Evaluation Procedure for Carbon Stock Changes in Japanese Forest Sectors

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Forest land remaining forest land

- 1995 Report adopted <u>IPCC Default Method</u>
  $\Delta CFFLB = (\Delta CFFG - \Delta CFFL)$

  $\Delta CFFLB$ = annual change in carbon stocks in living biomass
  $\Delta CFFG$ = annual increase in carbon stocks due to biomass growth
  $\Delta CFFL$ = annual decrease in carbon stocks due to biomass loss,

Forest land remaining forest land

- 2005 Report adopted <u>Stock Change Method</u>

  Δ CFFLB = (C t2 – C t1) / (t2 – t1)

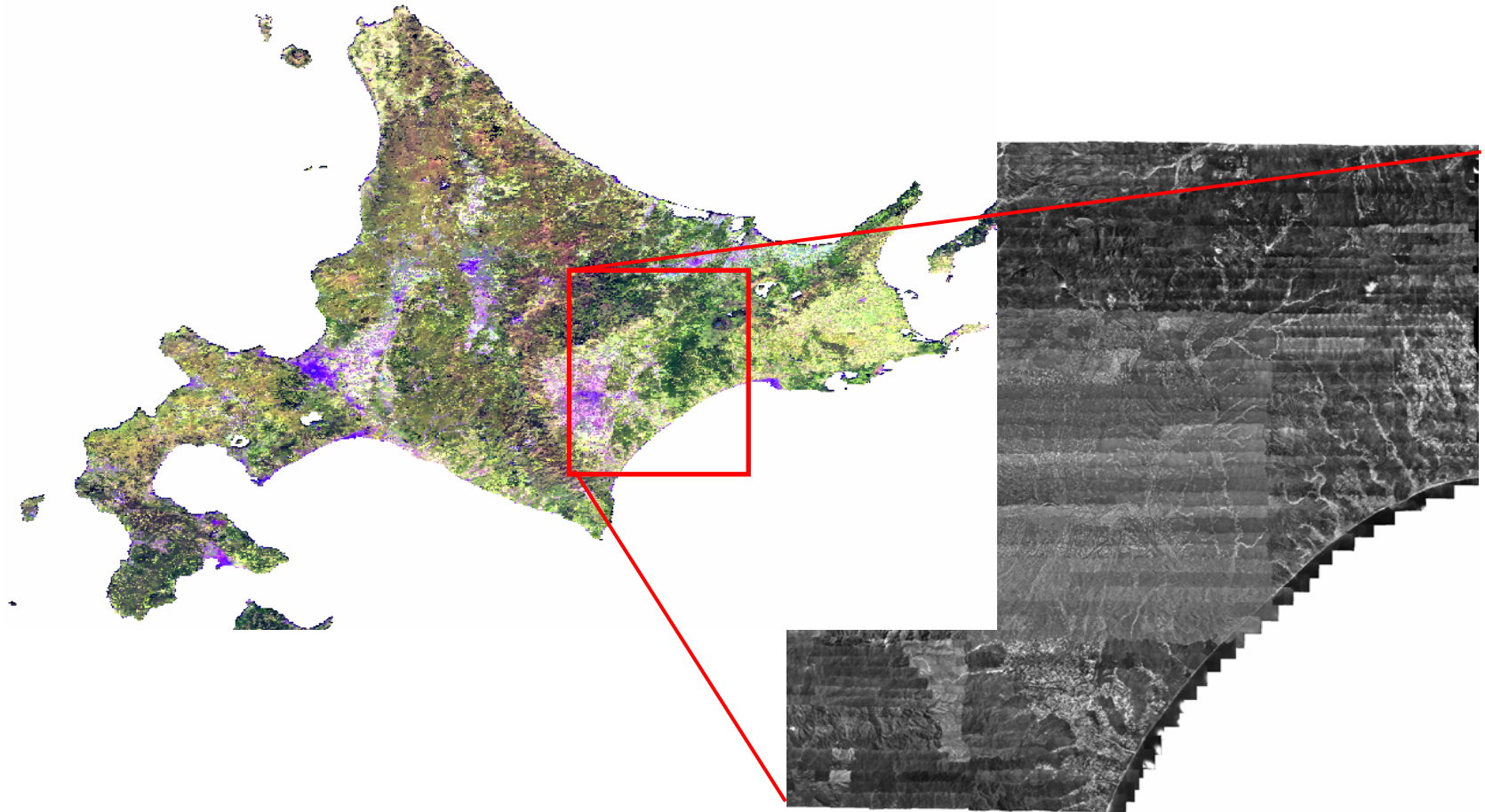
  Δ CFFLB = annual change in carbon stocks in living biomass

  C t2 = total carbon in biomass calculated at time t2

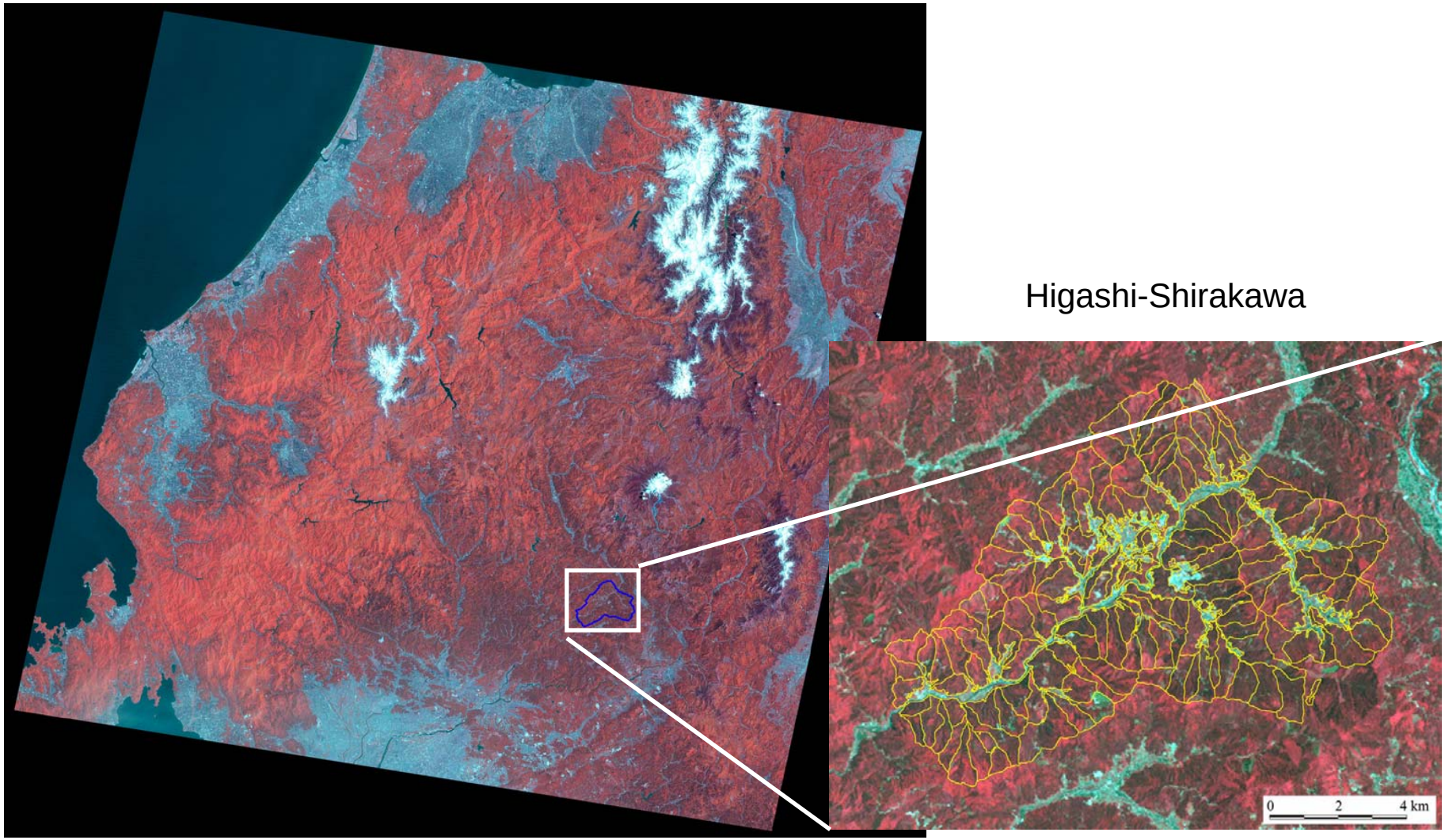
  C t1 = total carbon in biomass calculated at time t1

Monitoring ARD

Preparation of orthophotos around 1990 to define forest area in 1989/12/31



Location of an ARD test area by RS

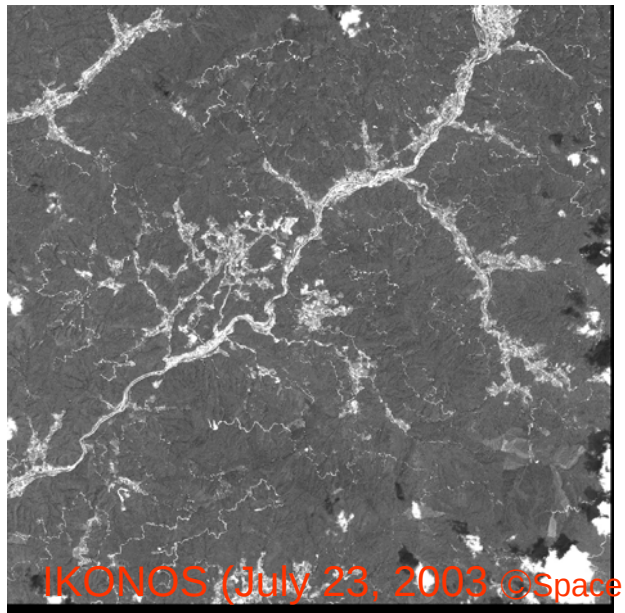


Images used in ARD monitoring test case


Landsat TM (June 1st, 1989)


Ortho photo (May 1st, 1990)


Landsat ETM+ (May 17th, 2001)


IKONOS (July 23, 2003 ©Space image)

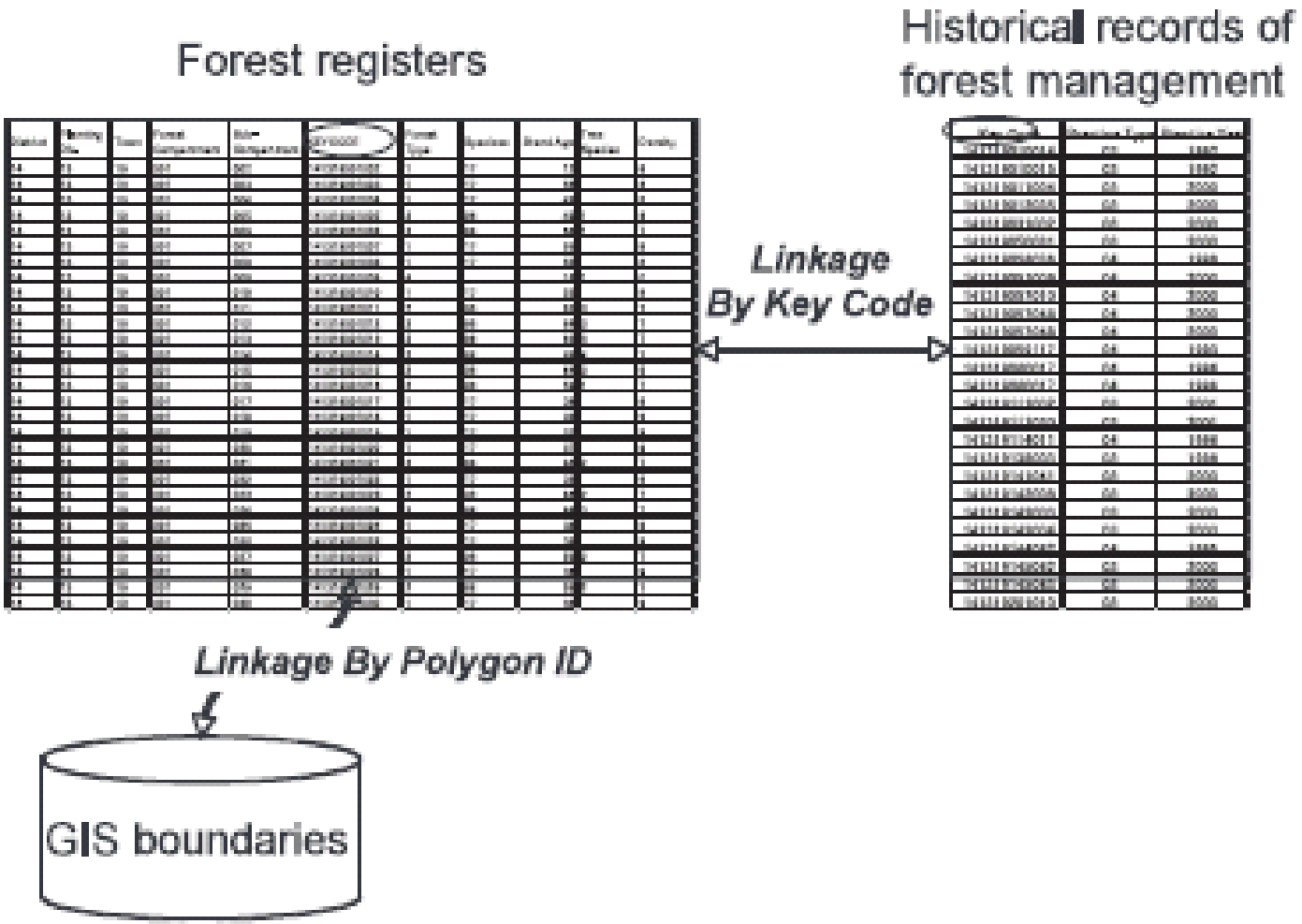
Identification of FM lands

- Narrow and broad interpretation of the definition of FM
  - (LULUCF GPG)… *A party could interpret the definition of forest management in terms of specified forest management practices, such as fire suppression, harvesting or thinning, undertaken since 1990. Alternatively, a country could interpret the definition of forest management in terms of a broad classification of land subject to a system of forest management practices, without the requirement that a specified forest management practice has occurred on each land.*

Forest Inventory Data 1

- Forest registers
  - Attribute information
    - Area, Species, Age, DBH, Volume, Ownership
  - Number of Compartment and Sub-compartment of all private and national forests
    - Compartments: 370,000 records
    - Sub-compartments: 31,000,000 records
  - Renewal every five years
  - Linkage to boundaries in forest maps

Forest Registers Database

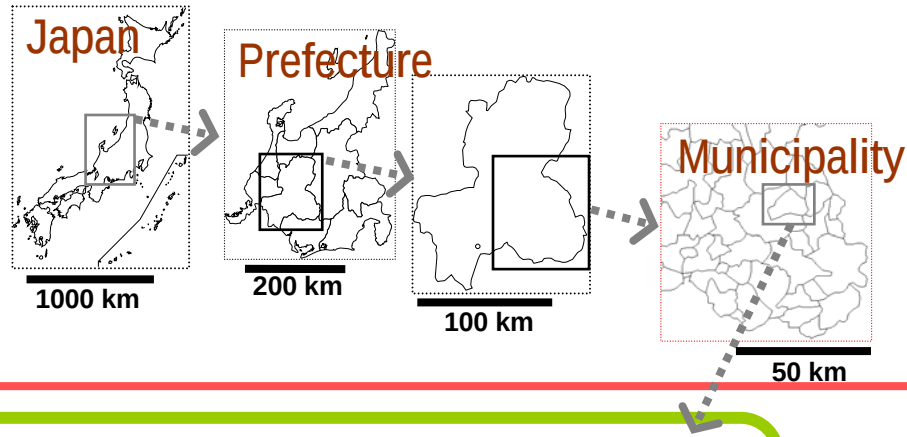


Forest Inventory Data 2

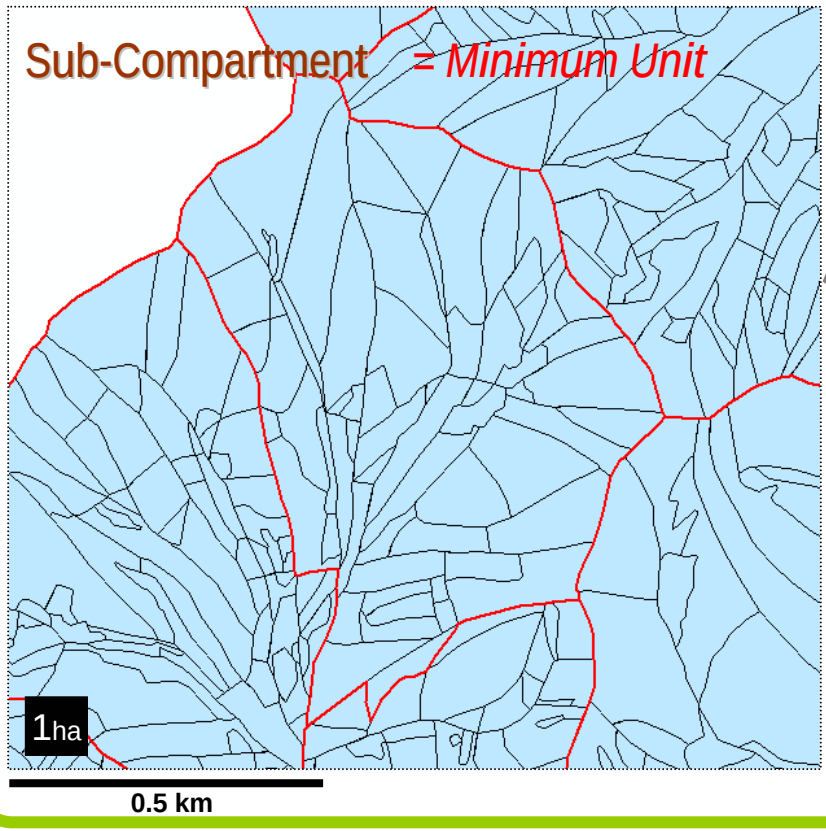
- Forest maps
  - 1/5000 scale maps
  - Boundaries of forest compartments and sub-compartments
  - Around 40% of the boundaries were digitized for GIS so far

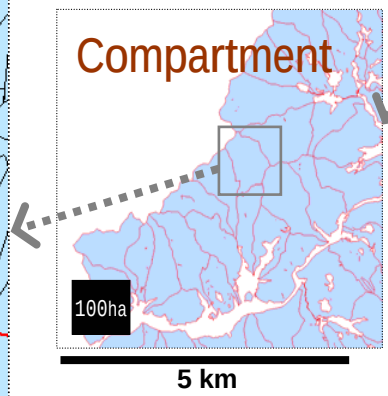
Geographic Units

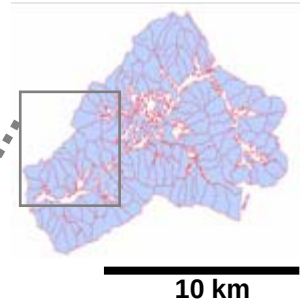
Administrative needs

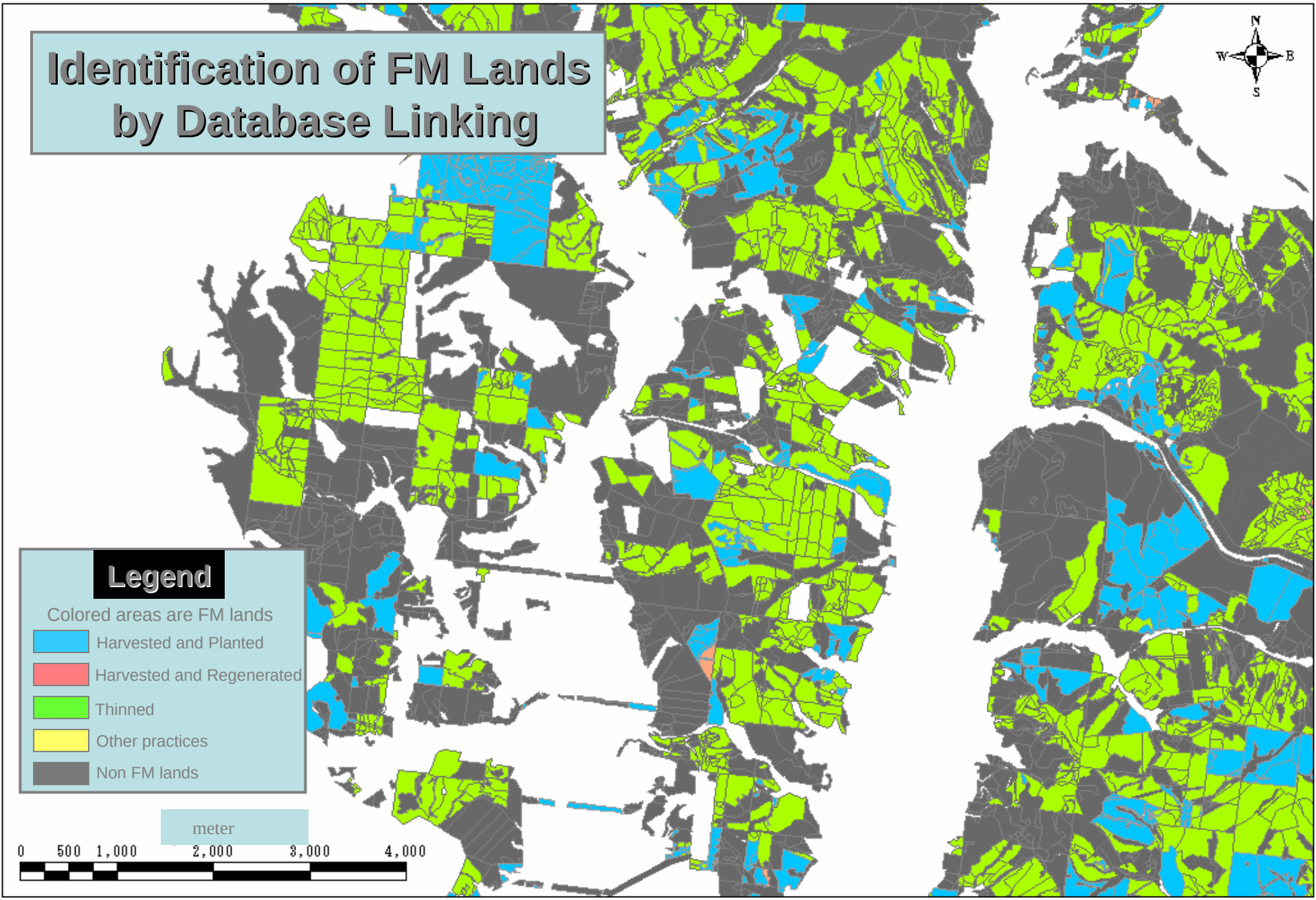


Forest management needs

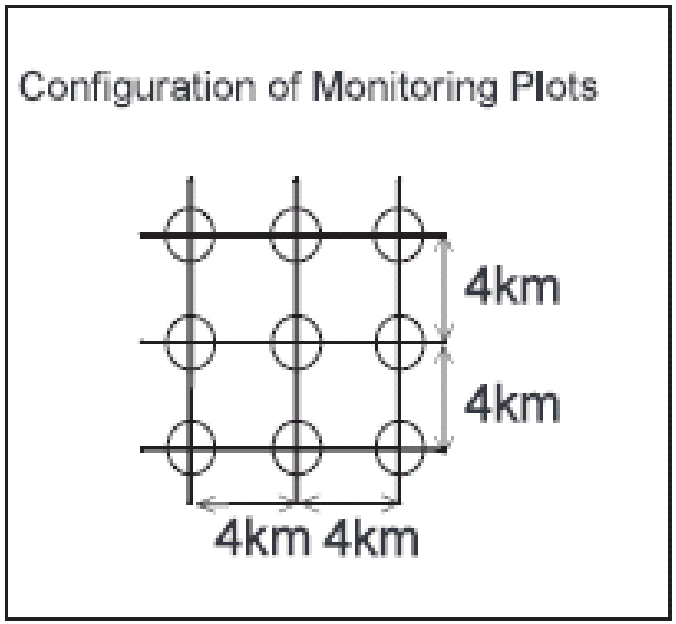


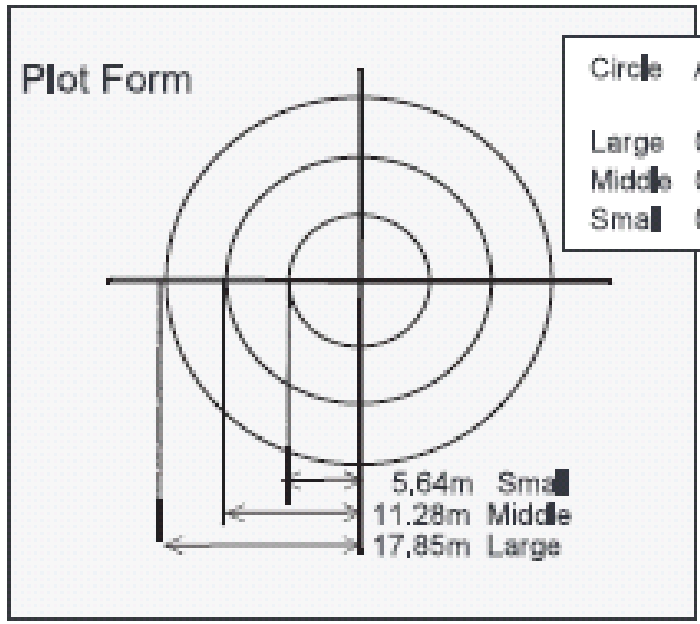





Identification of FM Lands by Database Linking
N
W
E
S
Legend
Colored areas are FM lands
Harvested and Planted
Harvested and Regenerated
Thinned
Other practices
Non FM lands
meter
0
500
1,000
2,000
3,000
4,000

Forest Inventory Data 3
Forest Resource Monitoring System



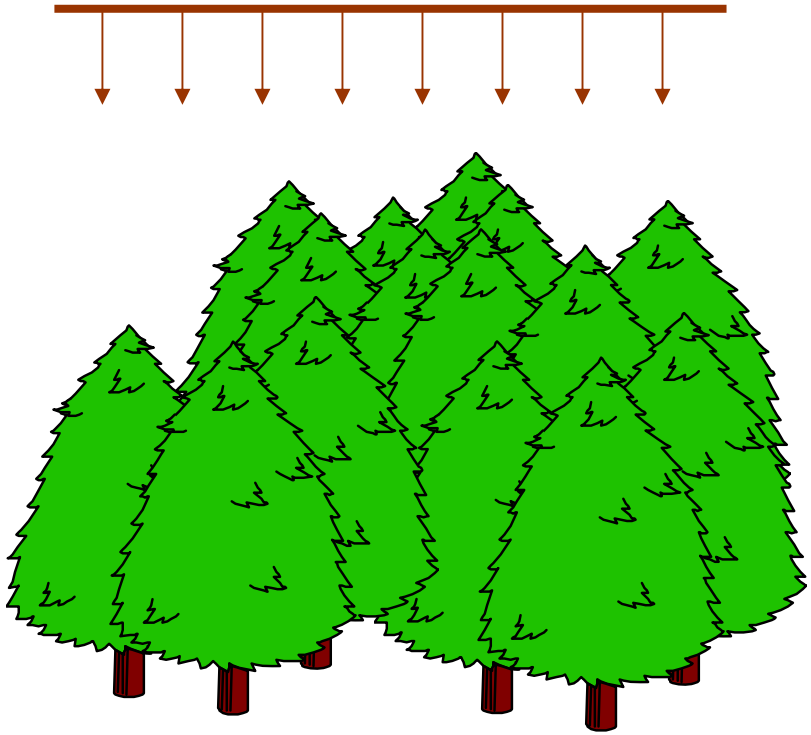


Circle	Area	DBH to be measured
Large	0,1 ha	> 18cm
Middle	0,04 ha	> 6 cm
Small	0,01 ha	> 1 cm

By M. Matsumoto

Definition of Forest

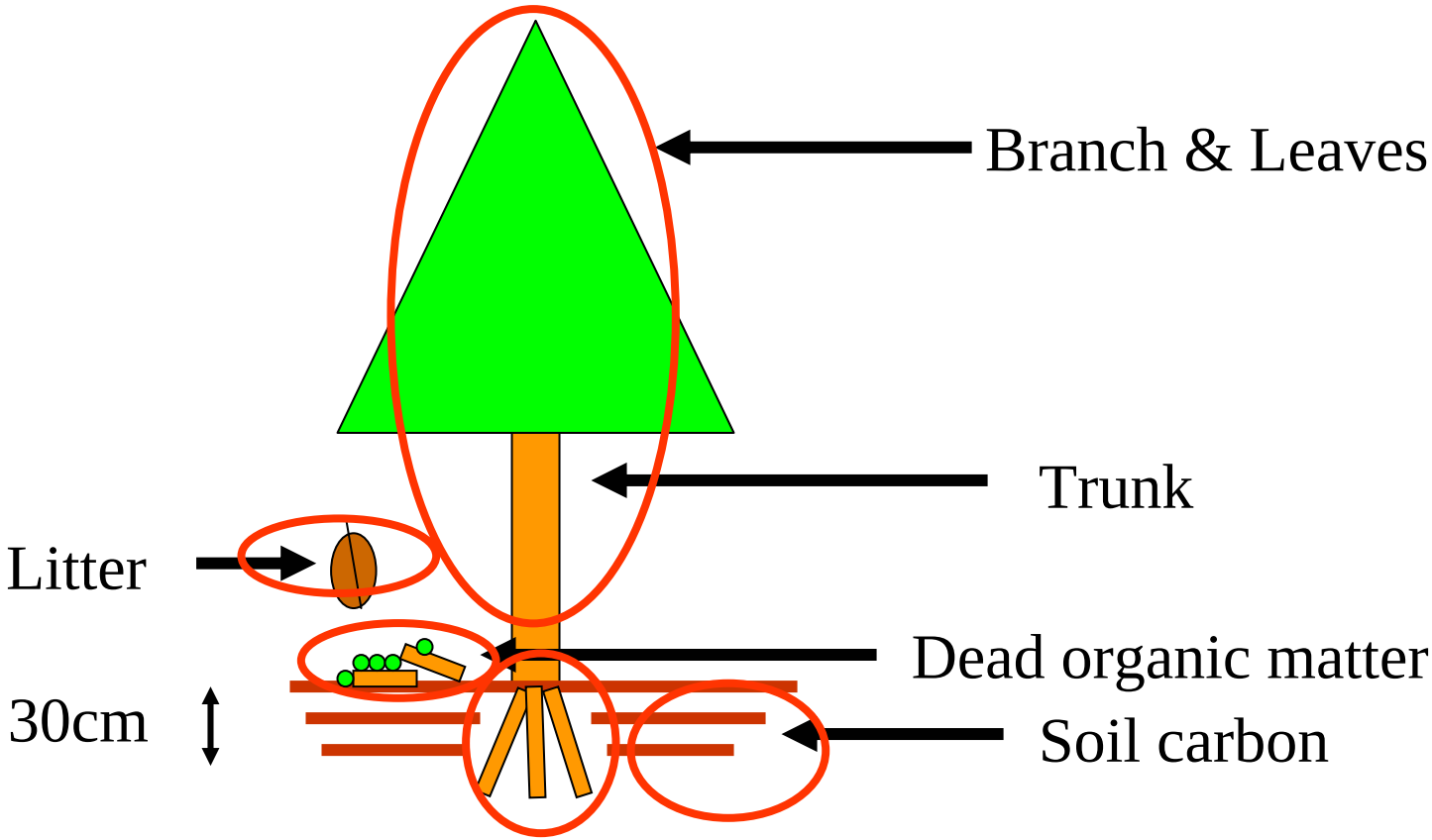
Minimum Crown cover 10-**30**%



a minimum height
2-**5**m

A minimum area 0.05-1.0ha(**0.3ha**)

Carbon pool in forests defined By Marrakech Accords



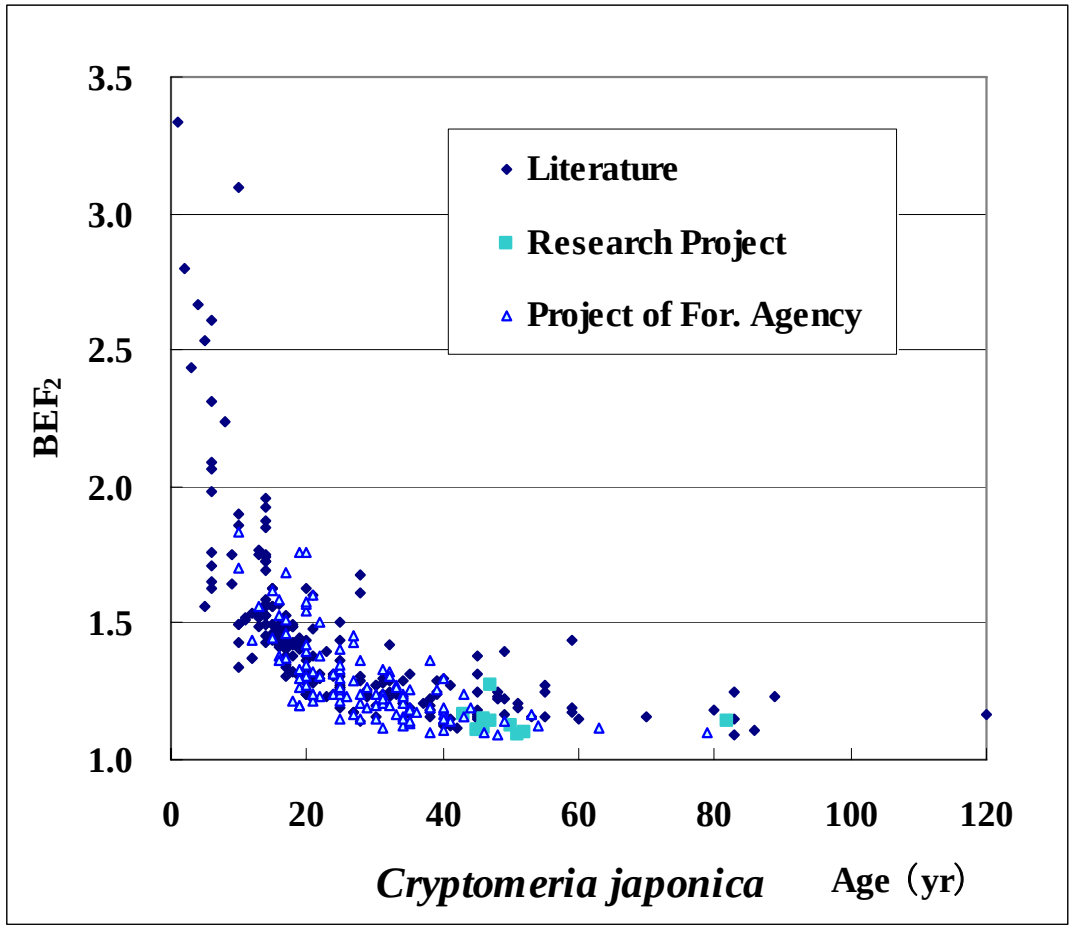
Collection of data (above ground biomass)

Tree species	Previous Literature	Research Project ①	Project by Forest Agency ②	③	④	Total
Cryptomeria japonica	216	11	66	25	17	335
Chamaecyparis obtusa	82	8		16	39	145
Pinus densiflora	135	0		4	3	142
Larix kaempferi	49	9		8	7	73
Abies sachalinensis	30	2		2	5	39
Picea jezoensis	0	3			3	6
Picea glehnii	1	4		2	5	12
Other conifers	1	1		1	3	6
Broadleaf	171				15	186
Total	685	38	66	58	97	944

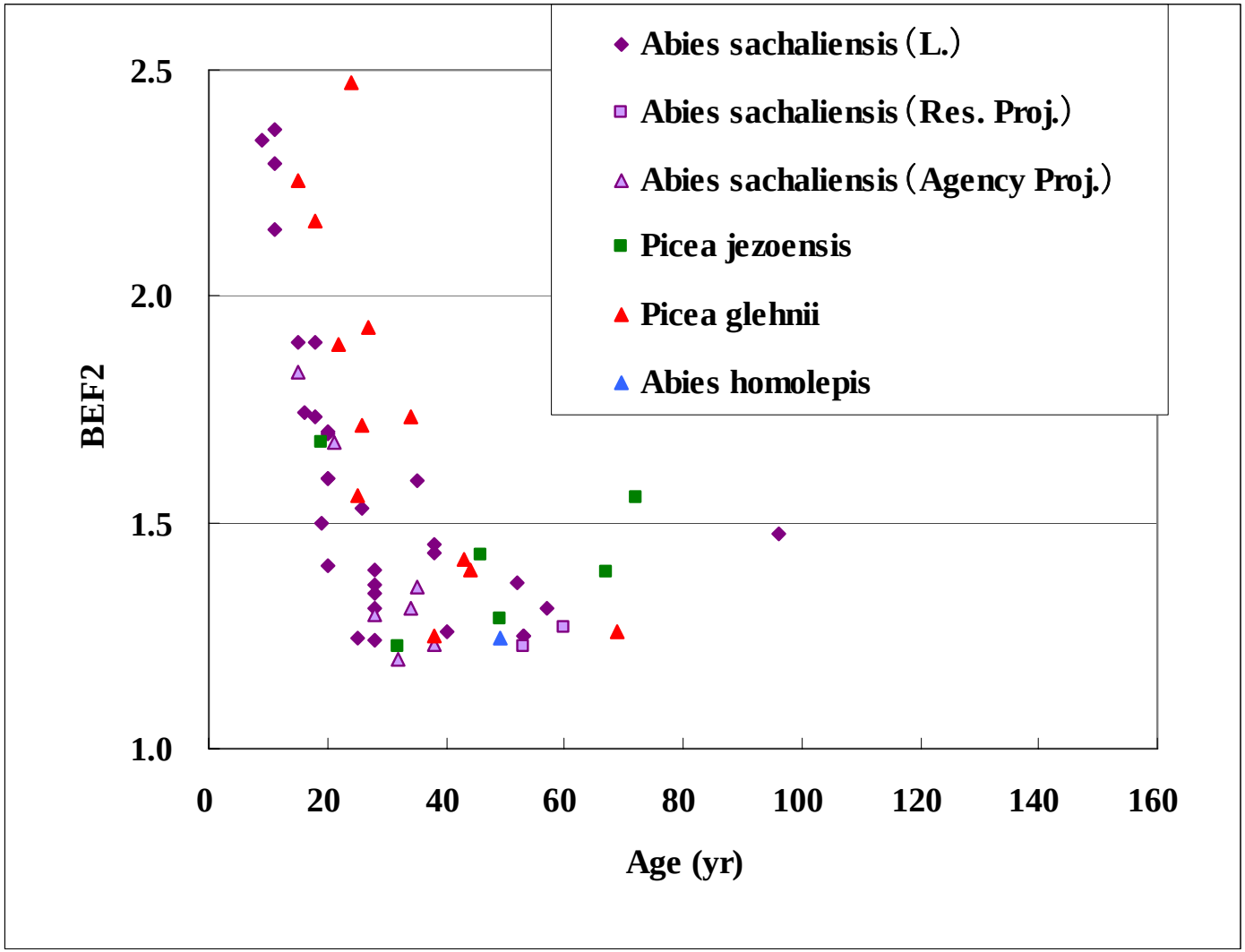
①Study on Transparent and Verifiable Method of Evaluating Carbon Sinks(FY2001-2003)
②Project on evaluate to effect of thinning for forest sink(FY1999-2000)
③Project on development for measurement system of forest sink(FY2001-2002)
④Project on organization development for measurement and Use of forest sink(FY2003-2006)

- We are measuring 73 plots in which 28 plots are measuring additionally below ground biomass in 2004.
- We will repeat same plan to measure in 2005 and 2006.

Biomass Expansion Factor (BEF_2) of Sugi Cedar



BEF_2 of Boreal Conifer

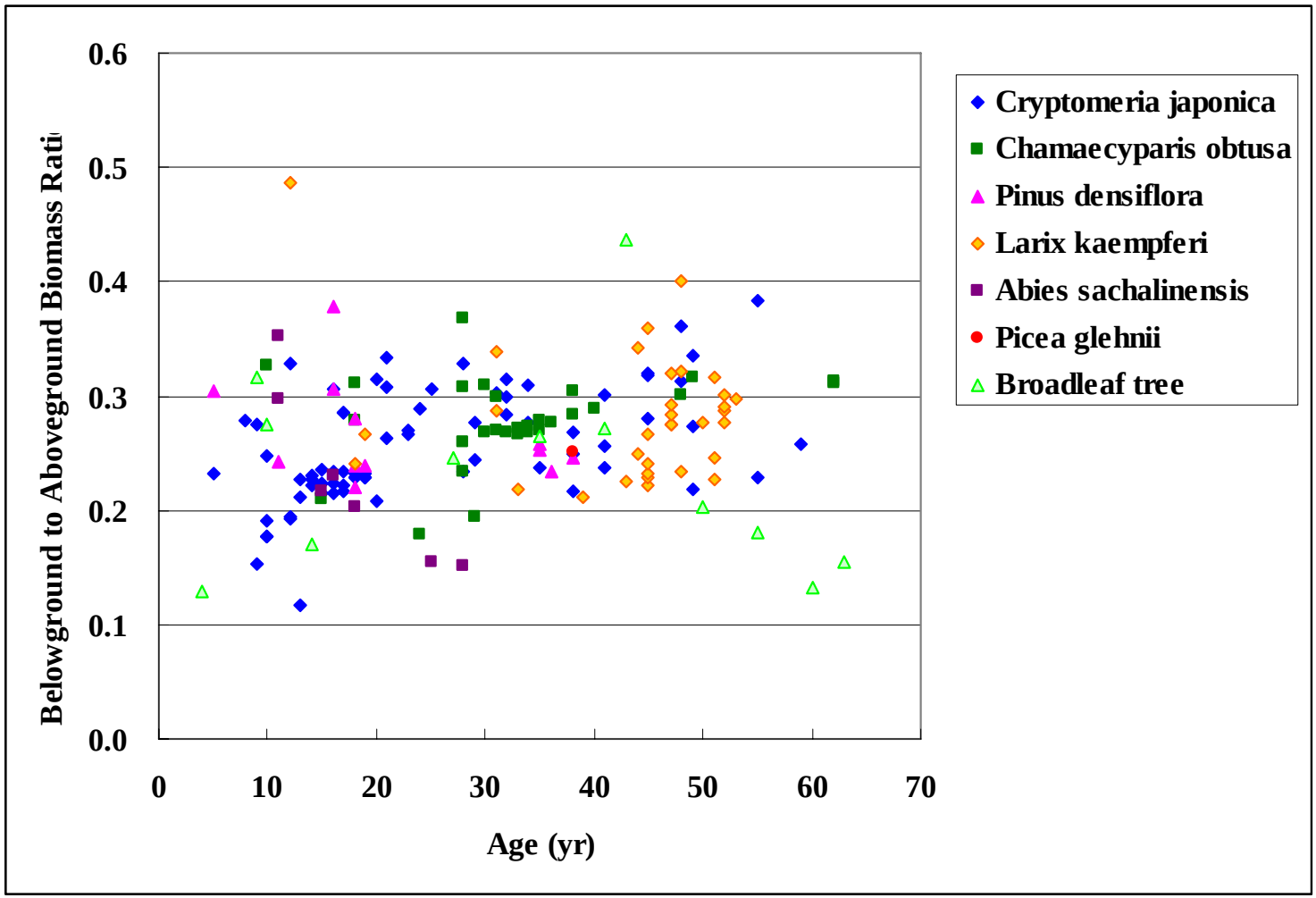


Biomass Expansion Factors of Some Typical Species in Japan

Stand Age	Tree Species	Previous Literature			by added data of research project FY2001-2003			Tentative value by added data of forest agency project FY1999-2003		
		Number of	Mean	Confi. RSE	Number of	Mean	Confi. RSE	Number of	Mean	Confi. RSE
≦20	Cryptomeria japonica	111	1.61	±0.07 4.3%	—	—	—	142	1.58	±0.06 3.6%
	Abies sachalinensis	14	1.85	±0.17 9.0%	—	—	—	15	1.85	±0.16 8.4%
	All of broadleaf	47	1.39	±0.07 4.9%	—	—	—	48	1.40	±0.07 4.9%
≧21	Cryptomeria japonica	105	1.25	±0.02 1.6%	116	1.24	±0.02 1.6%	193	1.23	±0.01 1.2%
	Abies sachalinensis	16	1.36	±0.05 3.9%	18	1.35	±0.05 3.7%	24	1.35	±0.05 3.7%
	All of broadleaf	124	1.28	±0.02 1.8%	—	—	—	138	1.27	±0.02 1.6%

By T. Iehara

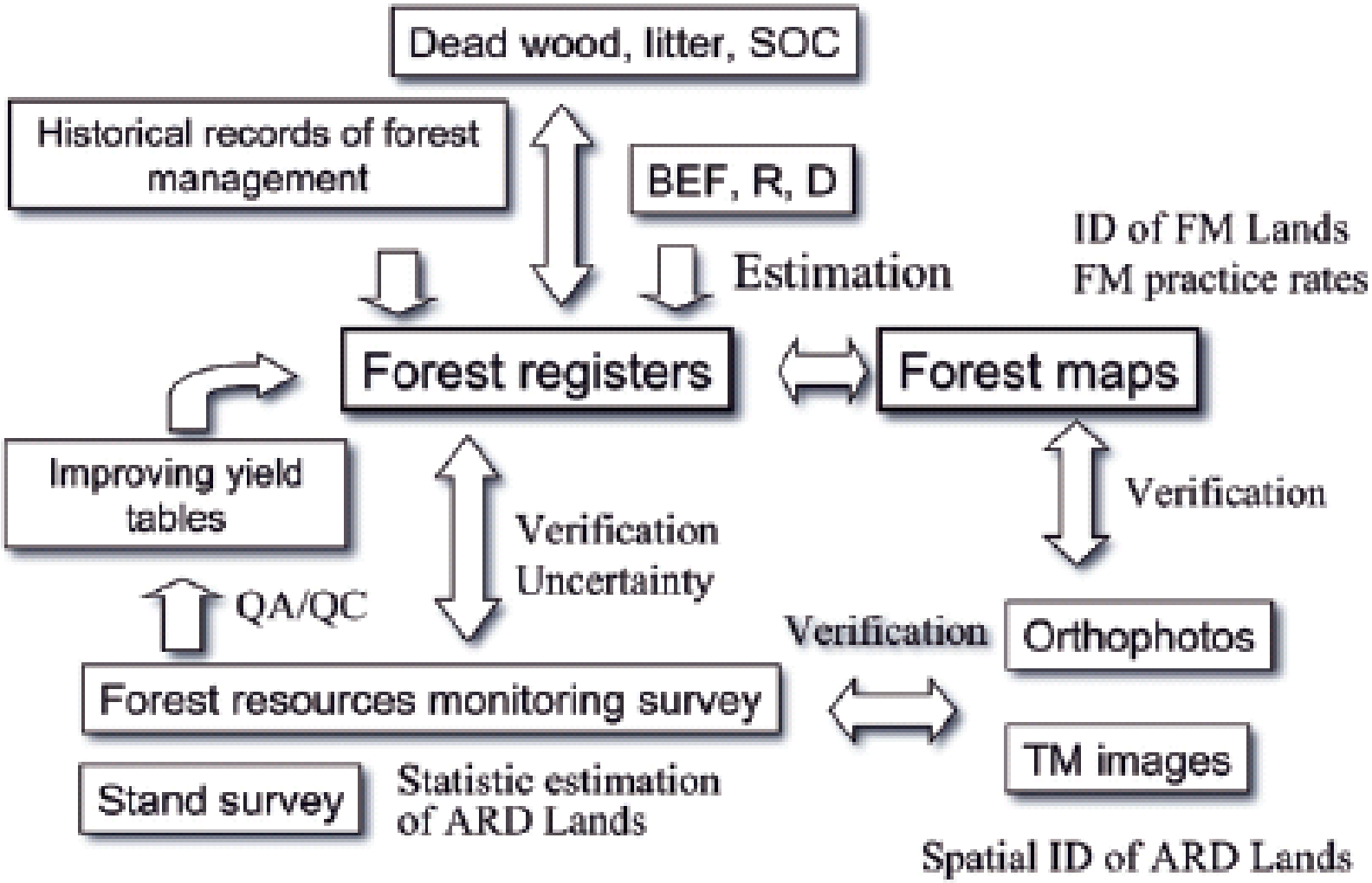
Belowground to Aboveground Biomass Ratio (Root-Shoot Ratio,R)



Belowground to Aboveground Biomass Ratio of Some Typical Species in Japan

Stand Age	Tree Species	Previous Literature		
		Number of	Mean	Confi. RSE
≦20	Cryptomeria japonica	37	0.23	±0.01 5.9%
	Abies sachalinensis	5	0.26	±0.05 21.1%
	All of broadleaf	4	0.22	±0.09 38.7%
≧21	Cryptomeria japonica	35	0.28	±0.01 4.6%
	Abies sachalinensis	2	0.15	±0.10 66.2%
	All of broadleaf	8	0.24	±0.07 28.0%

Forest GHG Accounting System



By M. Matsumoto