Improving the Mexico City Biogenic VOC Emissions Inventory.

P. Domínguez, M. Alegre, J. Aliphat, J. Jarquín, J. M. Hernández and Luis G. Ruiz-Suárez

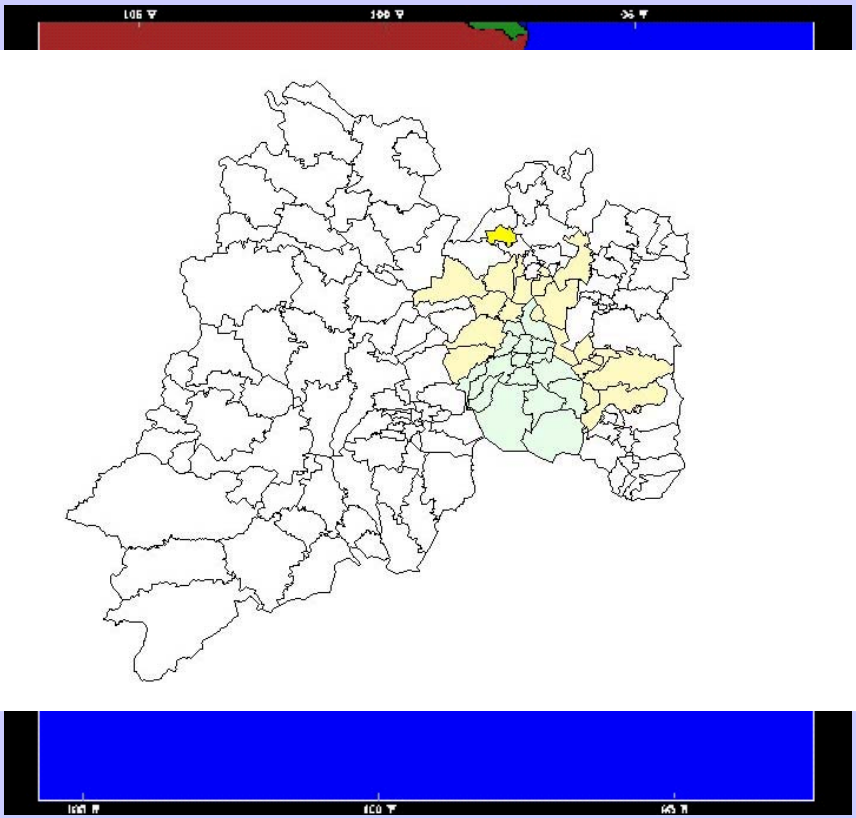
Centro de Ciencias de la Atmósfera

UNAM, México

Objectives

- To reduce uncertainty in the MCMA biogenic VOC emission estimates
- To produce a better imput of biogenic VOC emissions to regional air quality models.

The MCCM model uses a 3 levels nested dominium



To reduce uncertainties

improve

Use local EF

$$Emissions = \sum_i A_i F_i$$

$$A_{i,j} = S_{i,j} I_i C_j$$

Where:

S = surface area vegetation type *i*

I= Biomass leaf index of vegetation type *i*

Cj= Correction factor for I_i for stress level *j*

About emission factors

- To measure seasonally-resolved speciated emission factors for selected species
- Selection criteria
  - Widely distributed within in the basin
  - Widely used in reforestation programs
- Ranking for emission intensities (total VOC) to choose target tree species for seasonally

Species selected for speciated EF

Abies religiosa

Pinus patula

Quercus rugosa

Emission factors for *Abies religiosa*

Monoterpenes	Emission factor at 30°C μg g^{-1} h^{-1}	
	October 2002 Ends rains season	April 2003 Dry and very warm
α-pinene	0.418 ± 0.042	0.0051 ± 0.0001
β-pinene	0.810 ± 0.053	0.0001 ± 1E-5
Δ3-carene	0.839 ± 0.053	0.0013 ± 0.0001
limonene	0.014 ± 0.056	0.0008 ± 0.0002
γ-terpinene	----------	0.0003 ± 1E-5
Linalool	0.651 ± 0.066	DL.
Total	2.733	0.008

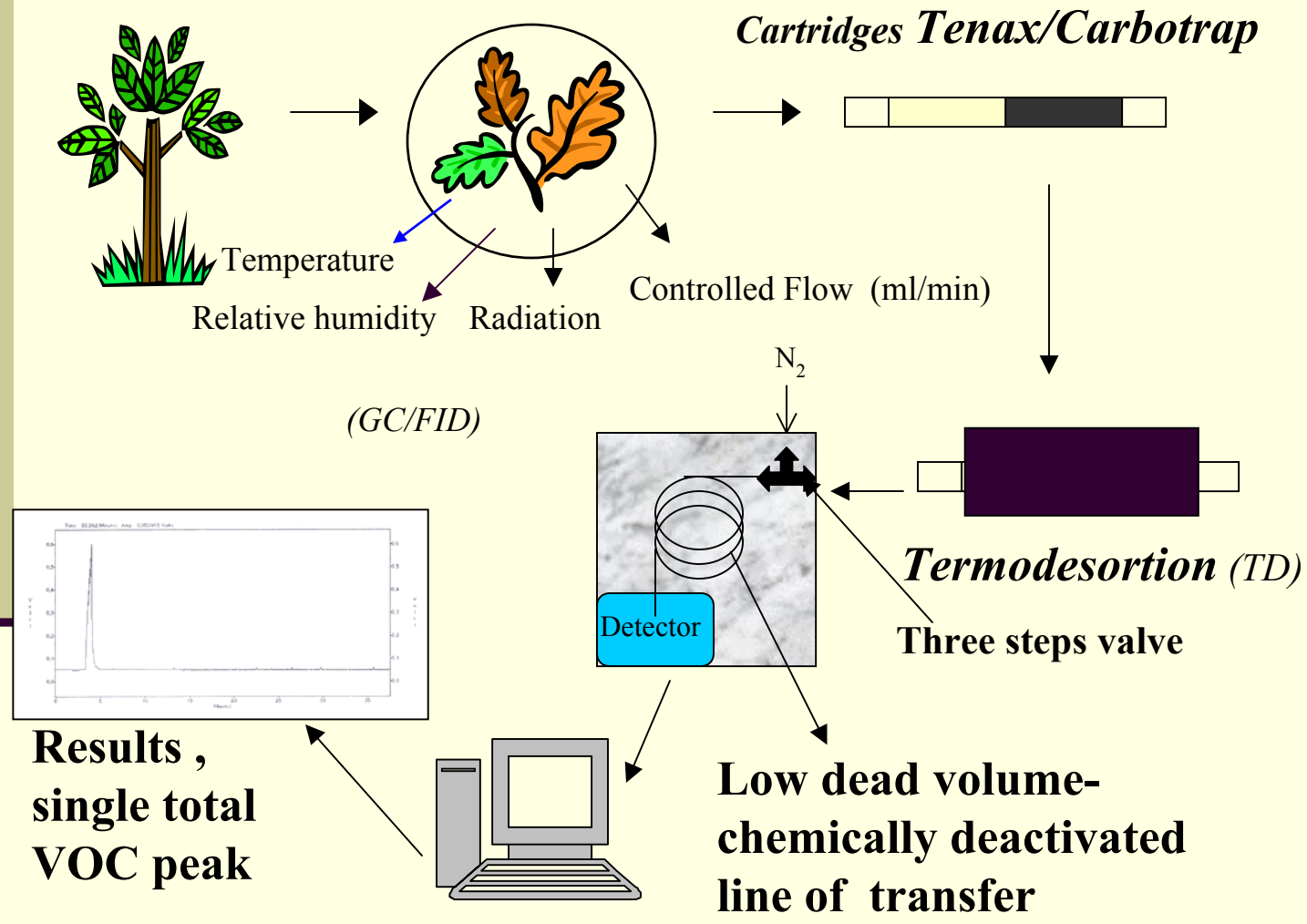
Emission factors for *Pinus patula*

Monoterpenes	Emission factor at 30°C $\mu g\ g^{-1}\ h^{-1}$	
	October 2002 Finishing rains season	April 2003 Dry and very warm
α-pinene	1.758 ± 0.038	0.308 ± 0.026
β-pinene	0.193 ± 0.010	0.048 ± 0.021
Δ3-carene		0.405 ± 0.024
limonene	0.688 ± 0.032	---------
γ-terpinene	0.632 ± 0.069	0.175 ± 0.025
Linalool	0.279 ± 0.011	0.178 ± 0.023
Total	3.5533	1.115

Emission factors for *Quercus rugosa*

Month	Emission factor at 30°C $\mu g\ g^{-1}\ h^{-1}$	C.V.
November 2002 Start dry season	17.175 ± 0.96	5.61 %
May 2003 Dry and very warm	126.50 ± 0.47	2.15 %
July 2003 Rains season	1.191 ± 0.23	1.99 %

Experimental set up for the ranking experiments



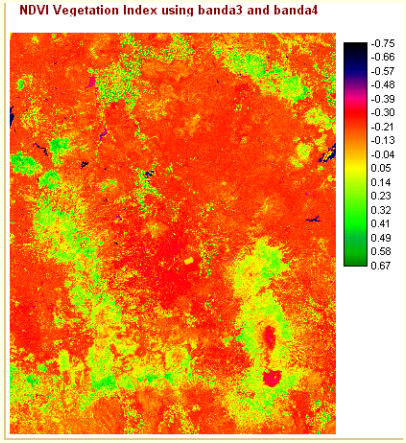
Pending tasks

- To check for possible light dependence of α-pinene
- To develop criteria to assign season dependent emission factors

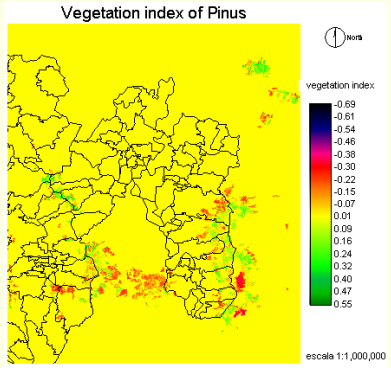
About activity data

- Identify land healty/stressed forest areas
- To measure leaf biomax index for each forest/degree of stress class

Biomass leaf index and correction factors

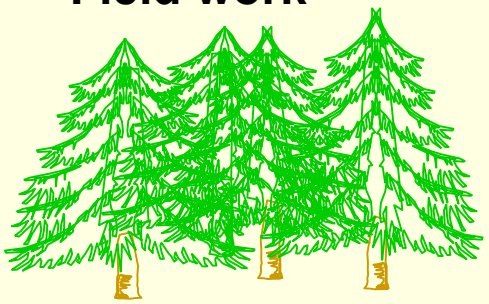


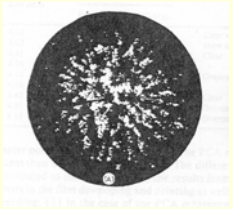
LANDSAT image procesing



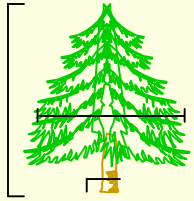
Choosing study sites

Field work

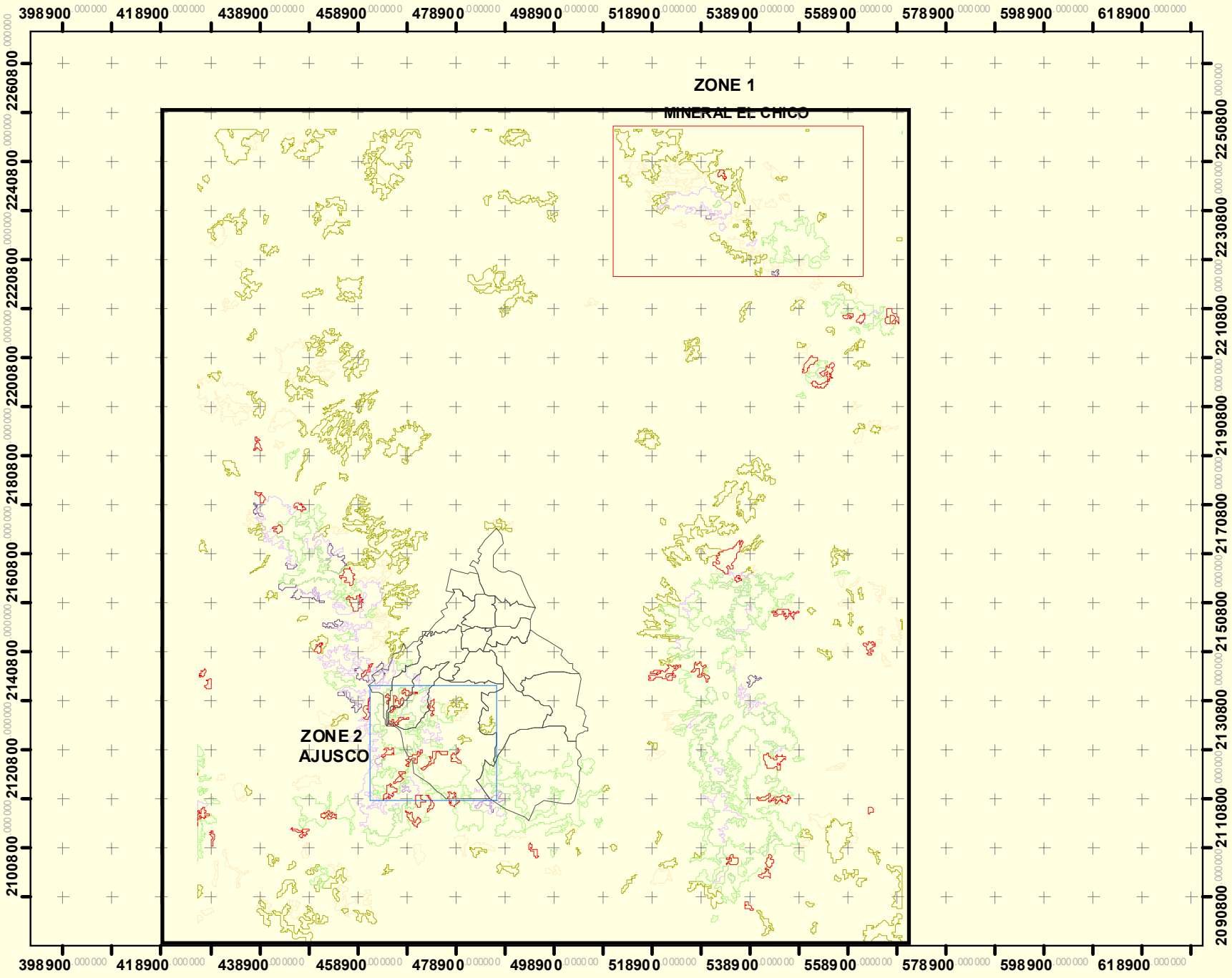




Hemispheric photo



biomass meassurements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ZONE 2
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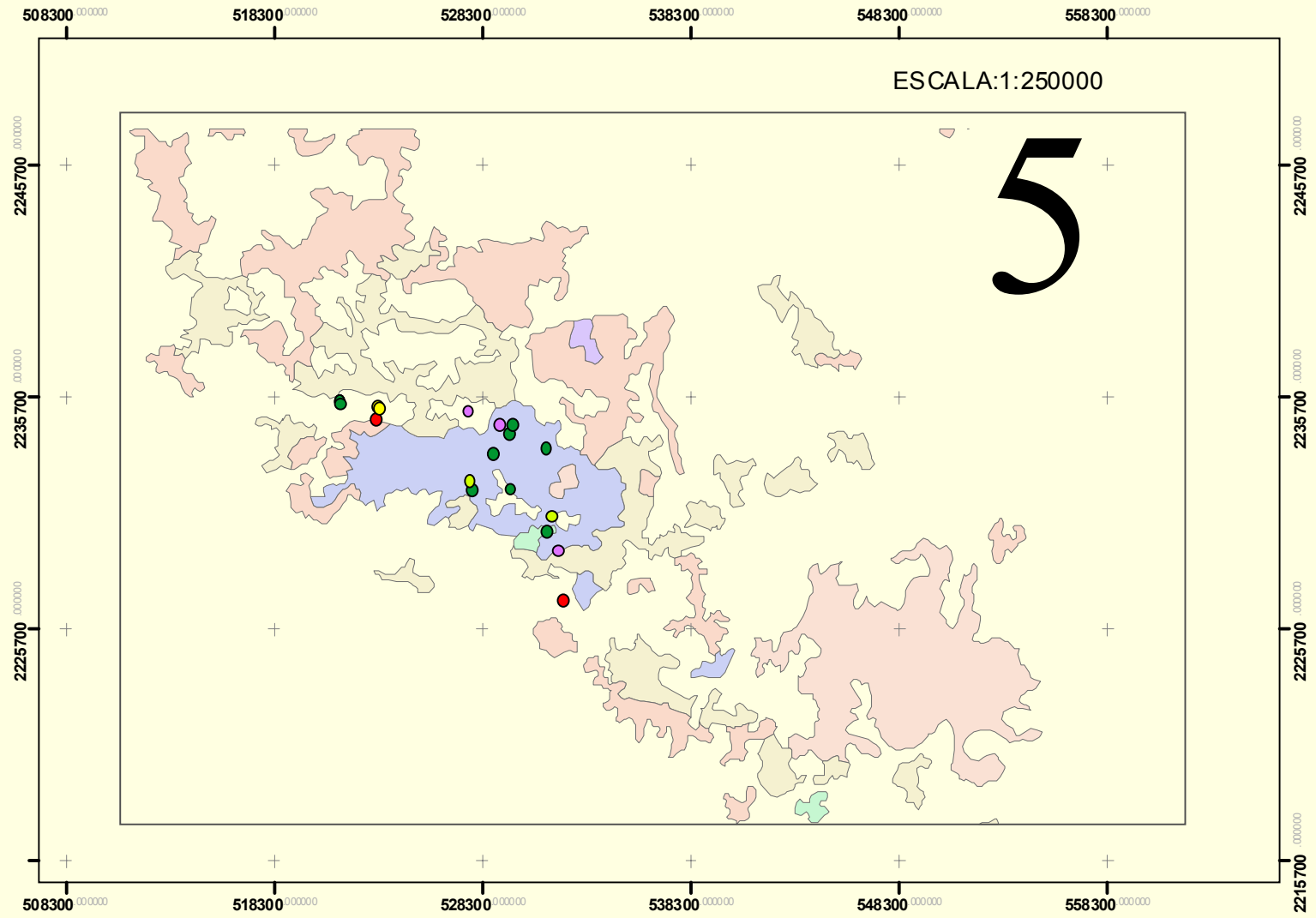
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2235700
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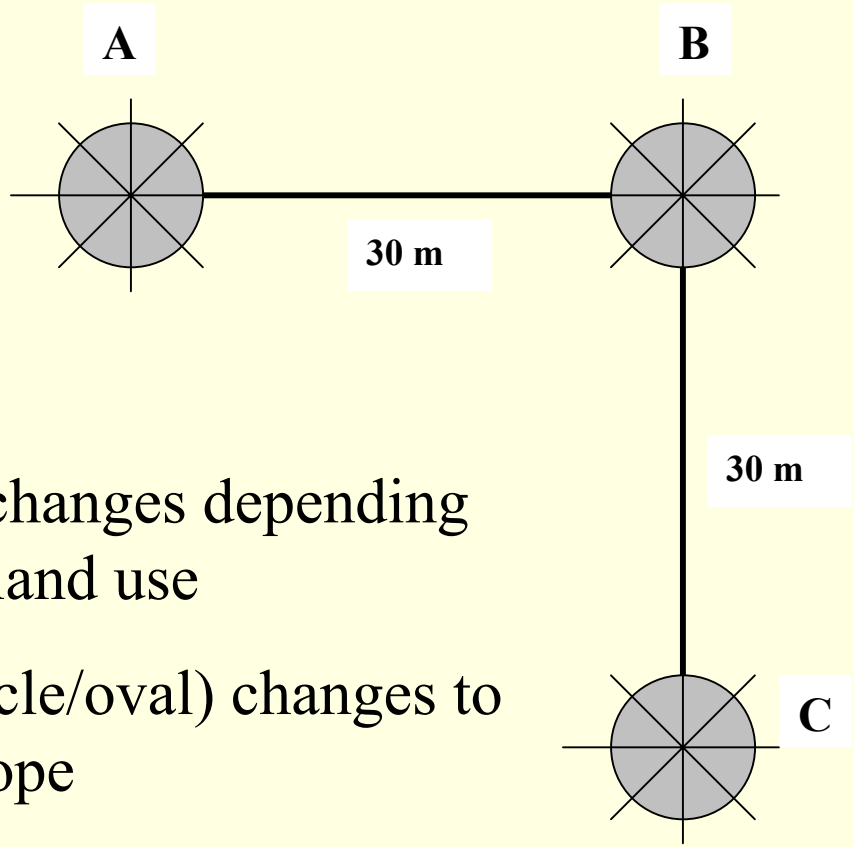
SIMBOLOGIA
Healthy_Quercus
Stressed_Pinus sp
Stressed_Abies sp
Healthy_Abies
Healthy_Pinus sp
Stressed_Quercus
Stressed Abies
Stressed Quercus
Healthy Quercus
Quercus-Abies
Healthy Abies sp

biomass measurement



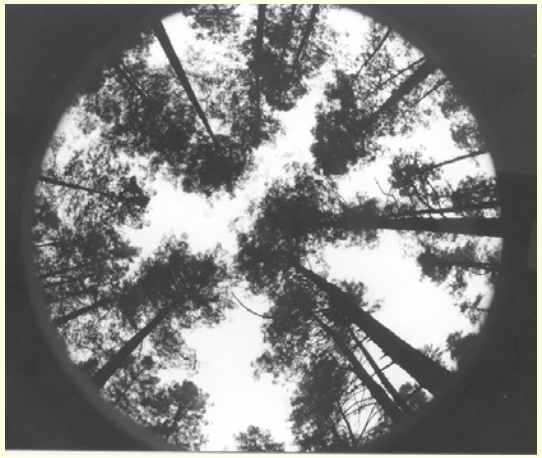
3 plots by site

Plot diameter changes depending on land cover/land use

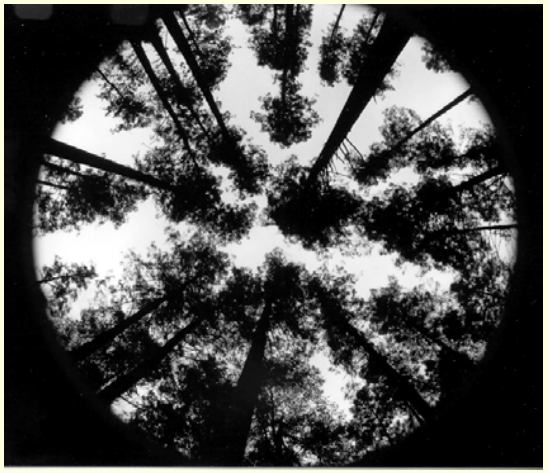
Plot shape (circle/oval) changes to compensate slope

LAI =0.36 m^2/m^2

LAI =0.46 m^2/m^2



LAI =0.60 m^2/m^2



LAI =1.11 m^2/m^2

Hemispherical photos taken in the center of each plot

Abies

Pending tasks

- To obtain reflectivity indexes with different algorithms
- To complete sampling
- To obtain the stress correcting factors Cj