

Analysis of primary forest development in forest stands in southern China (under the project Lin2Value)

- Edit of selected departments and inclusion of GPS coordinates for the creation of a 3D model –

Table of Content

- Introduction
 - About the project
 - Objectives
- Study Area
- Methodic
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References

- **Introduction**

- About the project

- Objectives

- Study Area

- Methodic

- Material

- Frame conditions

- Working steps

- Results

- Editing

- 3D model

- Conclusion

- Questions

- References

- Started in June 2012

- Cooperation between Chinese Academy of Forestry and 3 German universities

- Goals:

- Leave of most forest plantations

- Implementation of multifunctional mixed stands (multifunctional forest management)

- Investigation into possible alternative treatments

- Use of appropriate harvesting techniques

- Stability of stocks against harmful events (blizzard/ice break)

- Introducing plants on the right soil

- Wood biomass determination (TLS & wood discs)

- Wood energy (pallets)

- Quantification of site-specific soil

- **Introduction**
 - About the project
 - Objectives
- Study Area
- Methodic
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References

- Mapping of forest stands in the region Pingxiang, Guangxi Province
- Creation of 3D model based on recorded GPS coordinates

- Introduction
 - About the project
 - Objectives
- **Study Area**
- Methodic
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References



Picture 1:
https://upload.wikimedia.org/wikipedia/commons/thumb/2/29/China_on_the_globe



Picture 2:
<http://mapsof.net/map/china-guangxi-location-map>



Picture 3:
<http://www.hiddenchina.net/img/maps/guangxi.jpg>

- located in China
- close to border of Vietnam
- near the small town Pingxiang (circle in picture3)



Picture 4: Sabrina Pierschkalla

- area 1 (picture4) pure pine stand
- tree species: *Pinus massoniana*
- size of 12 ha
- slope up to 70%



Picture 5: Sabrina Pierschkalla

- area 2 (picture5) mixed stand
- tree species: *Cunninghamia lanceolata* and *Mytilaria laosensis*
- size of 3 ha
- slope up to 60%

- Introduction
 - About the project
 - Objectives
- Study Area
- **Methodic**
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References

- GPS handheld device (Garmin GPSMap 76CSx)
- Measure tape (50 meters)
- Vertex & Transponder (Vertex IV, TransponderT3)
- Compass (Suunto)
- Inclinometer/Altimeter (Suunto)
- RapidEye Imagery

- Introduction
 - About the project
 - Objectives
- Study Area
- **Methodic**
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References

- Conditions have been concluded between project partners:

- Availability of drivers and workers
- Strong constraints on the freedom of recording coordinates
- Areas near to Vietnamese border
 - national security
 - forbidden to take tracks
- reference points recorded easily and in abundance

- Introduction
 - About the project
 - Objectives
- Study Area
- **Methodic**
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References

- Selection of forest stands
- Demarcation of Area
 - Set exact boundaries
 - Reference points on each corner via GPS
 - Distance between the reference points
- Terrain Assessment
 - Previously selected grid (20x30m)
 - Distance between lines like normal skidding trails
 - Record of GPS points at every stop → 3D model
- Stand description
 - Angle count method
 - Random selection of plots (min. 5 per stand)
 - Basal area (relaskope); 25 DBHs; 5 heights incl. crown base

Cunninghamia lanceolata

Plot 1				Plot 2				Plot 3			
ACM: 42				ACM: 21				ACM: 22			
DBH (all trees)	Sample trees			DBH (all trees)	Sample trees			DBH (all trees)	Sample trees		
Mean	DBH	Height	Crown Height	Mean	DBH	Height	Crown Height	Mean	DBH	Height	Crown Height
	33	22,7	14,6		19	13,5	7		24	16	9,6
	25	16	11,4		21	14,3	9		16	13,1	11
26,2	31	19,6	14,7	21,0	16	14	9	19,7	18	14,2	12,6
	23	17,4	12,4		18	10,6	8,4		24	16	9,8
	20	17,3	13,7		25	17,2	9		21	13	9,6

Pinus massoniana

Plot 1				Plot 2				Plot 3			
ACM: 32				ACM: 25				ACM: 16			
DBH (all trees)	Sample trees			DBH (all trees)	Sample trees			DBH (all trees)	Sample trees		
Mean	DBH	Height	Crown Height	Mean	DBH	Height	Crown Height	Mean	DBH	Height	Crown Height
27,5	32	22,6	15,8	25,9	27	18,5	12,9	23,8	34	19,8	14,7
	36	20,3	15,5		34	18,2	12,6		33	25,4	18,2
	30	21,8	15,8		24	16,4	13,2		21	21	11,5
	35	19,9	15,3		26	20,8	15,5		24	19	14,5
	26	18,4	14,8		26	22,5	14,6		27	19,3	13,2
Plot 4				Plot 5				Plot 6			
ACM: 24				ACM: 26				ACM: 23			
DBH (all trees)	Sample trees			DBH (all trees)	Sample trees			DBH (all trees)	Sample trees		
Mean	DBH	Height	Crown Height	Mean	DBH	Height	Crown Height	Mean	DBH	Height	Crown Height
	33	22	15,9		34	22,2	15,8		35	19,2	14,5
	37	25,5	19,4		22	19,5	15,8		28	22	17,6
27,7	24	19,9	16,9	26,3	26	19,4	14,8	29,3	38	23,5	18
	19	18,2	15,5		34	23,8	17,5		27	16,8	13,3
	25	19,1	14,6		25	19,5	14,3		21	19,4	15

- Introduction
 - About the project
 - Objectives
- Study Area
- **Methodic**
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- References

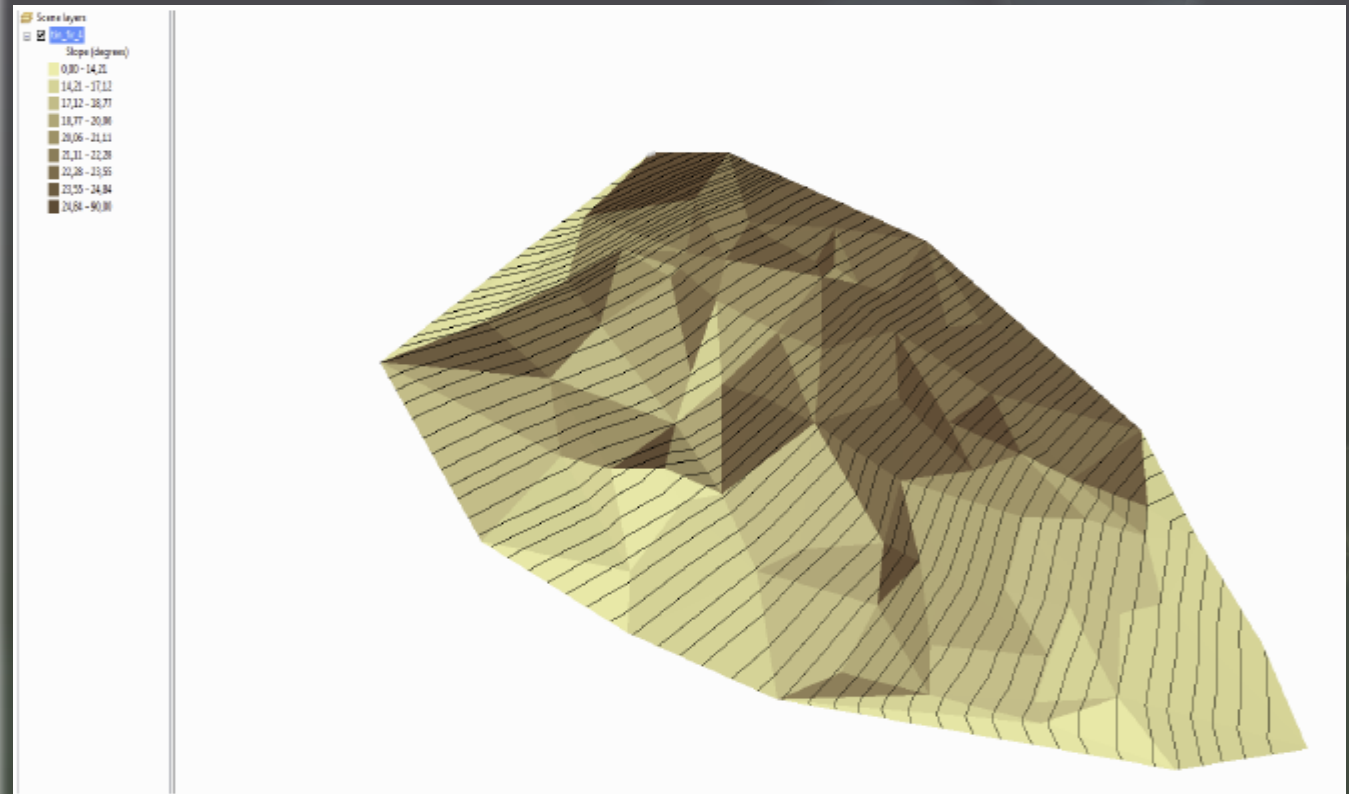
- Introduction
 - About the project
 - Objectives
- Study Area
- Methodic
 - Material
 - Frame conditions
 - Working steps
- **Results**
 - Editing
 - 3D model
- Conclusion
- Questions
- References



- Editing was done (for now) with GoogleEarth
→ RapidEye
Imagery faulty
- Use of editing tool belonging to software

- Introduction
 - About the project
 - Objectives
- Study Area
- Methodic
 - Material
 - Frame conditions
 - Working steps
- **Results**
 - Editing
 - 3D model
- Conclusion
- Questions
- References

- 3D model was created with recorded GPS points
- ArcGIS software was used
- Visualize difference in the ground
- Exact slope is missing
- Color change = change in slope



- Introduction
 - About the project
 - Objectives
- Study Area
- Methodic
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- **Conclusion**
- Questions
- References

- Editing was only partially complete
 - no high-quality maps available
- Editing possible with Google Earth, but not classification
 - Maps in other programs only up to certain scale
- Support of good imagery
 - RapidEye imagery in adequate
 - Needed areas not overflow
- GPS points alone are not enough to create meaningful 3D models
 - Support of digital maps with contour lines only
- Adequate collection and evaluation important
- Detailed analysis is to be performed subsequent to research project as part of a master's thesis

Thank you for your kind
attention !

Questions ?

- Introduction
 - About the project
 - Objectives
- Study Area
- Methodic
 - Material
 - Frame conditions
 - Working steps
- Results
 - Editing
 - 3D model
- Conclusion
- Questions
- **References**

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