

TÜV Rheinland Agroisolab.

**Practical applications  
of stable isotopes  
technologies for  
timber tracking**



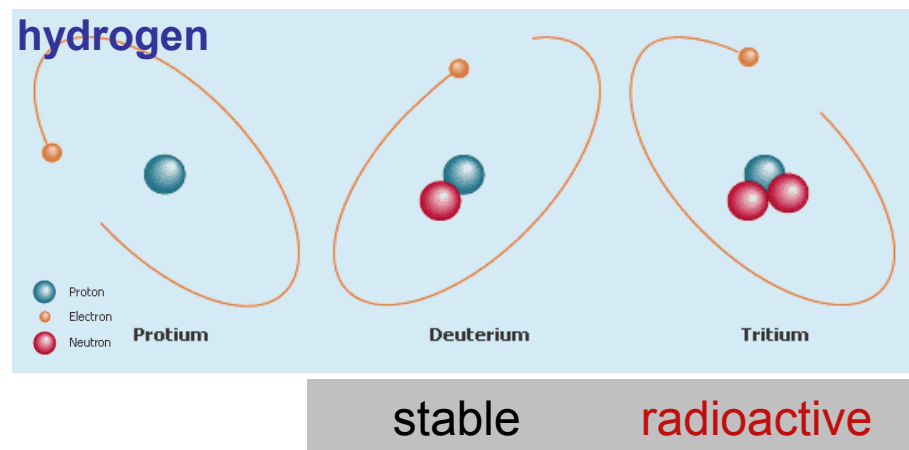
## Stable isotopes in bioelements

**Not radioactive**

Found in all nature

Different distribution and pattern

Physical tracking tool



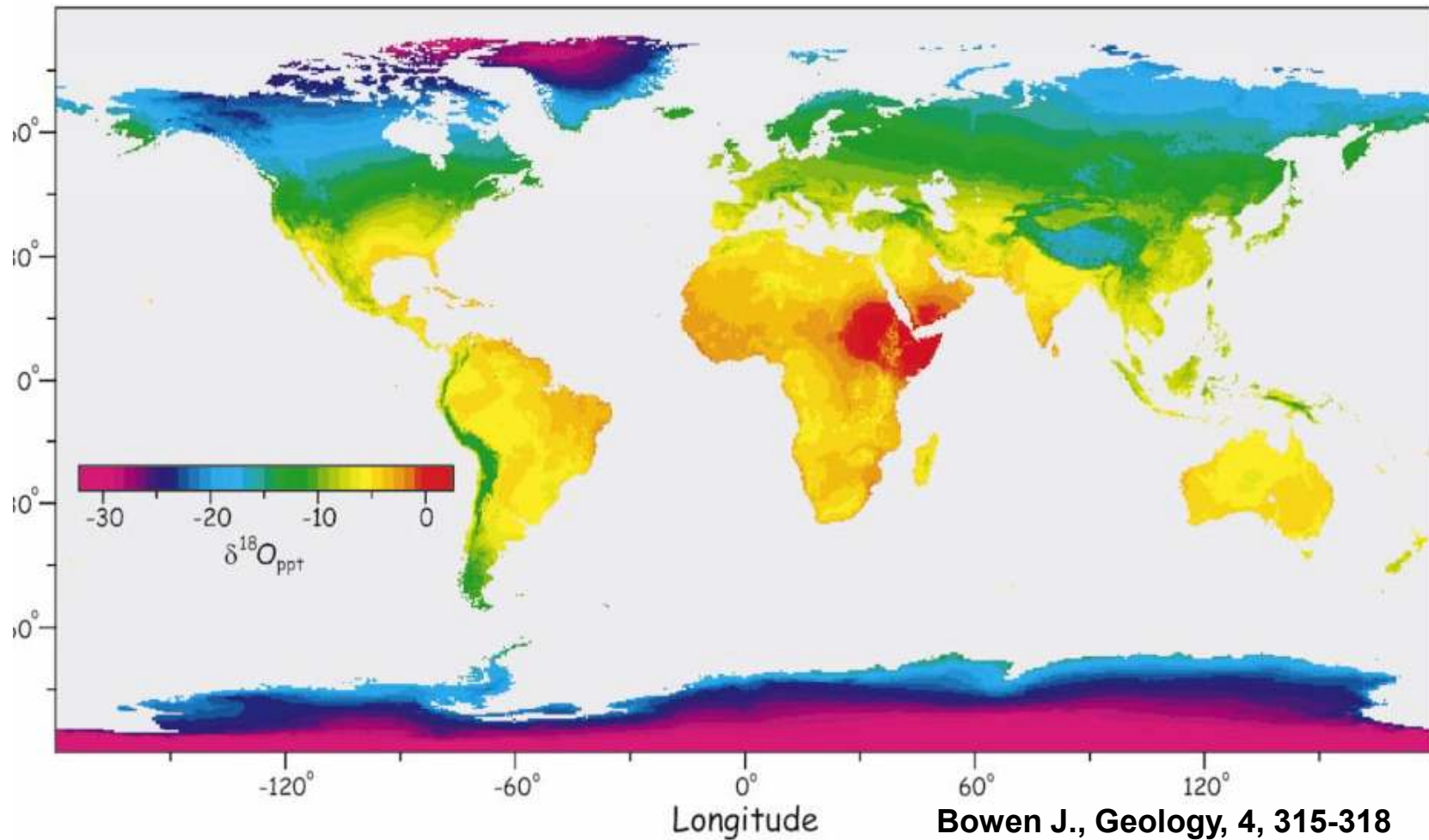
In relation to one million atoms from

Variation in the nature

hydrogen	the biomass consists of	150	heavy hydrogen
oxygen		2000	heavy oxygen
nitrogen		3600	heavy nitrogen
carbon		11000	heavy carbon
sulfur		42000	heavy sulfur

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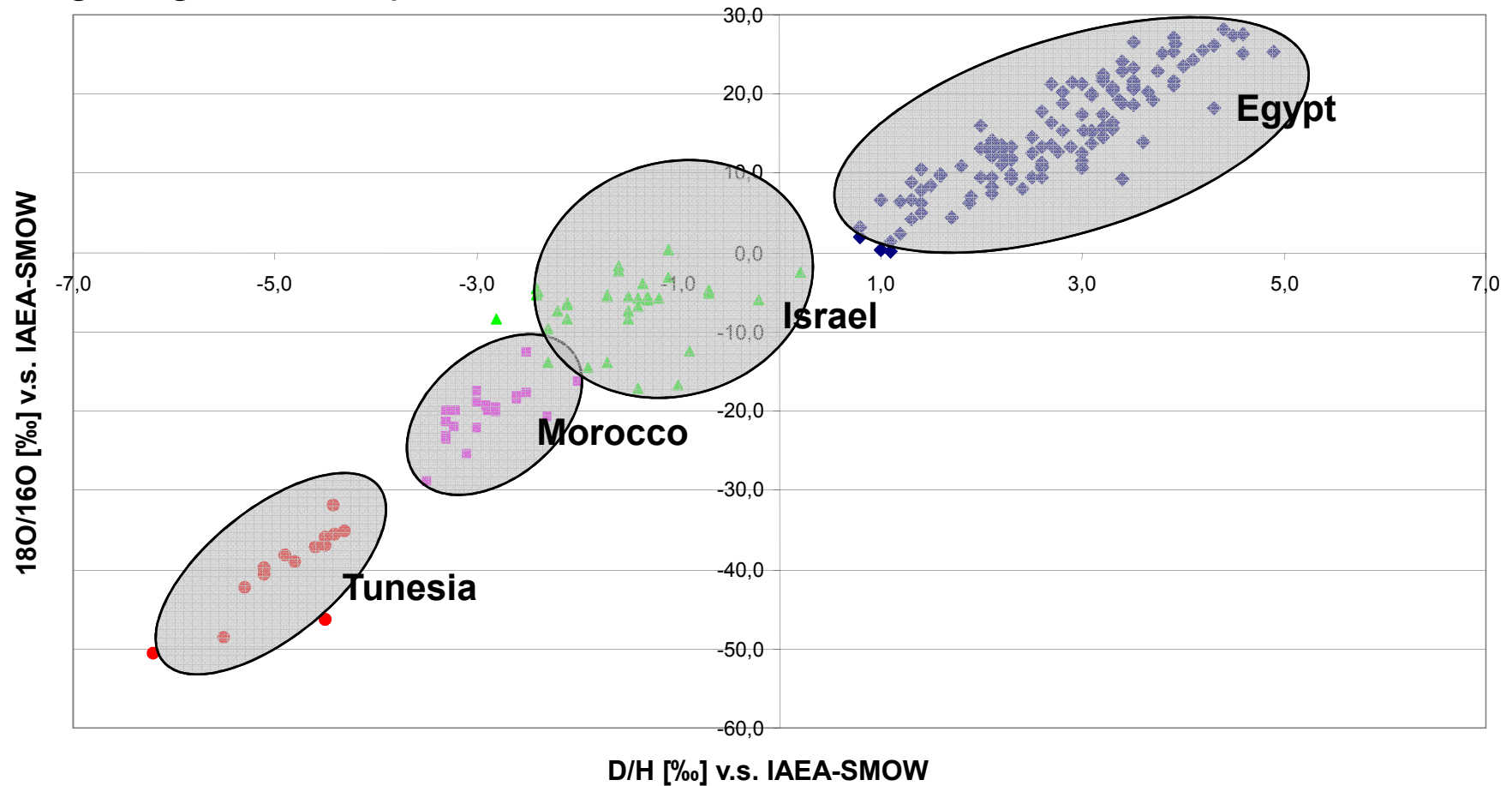
Isotopic patterns in the global water cycle.



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Verification of origin: New potatoes

e.g. origin of new potatoes



◆ Egypt (n=127)    ▲ Israel (n=31)    ■ Morocco (n=22)    ● Tunisia (n=14)



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Stable isotopes – Information to track back agricultural products



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IRMS laboratories in Germany.

Official food laboratories of the authority using stable **isotope** to check the origin of food.

**Is the stable isotope application applicable for timber ?**

**Projects (2006-2011):**

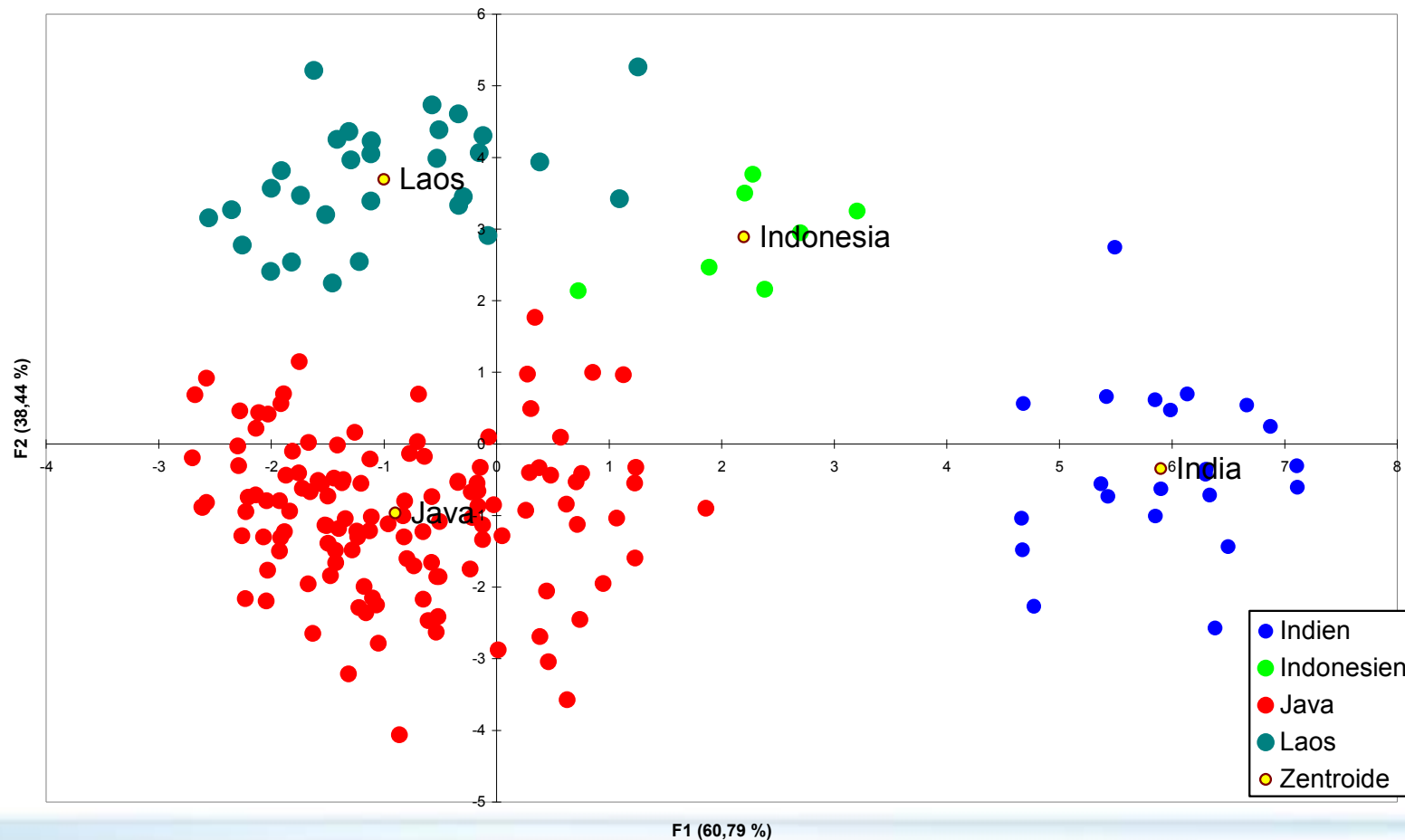
- ✓ 2006-2007: database of spruce – boreal timber project.
- ✓ 2008-2010: database of teak, mahogany
- ✓ 2009-2010: concession project





### Teak (*tectonia grandis*) in the Asian region (DA analysis: D, $^{13}\text{C}$ , $^{15}\text{N}$ , $^{18}\text{O}$ , $^{34}\text{S}$ )

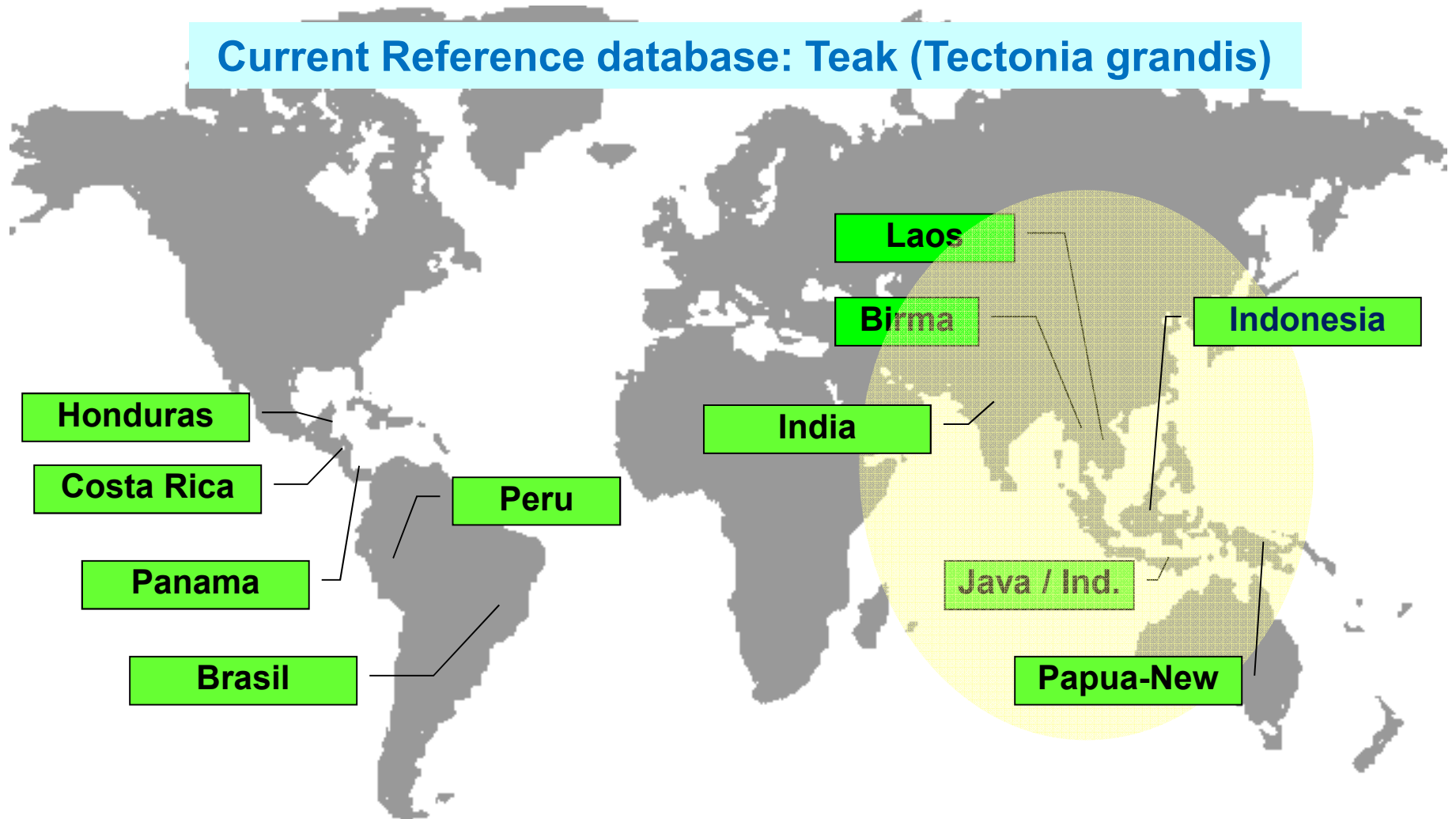
Beobachtungen (Achsen F1 und F2: 99,24 %)



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WWF-project II: Differentiation of teak (*Tectonia grandis*) (2008-2010)

Current Reference database: Teak (*Tectonia grandis*)

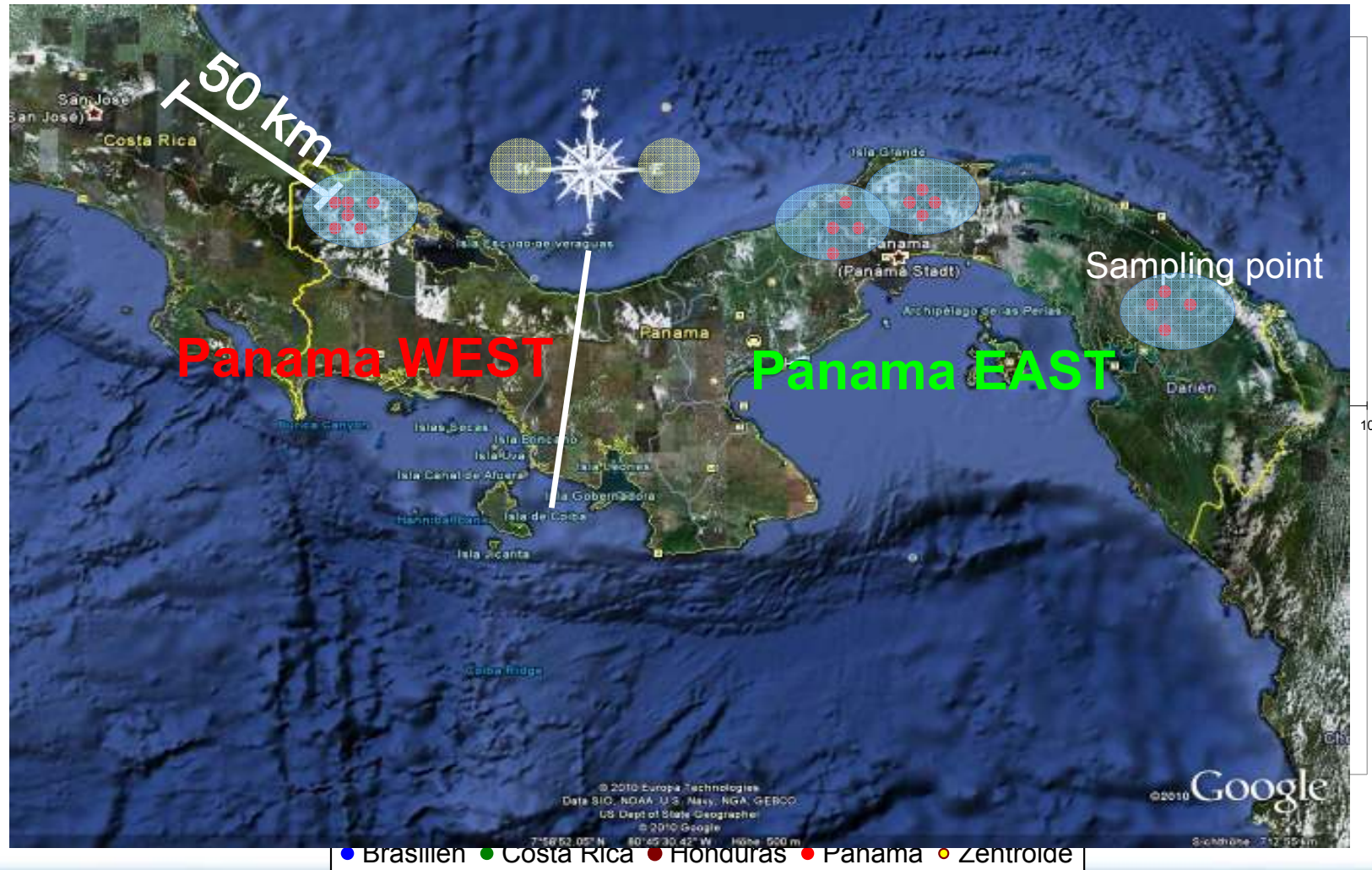




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WWF-project II: Differentiation of tropical timber (2008-2010)

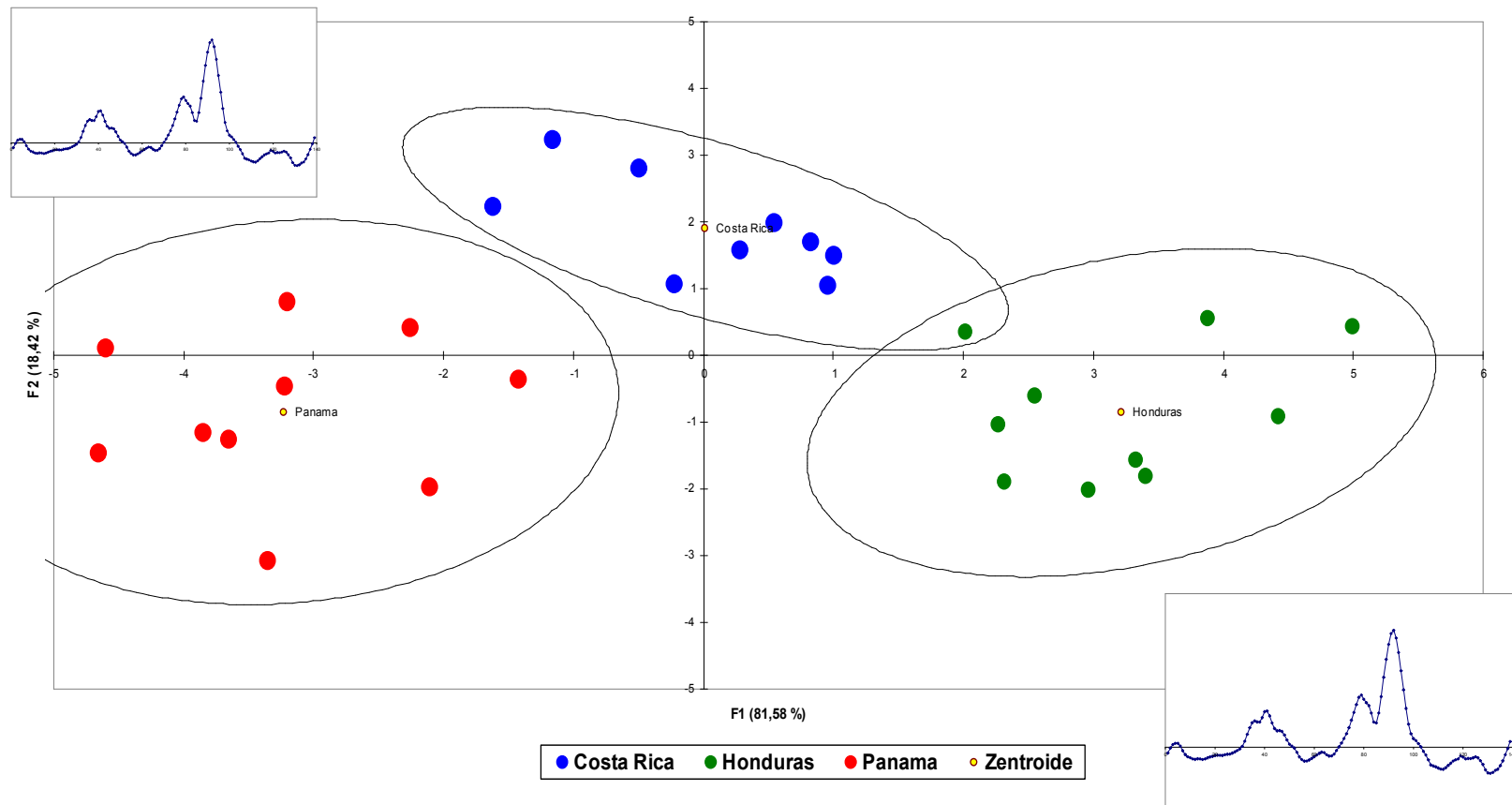
Teak (*tectonia grandis*) in Central America (DA analysis: D,  $^{18}\text{O}$ ,  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^{34}\text{S}$ ,  $^{87}\text{Sr}$ )



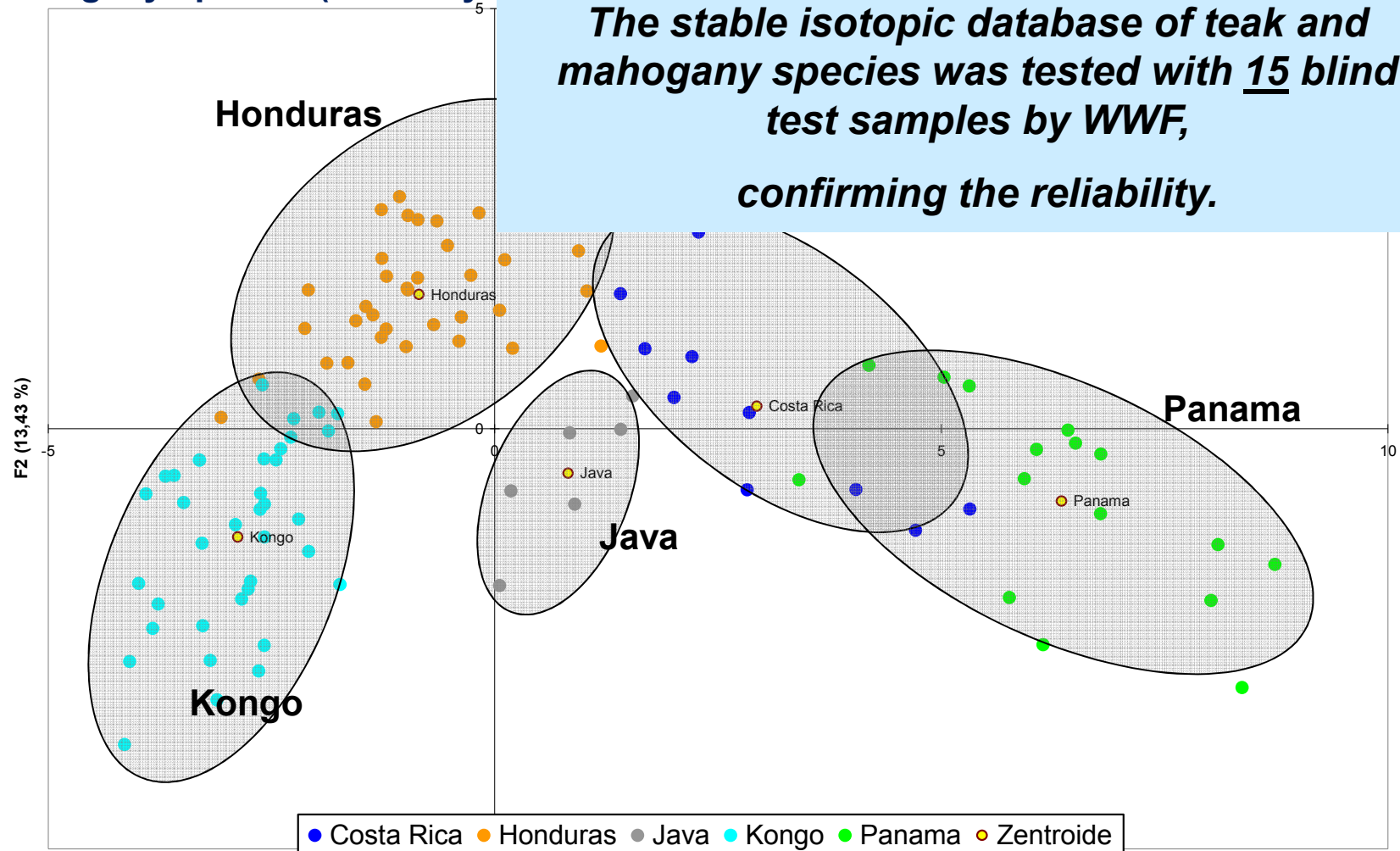
# TÜV Rheinland Agroisolab.

WWF-project II: Differentiation of tropical timber (2008-2010)

**Teak (*tectonia grandis*): Closer comparison with Panama and Costa Rica: D,  $^{18}\text{O}$ ,  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^{34}\text{S}$ )**  
**+ NIR (Near Infrared)**



### Mahogany species (DA analysis)



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Comparison of Teak and Mahogany from various regions.

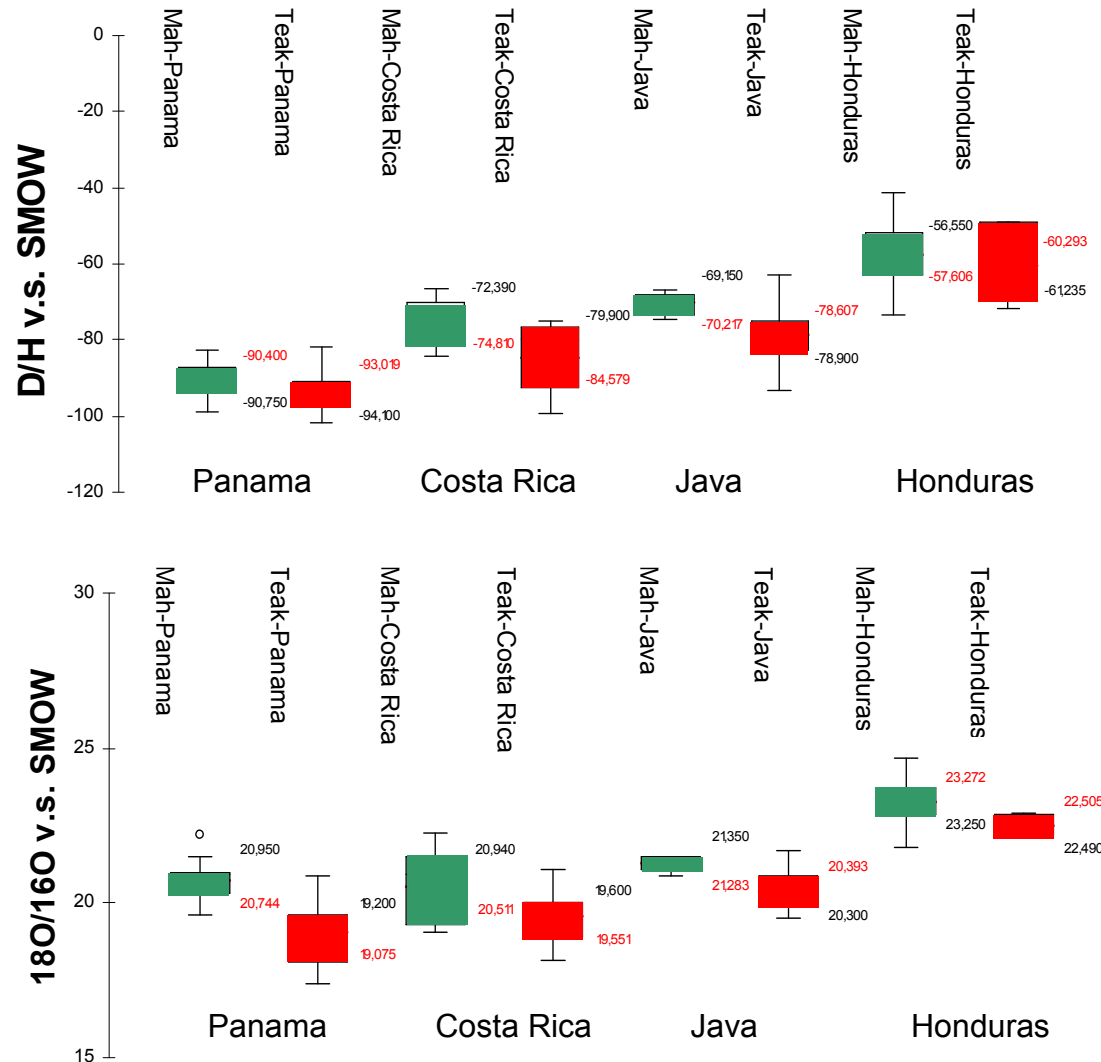
## Comparison of different timber species.

*Test of data transfer*

■ = Mahogany

■ = Teak

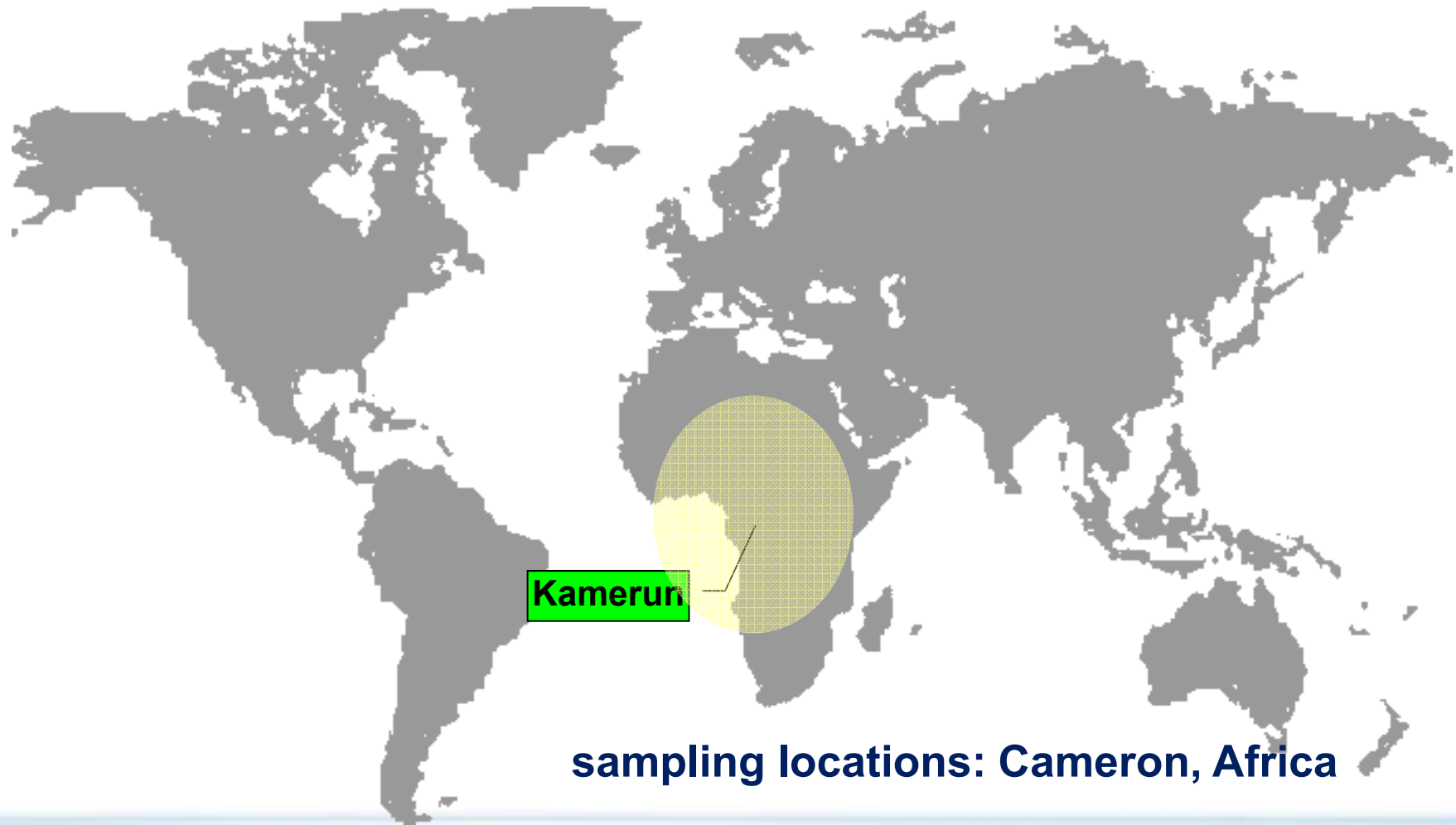
There is the opportunity to find transfer parameters for different kind of wood





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GTZ-project: Differentiation of timber from concession (2009-10)

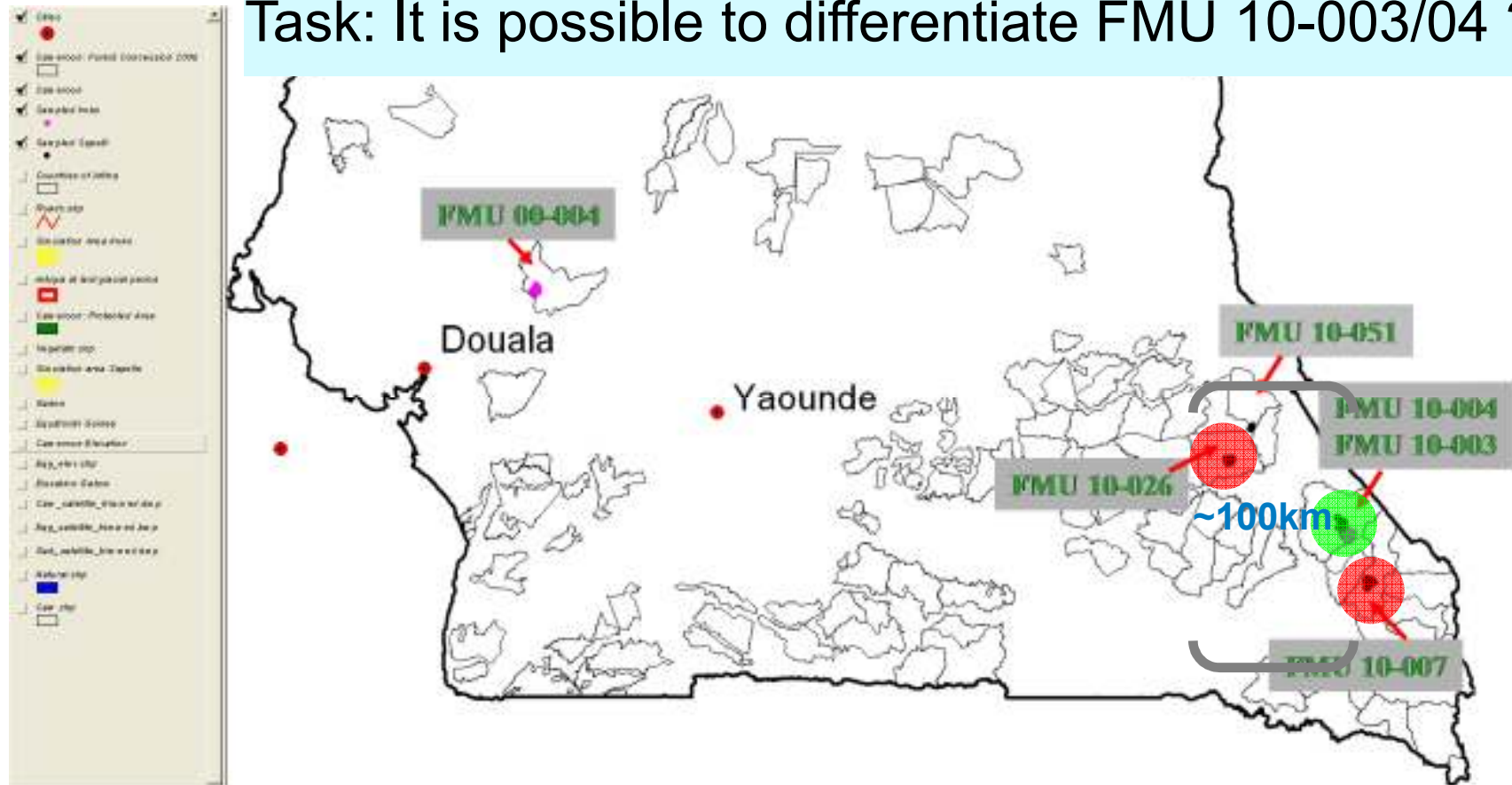


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GTZ-project: Differentiation of timber from concession (2009-10)

sampling locations: Cameroon in detail:

Task: It is possible to differentiate FMU 10-003/04 ?

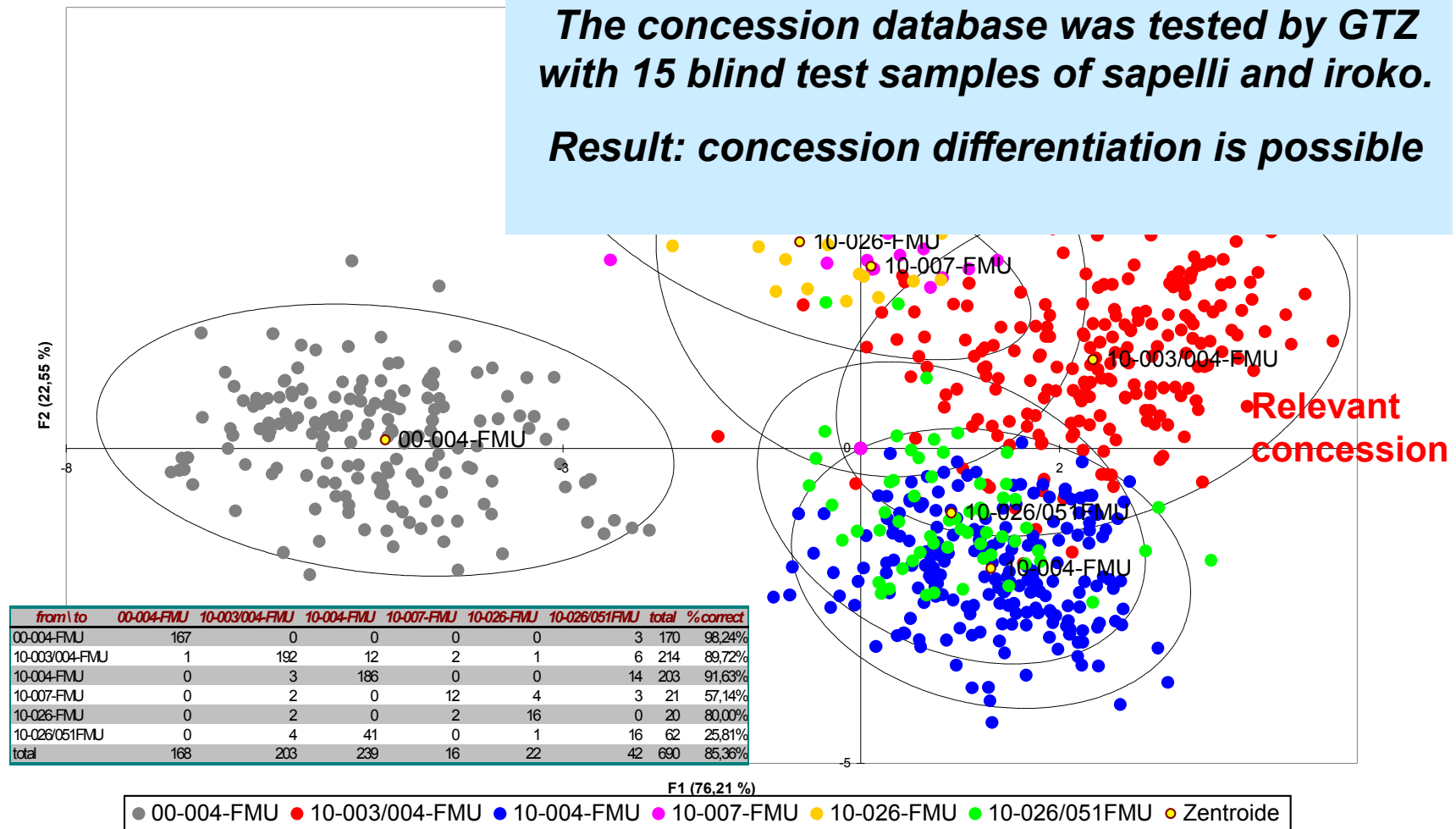


# TÜV Rheinland Agroisolab.

GTZ-project: Differentiation of timber from concession (2009-10)

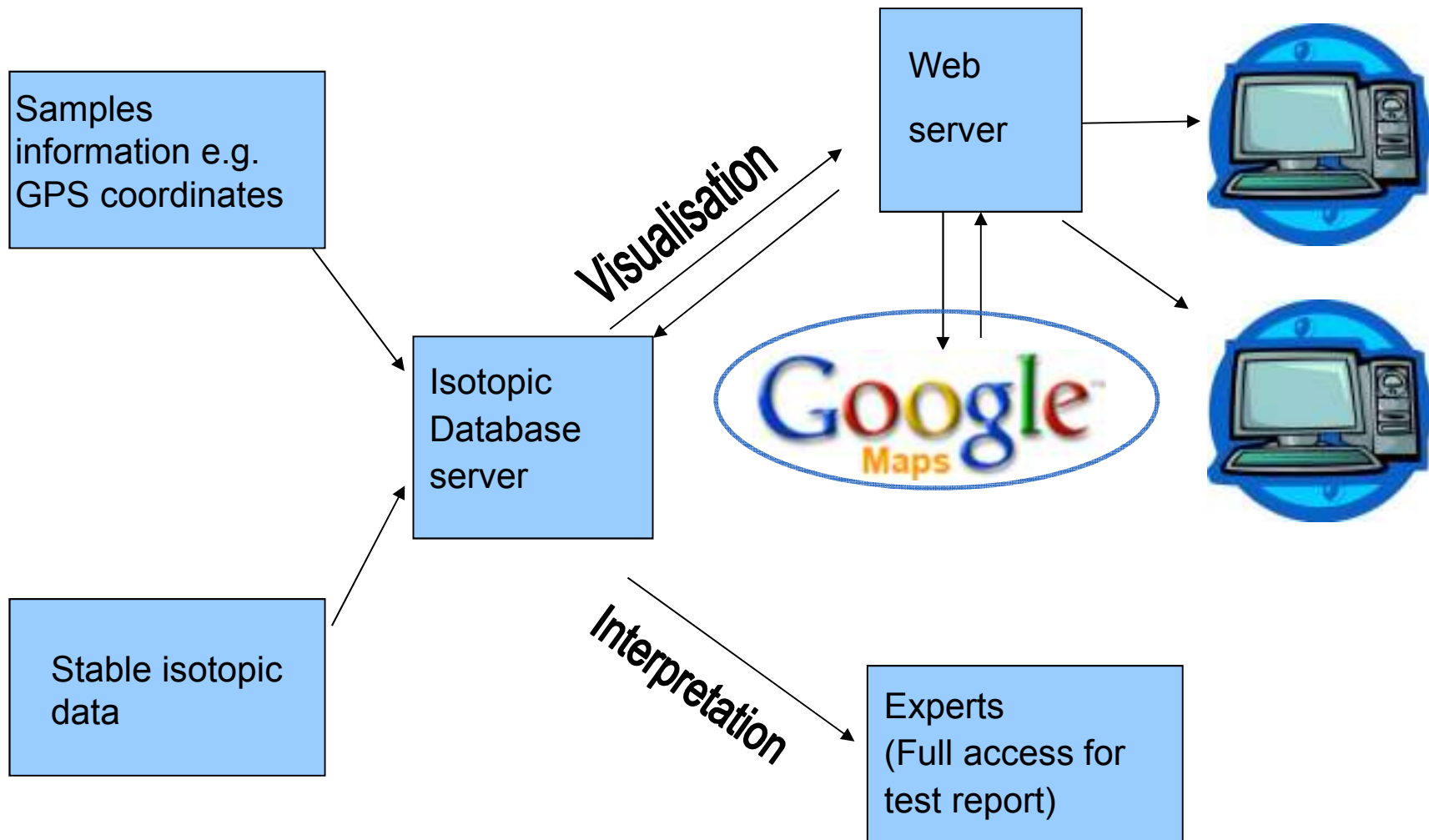
Iroko and Sapelli from concession

**The concession database was tested by GTZ with 15 blind test samples of sapelli and iroko.**  
**Result: concession differentiation is possible**



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## Tracking system

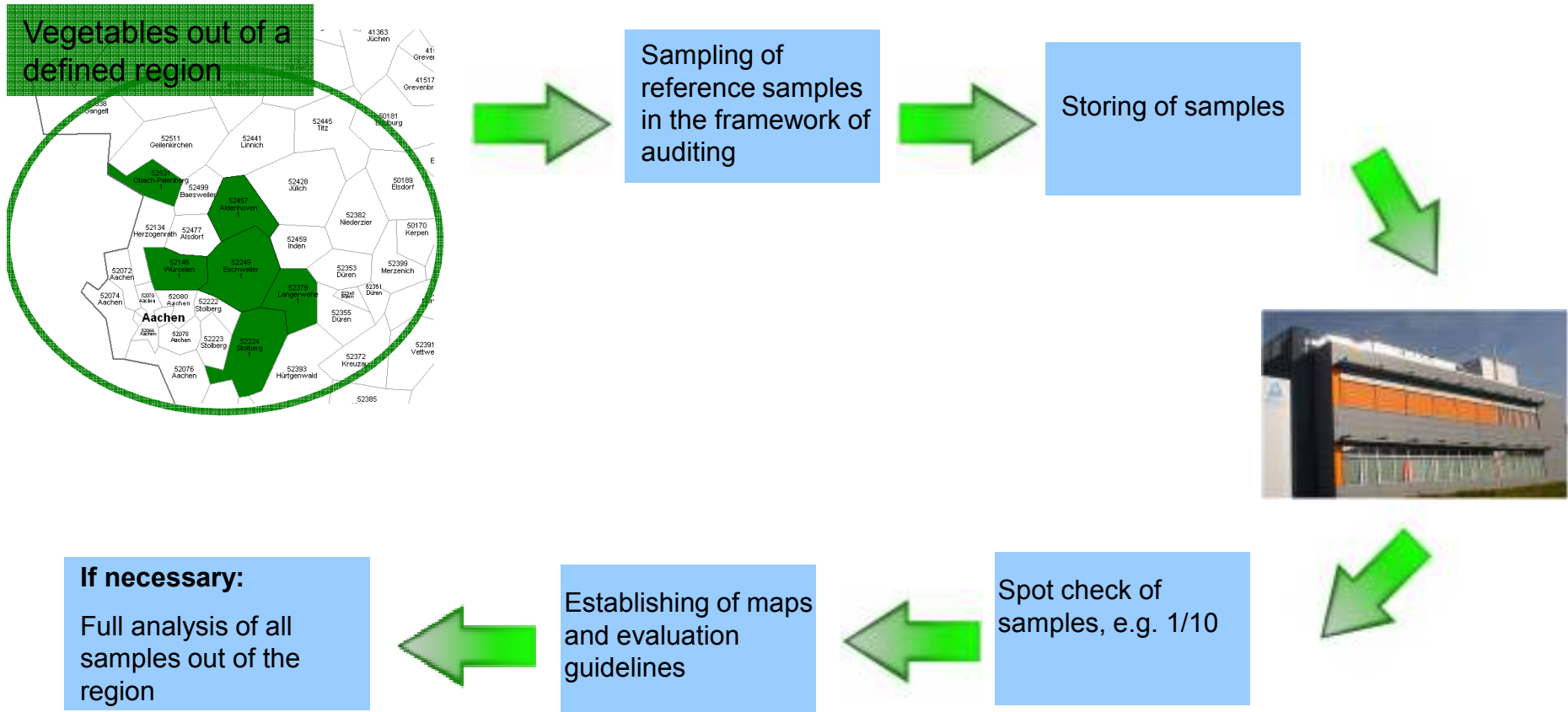




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## Analytical Tracking System (ISDA – system)

- Aim:** **analytical check of the authenticity** (origin, mixing)
- verifying the origin
  - check of mixed batches



## Thank you very much Your attention

### *Further information:*

#### **Teak & Mahogany database:**

[http://www.wwf.de/fileadmin/fm-wwf/pdf\\_neu/Fingerprinting%20Projekt%20-%20tropische%20Regionen.pdf](http://www.wwf.de/fileadmin/fm-wwf/pdf_neu/Fingerprinting%20Projekt%20-%20tropische%20Regionen.pdf)

#### **GTZ-Concession-project:**

International wood fingerprinting conference 2010 - English:

[http://www.wwf.de/fileadmin/fm-wwf/pdf\\_neu/Fingerprinting\\_conf\\_rep\\_EN.pdf](http://www.wwf.de/fileadmin/fm-wwf/pdf_neu/Fingerprinting_conf_rep_EN.pdf)

International wood fingerprinting conference 2010 - French:

[http://www.wwf.de/fileadmin/fm-wwf/pdf\\_neu/Fingerprinting\\_conf\\_rep\\_FR.pdf](http://www.wwf.de/fileadmin/fm-wwf/pdf_neu/Fingerprinting_conf_rep_FR.pdf)

International wood fingerprinting conference 2010 - Spanish:

[http://www.wwf.de/fileadmin/fm-wwf/pdf\\_neu/Conf\\_doc\\_Fingerprinting\\_2010\\_sp\\_WEB.pdf](http://www.wwf.de/fileadmin/fm-wwf/pdf_neu/Conf_doc_Fingerprinting_2010_sp_WEB.pdf)

