2nd Year Specialization Area

Ecosystem based multi-use forest management planning

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Karadeniz Technical University

- General information

Karadeniz Technical University was established in **1955** in Trabzon.

- **12 faculties**
- **31,568 students**
- **128,829 alumni**
- 1,737 foreign students from 93 different countries.

Turkey is in the First 10 in the World in Receiving International Students to Higher Education

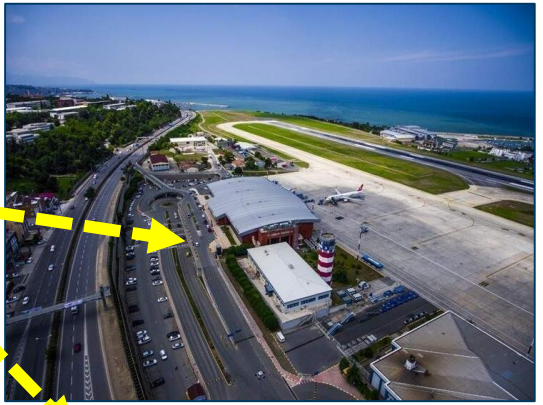
1. USA	987,314
2. England	452,079
3. Australia	444,514
4. Germany	311,738
5. Russia	262,416
6. France	229,623
7. Canada	224,548
8. Japan	182,748
9. China	178,271
10. Turkey	125,138

Karadeniz Technical University

- General information

KTU Campus

Trabzon International Airport



Faculty of Forestry

Koru Dormitory for International Students

Single room
75 €/month

Student cafeterias

Karadeniz Technical University

- Faculty of Forestry

Faculty of forestry was established in 1971 and has 4 departments.

1- Forestry Engineering (Forest Resources)

2- Forest Industrial Engineering

3- Wildlife Ecology and Management

4- Landscape Architecture

Karadeniz Technical University

- Department of Forest Engineering

- 8 sub departments (Forest management, forest protection and entomology, silviculture, forest botany, Forest soil and ecology, Forest geodasy and photogrametry and Forest economics),
- 20 Prof., 10 Assoc. Prof., 2 Asst. Prof., 11 Res. Asst. (43 academic staff),
- 8 Labs: soil, silviculture, genetic, herbarium, entomology, dendrometry, computer, forest management,
- Every year about 80 students are enrolled with about 80 graduate students (nearly 400 students in total)
- High research interest and capacities in forest resource management, and forest fire management and ecology in the Mediterranean region,
- Management practice opportunity in different forest ecosystems.

Specialization area of KTU

Ecosystem based multi-use forest management planning

Content

- ❑ Integration of economic, ecologic and socio-cultural values into multi-use forest management planning
- ❑ Using and developing tools to understand forest dynamics
- ❑ Geo-Information science, remote sensing applications in forest management planning
- ❑ Biodiversity integration
- ❑ Fire ecology and management

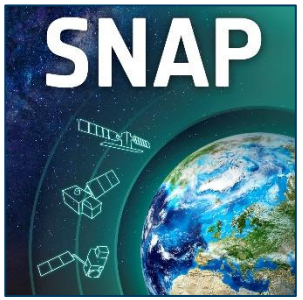
Using Satellites Images in Forest Ecosystems

Lecturer: Assoc. Prof. Uzay Karahalil

Contents

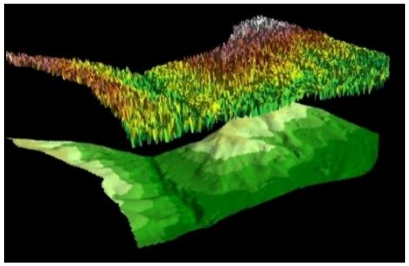
- ❑ General information about natural resource satellites, Sentinel/Landsat
- ❑ SNAP software
- ❑ Downloading/opening the images, definition of bands,
- ❑ Mosaicing, rectifying and cutting images
- ❑ Unsupervised/supervised classification with different algorithms
- ❑ Case study: Supervised classification of Köprülü Canyon National Park

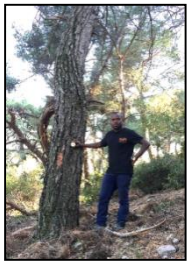
Köprülü Canyon National Park



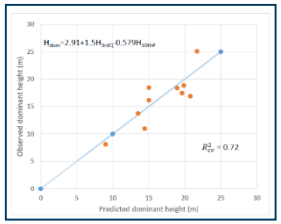
Estimating Stand Parameters Using Images and LIDAR Data

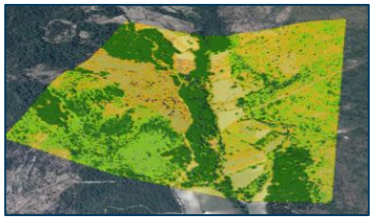
Lecturer: Assoc. Prof. Uzay Karahalil



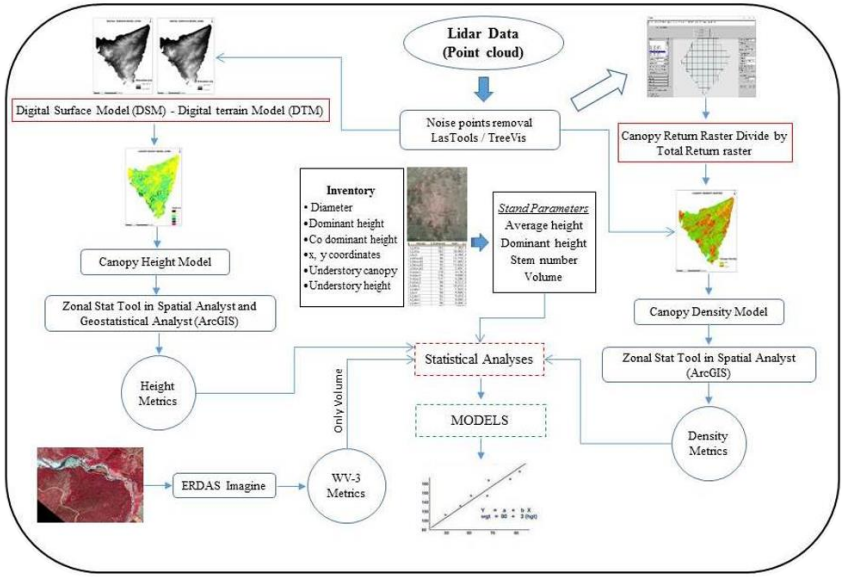


Kennedy KANJA (Zambia)





S.P No	Area m²	No. of Trees	Trees per ha	Dominant Height (m)	Av. Height m	Total Volume (m³)	Volume per Ha	Shrub C.C %	Shrub Height (m)
2	600	19	317	10.8	8.7	2.215	36.9	10	1.7
6	400	17	425	15.7	13.3	4.158	103.9	30	1
7	400	32	800	15.2	13.4	8.377	209.4	35	1.5
9	800	20	250	21.6	13.8	7.194	89.9	80	2
10	400	13	325	20.2	17.3	10.207	255.1	25	1.6-1.7
11	400	18	450	24.6	20.	10.077	251.9	40	1.3-1.4
13	800	6	75	14.4	9.92	1.531	19.1	10	3.5-4
16	600	12	200	15.4	12.7	5.509	91.8	100	3.5-4
21	800	8	100	31.1	25	12.888	161.1	5	0.7-0.8
23	600	13	217	20.1	16.1	13.15	219.1	0	0
24	600	10	167	20.2	15.4	16.872	281.2	65	1.6-1.7
25	800	26	325	28.5	21.5	10.193	127.4	40	1.7
26	800	14	175	18.4	15.3	8.803	110.0	10	1.3-1.4
27	400	14	350	16.1	12.2	6.621	165.5	30	1.5
28	400	31	775	15.2	11.9	5.965	149.1	35	1.5-1.6
29	400	40	1000	11.1	8.9	3.301	82.5	10	3
30	400	27	675	15.2	12.3	7.878	196.9	80	2.5-3
31	400	17	425	16.4	14.6	6.047	151.2	15	1
32	400	18	450	14.9	12	3.952	98.8	90	4-4.5
33	600	35	583	14.6	8.5	5.405	90.1	10	1.3
35	600	12	200	27.9	23.6	11.626	193.7	5	1.8-1.9
36	800	13	163	24	21.5	15.675	195.9	30	2.5-3
37	600	18	300	19.5	14.3	10.147	169.1	40	1.7
39	400	19	475	15.8	14.5	3.858	96.4	10	4-4.5
40	600	9	150	14	11.3	2.347	39.1	100	3.5-4



Forest Dynamics and Modeling

Lecturer: Assoc. Prof. Uzay Karahalil

Contents

- General principles of forest dynamics; the relationships of tree, stand, habitat, ecosystem and forests
- Natural disturbances and management actions/treatments to be applied to forests
- Description of compositional and configuration of forest ecosystems
- Modeling forest management problems with linear programming
- Development of plan alternatives, model outputs, assessment of forest dynamics with performance indicators and comparison of various planning alternatives
- Understanding the cause-effect relationships

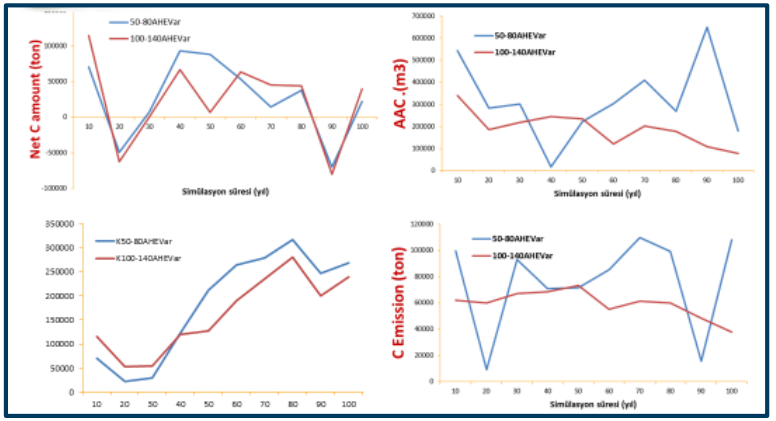
Learning Outcomes

LO1: Develop a simulation and an optimization model for managing a forest landscape

LO2: Lay out management strategies and use the models to solve the problem

LO3: Apply the models in large scale forest management unit and be able to analyze the forest dynamics under various settings

LO4: Show the cause and effect relationships in a forest ecosystem and draw a conclusion by interpreting the results



Ecological Modeling

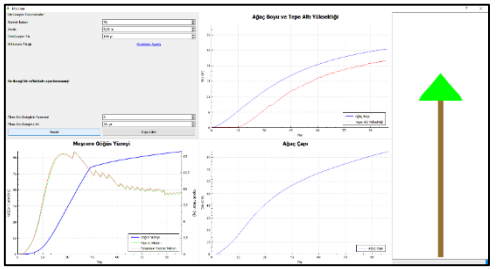
Lecturer: Prof. Dr. Ertugrul Bilgili

Content

- Concept of ecological modelling, modelling approaches, model applications in forestry, model development and principles, bounding, parsimony, flow chart, sensitivity analysis, and verification in modeling.

Learning Outcomes

- Report on the concept of ecological modeling in forest ecosystems.
- Discuss modeling approaches and identify the key differences between them.
- List the model development principles, define modeling terminology.
- Develop a flow chart of a dynamic process and develop a simple dynamic model to simulate it.
- Conduct sensitivity analyses and validate the models using independent data.
- Report and present model results.



Protecting Biodiversity in Forest Ecosystems

Lecturer: Prof. Dr. Ertugrul Bilgili

Content

- Concepts of ecosystem and biodiversity, the structure and functions of different forest ecosystems, principle components of biodiversity, indicator, keystone, and flag species, habitats and biodiversity, patch Dynamics.

Learning Outcomes

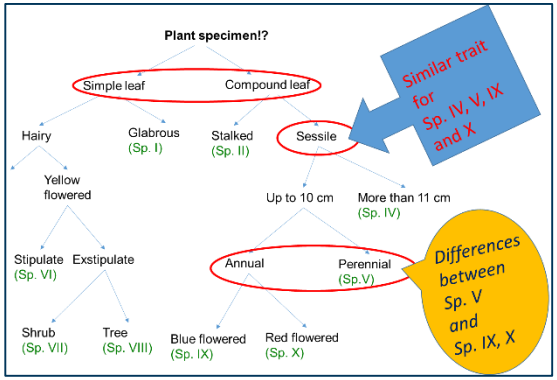
- Define biodiversity and explain its importance.
- Explain the structure and functions of different forest ecosystems.
- Relate biodiversity to the well being of ecosystems.
- Define indicator, keystone and flagship species and relate them to the protection, maintenance and survival of ecosystem components.
- Explain the role of patch dynamics in the protection of biodiversity.
- Evaluate and discuss the threats to biodiversity.
- Calculate indexes of biodiversity (richness, evenness).
- Report and present the findings.

Principles of Identifying Vascular Plants

Lecturer: Prof. Dr. Salih Terzioglu

Content

- ❑ Vegetative and generative organs of Vascular plants (Spermotophyta (Gymnospermae, Angiospermae) and Pteridophyta)
- ❑ Preparing identification keys and their usage in identifying plant taxa.
- ❑ Plant association and plant sociology
- ❑ Biodiversity and its components
- ❑ Vegetation classification by: Braun-Blanquet, IUCN, EUNİS, Natura2000
- ❑ Floristic list, characteristic species, habitats, minimal areas
- ❑ Integration of biodiversity (flora) into forest management plans
- ❑ Case study: Field work



Learning Outcomes

- ❑ Understand different vegetative and generative organs of vascular plant taxa.
- ❑ Use different plant identification keys (Multi-access, dichotomous etc.)
- ❑ Identify the families of vascular plants.
- ❑ Identify the living and/or herbarium materials of vascular plants.

Forest Fires and Management of Forest Resources

Lecturer: Asst. Prof. Kadir Alperen Coskuner

Content

- ❑ Fire regime and its parameters,
- ❑ Forest fire management,
- ❑ Spatial and temporal analysis of the effects of forest fires on forest ecosystems,
- ❑ Integration of forest fires into forest resource planning,

Learning Outcomes

- ❑ Define and explain dynamics of forest fires
- ❑ Explain fire regime and parameters
- ❑ Understand the effects of forest fires on different forest ecosystems
- ❑ Conduct spatial and temporal analysis of forest/vegetation cover change after fire

Karadeniz Technical University

- Ongoing research projects

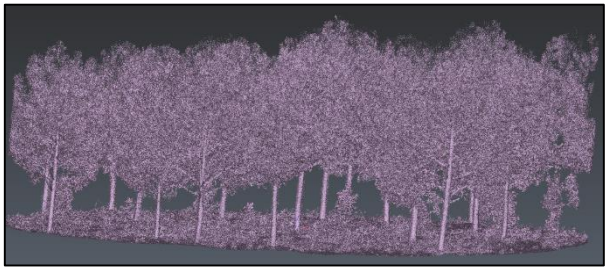
Forest Fuel Mapping and Fire Risk-Danger Potential Assessment System (ORYAM-SIS)

Project Leader
Asst. Prof. Kadir Alperen Coskuner

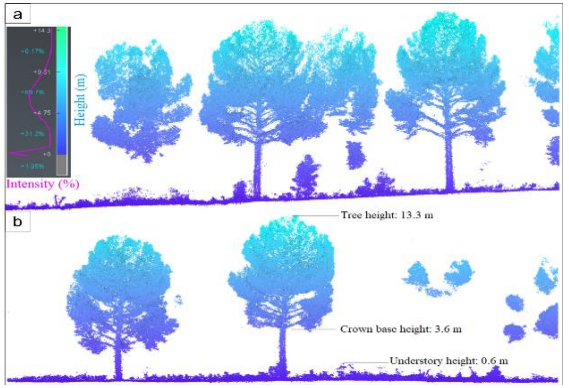
Funding: The Scientific and Technological Research Council of Türkiye (TUBITAK), Project No: TOVAG-221O267

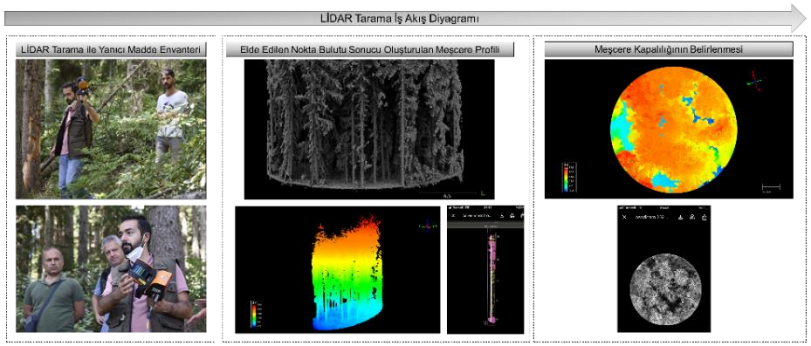
Fuel characterization and inventory (Field work), Remote sensing applications (Stallite images and LiDAR) and Software development

Hand-held mobile laser scanning process



LiDAR (ZEB Horizon)





Karadeniz Technical University

- Ongoing research projects

The effect of wildfires and prescribed burning on seed germination, seedling growth and development, soil nutrient dynamics and soil micro-arthropods in pure Anatolian black pine and scots pine stands

Funding: The Scientific and Technological Research Council of Türkiye (TUBITAK), Project No: TOVAG-122O425

Project Leader
Prof. Dr. Ertugrul Bilgili

Prescribed burning in Scots pine (*Pinus sylvestris*) stands (Ordu, Türkiye)

Karadeniz Technical University

- Thesis topics

- Land use changes and their implications to forest management planning
- Estimating selected forest parameters using Sentinel images
- Integration of soil conservation/water production into forest management plans
- Integration of carbon sequestration into forest management planning
- Evaluation of forest dynamics under various management strategies in preparing forest management plans
- The effects of various rotation periods on the performance of forest ecosystems
- Integration of climate change into forest management plans
- Causes and effects of forest fires in deciduous forests and shrubby vegetation: A case study in North Eastern Anatolia – Turkey
- Integrating plant diversity into forest management plans

❑ Different landscapes and ecosystems

Mediterranean Ecosystems, Koprulu Canyon, Antalya.

Mixed conifer forests (Kastamonu, Ilgaz)

Pure Scots pine (*Pinus sylvestris*) forests. Kastamonu

Artvin, Karagol

Bolu Gölcük National Park

Mistletoe infected pure fir stands (*Abies cilicia*) Niğde

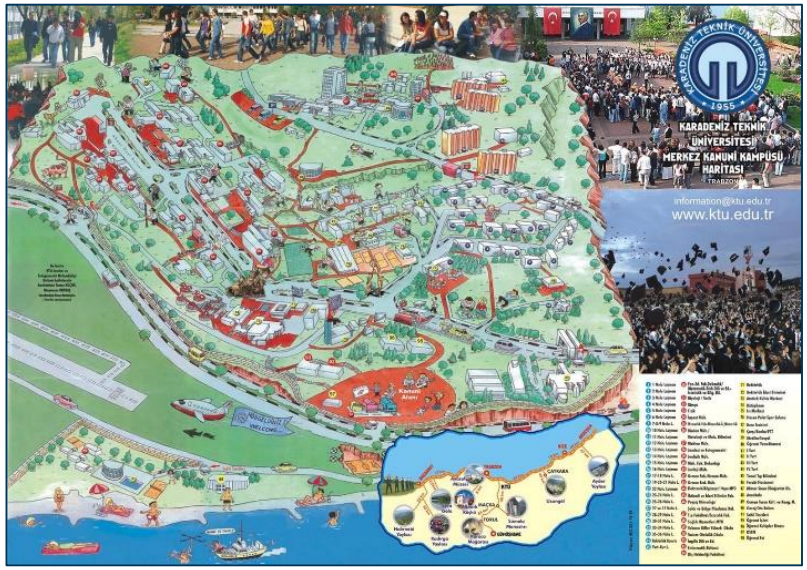
Karadeniz Technical University

- Why KTU of Turkey?

KARADENİZ TEKNİK ÜNİVERSİTESİ
KARADENİZ TECHNICAL UNIVERSITY
1955

❑Cozy campus life with different fields of research

KTU Campus map



Karadeniz Technical University

- Why KTU of Turkey?

KARADENİZ TEKNİK ÜNİVERSİTESİ
KARADENİZ TECHNICAL UNIVERSITY
1955

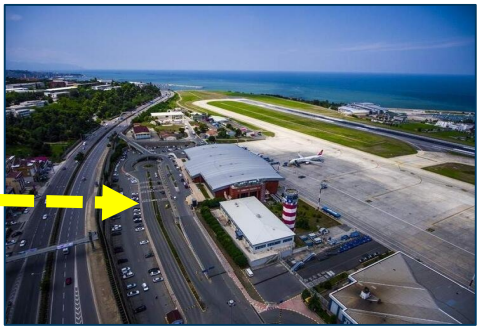
❑ Qualified academic staff and good facilities

Karadeniz Technical University

- Why KTU and Turkey?

❑Easy access and convenient place to live

Trabzon Airport



City of Trabzon

Koru Dormitory for International Students

Karadeniz Technical University

- Why KTU and Turkey?

KARADENİZ TEKNİK ÜNİVERSİTESİ
KARADENİZ TECHNICAL UNIVERSITY
1955

❑The university has ECTS label, diploma supplement and accreditation

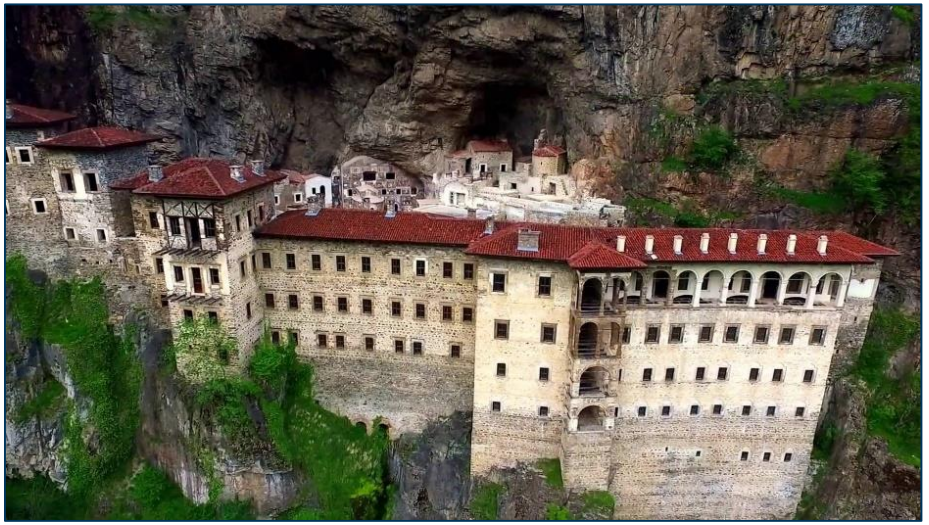
European Accreditation of Engineering Programmes
EUR-ACE®

❑Awarded with MÜDEK/ABET/EUR-ACE accreditation certificate

❑ Very economic and enjoyable

Uzun Göl (The Long Lake)

Sumela Monastery



Trabzon- Bedesten

Hagia Sophia (Ayasofya)

Karadeniz Technical University

- Thank you

Erasmus team to help you…

KARADENİZ TECHNICAL UNIVERSITY OFFICE OF INTERNATIONAL RELATIONS

ERASMUS+ OFFICE

E-mail: ofinaf@ktu.edu.tr

Working Hours: 08:00 - 12:00 / 13:00 - 17:00

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