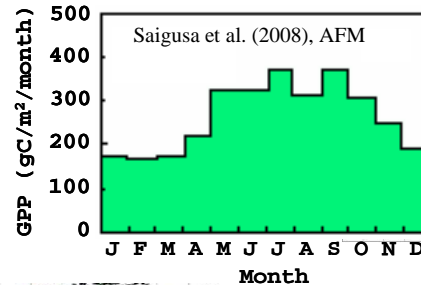
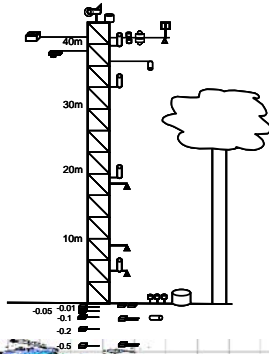


Source

MODIS Dataset

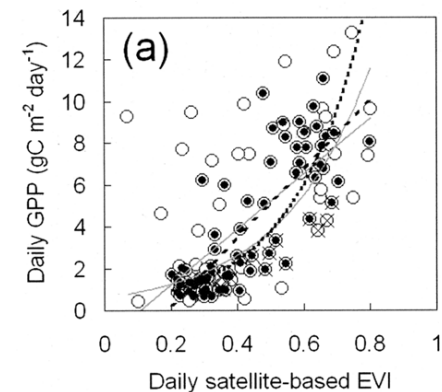
Field Observation data
(Primary production, daily)

MOD09, MOD17a2
→Vegetation Index (EVI, NDVI)
→ GPP



Satellite / Field data study

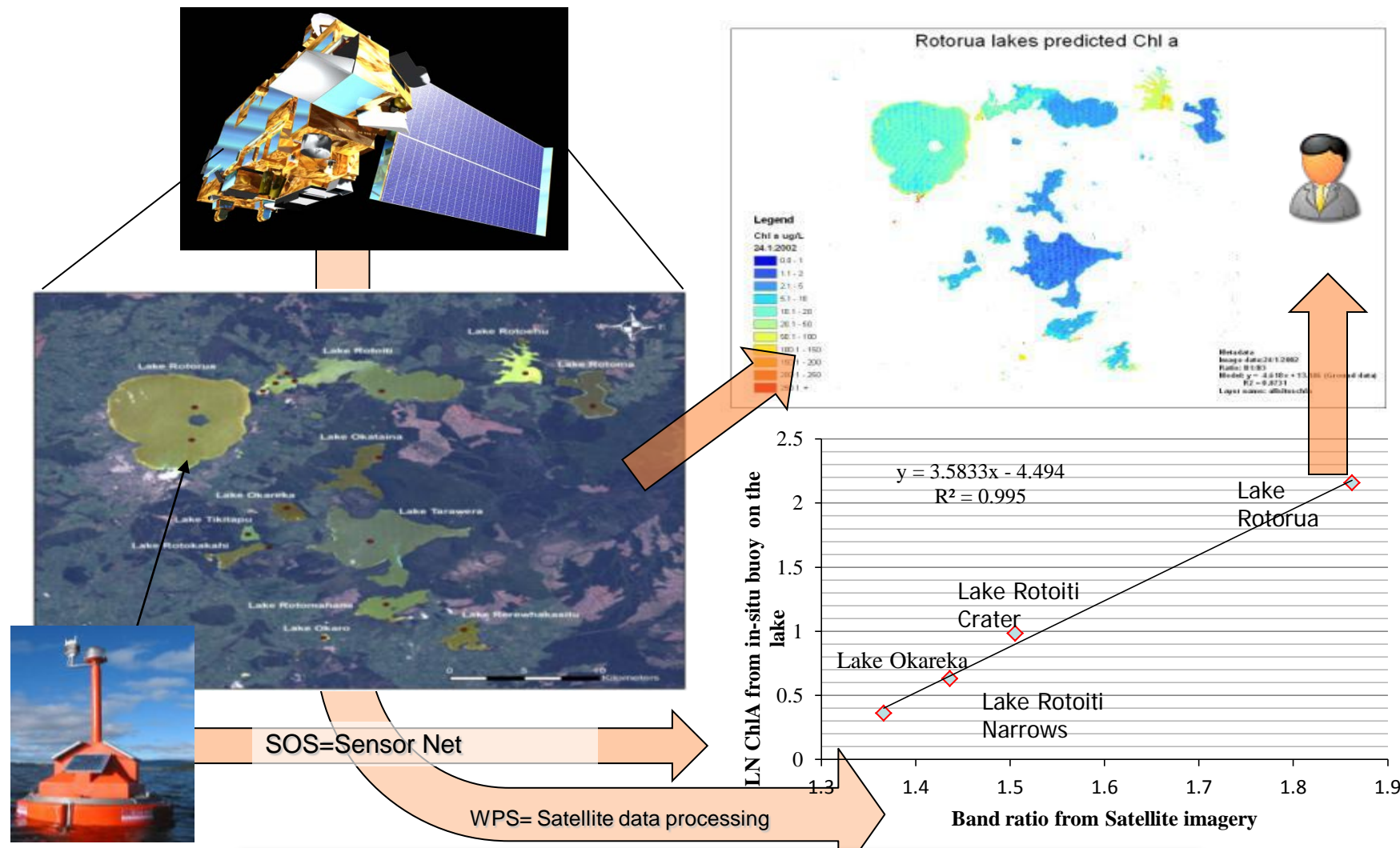
Applying to same forest type
for GPP map.



(Nagai et al., submitted to IJRS)

- The prototype system will done with observation in Japan, Taiwan and Thailand.
- The success of study will be extended to sensor networks in regional and global FLUX group.

Combining satellite and in-situ data



Accurate water quality map production with GLEON

Flux Monitoring Sites in Southeast Asia

<http://www.asiaflux.net/>



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Site Information

Map of Asia

South Asia

Southeast Asia

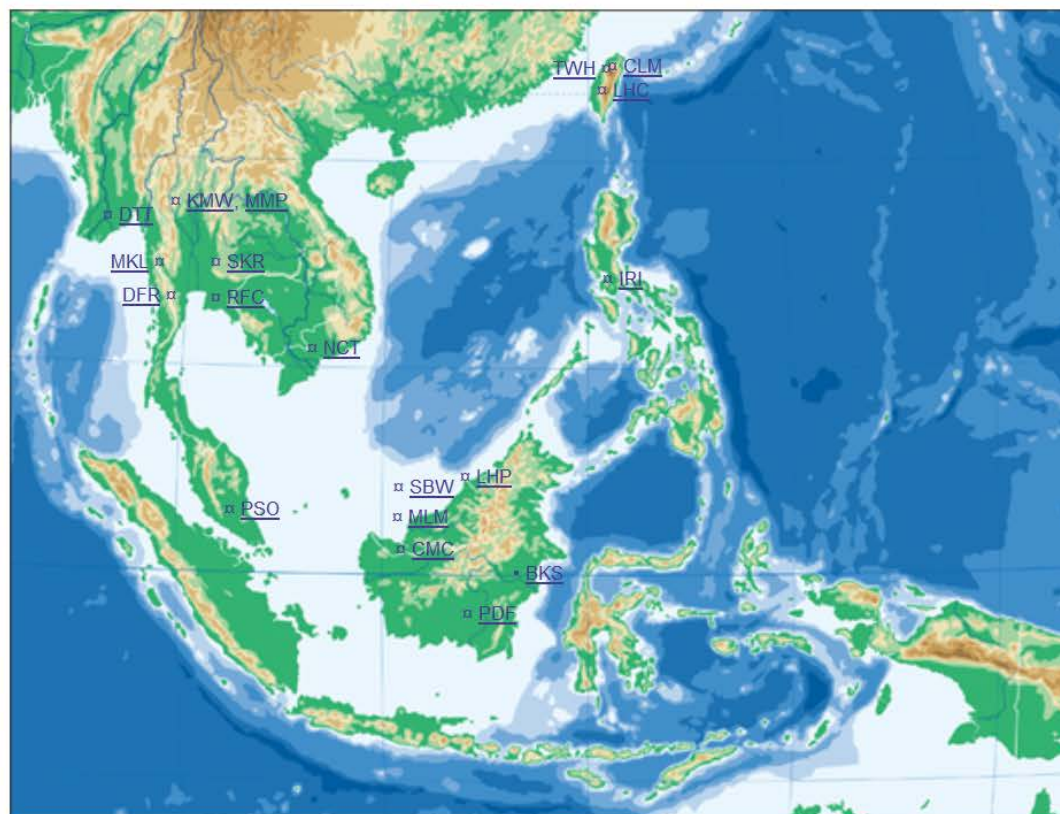
East Asia

Far East Asia

Other Areas

-> Google Map

Call for Site Info



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한국어 안내

OGC TC/PC Meetings | Programs | Registration | Accommodation | Tour | Venue | Information

The 82nd OGC Technical Committee and Planning Committee Meetings

2012. 10. 7(Sun) ~ 10. 12 (Fri)
Coex, Seoul, Korea



same period with PRAGMA
Sorry!



Hosted and Sponsored by  MLTM
The Ministry of Land, Transport and Maritime Affairs

Sponsor

Open Geospatial Consortium

Standard Setting Community for Geospatial things.

GML, WMS, CS-W are all OGC standards.
Many specs are in discussion

AIST is a member of OGC and any future collaboration will be welcome
Please contact Yoshio if interested.



Oct. 10(Wed) ~ 12(Fri) Seoul, COEX



NEWS & NOTICE

more ▾

- Events for Pre-registered vis... [2012-08-21]
- SMART Geospatial Expo 2012 - V... [2012-08-21]
- Smart Korea 2011- Geospatial I... [2012-08-07]
- Let us introduce you to the ke... [2012-08-02]
- SMART Geospatial Expo 2012 Lea... [2012-07-05]



Registration



Conference



Business Meeting



Mobile APP



Smart Geospatial Expo 2012
E-brochure DOWNLOAD



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The 82nd OGC Technical Committee
and Planning Committee Meetings



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Korea Water
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Tel : +82-31-738-4462 Fax : +82-31-738-4466 e-mail : info@smartgeoexpo.kr

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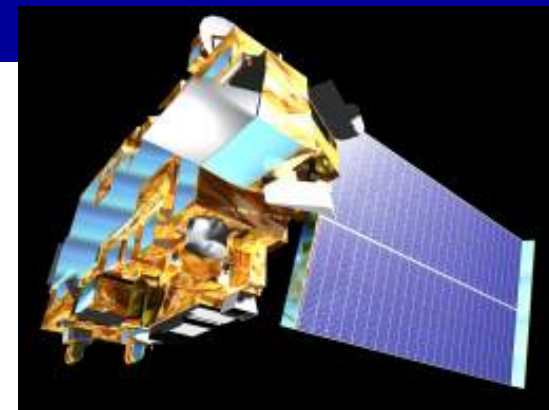
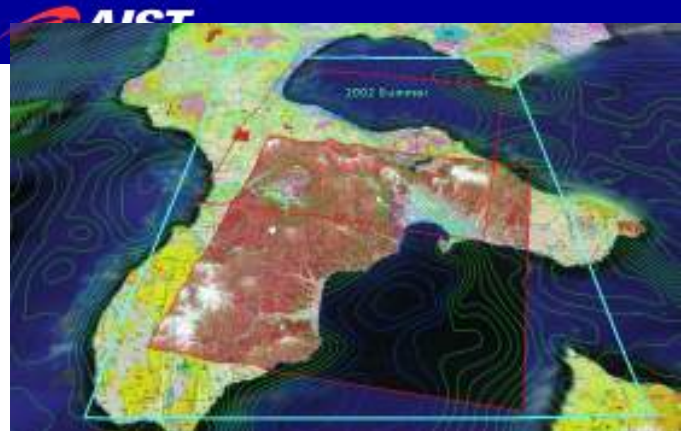
Smart Geospatial expo at COEX
<http://smartgeoexpo.kr/>

AIST corner at OGC member booth at Smartgeospatial Expo 2012

- Supported by OGC and MLTM Korea
- Posters are Exhibited
 - AIST and GEO Grid project.

Please come to the exhibition if you interested in OGC related works and the GEO Grid

- Unfortunately, no person will be the corner most of the time because all AIST members are attending to OGC-TC meeting(and PRAGMA meeting😊).



Thank you very
much for your
attention !

