

Citizen Science Mobile App and Data in Support of Forest Mapping

– Tree–Quest App and Laxenburg Park Campaign –

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Citizens for Copernicus (C4C): Combing Copernicus and Crowdsore Data for Forest Resources Monitoring



The C4C project has received funding from the Austrian Research Promotion Agency (FFG) under ASAP 2022 call, [application No. 47907528](#).

Open-Earth-Monitor Cyberinfrastructure (OEMC)



This project has received funding from the European Union's Horizon Europe research and innovation programme under [grant agreement No. 101059548](#).

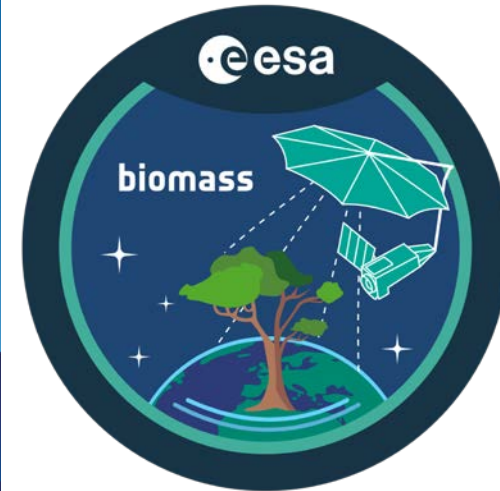
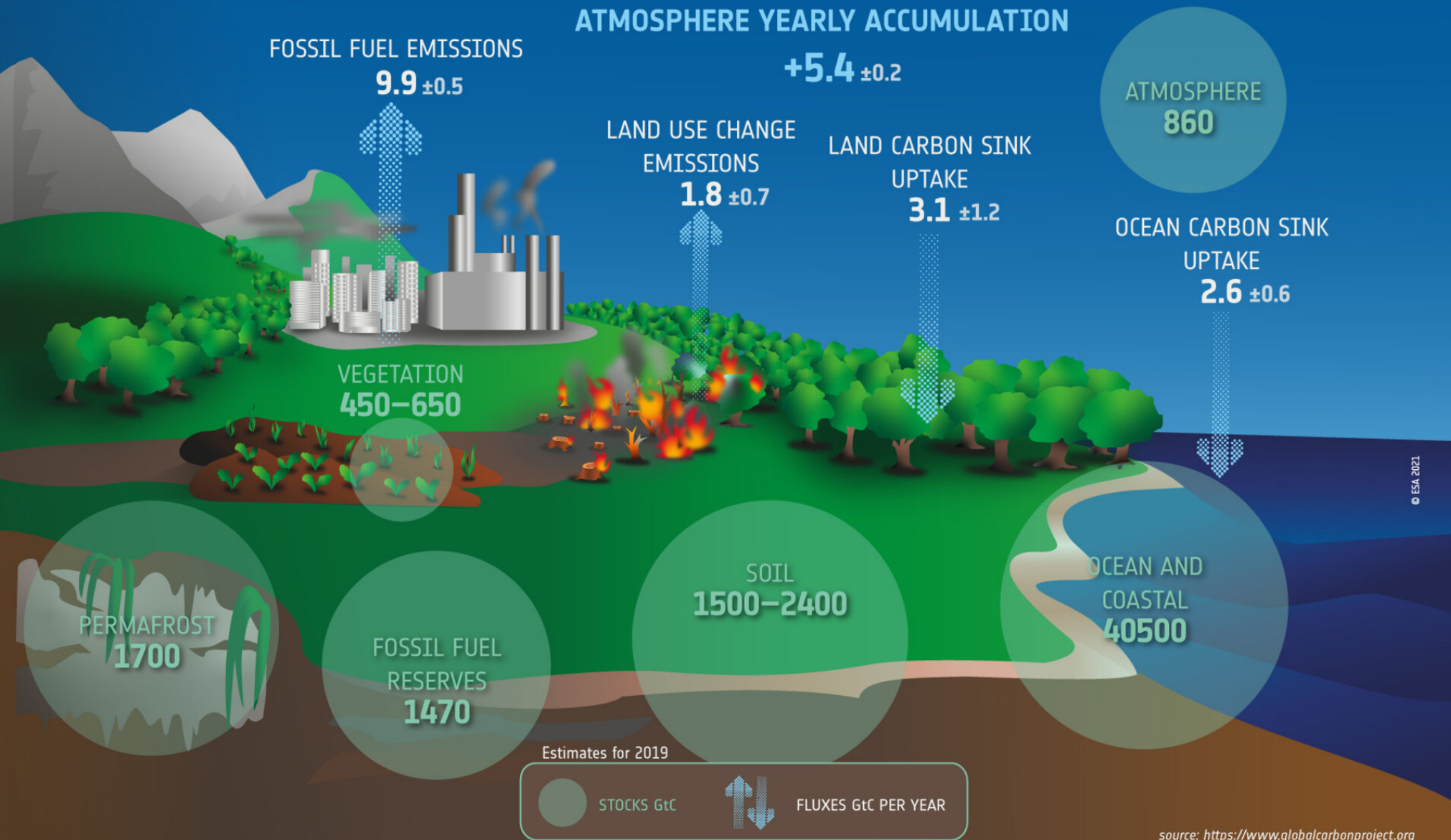
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Novel Data Ecosystems for Sustainability (NODES), IIASA

Event: OEMC Global Workshop 2024, Laxenburg, Austria

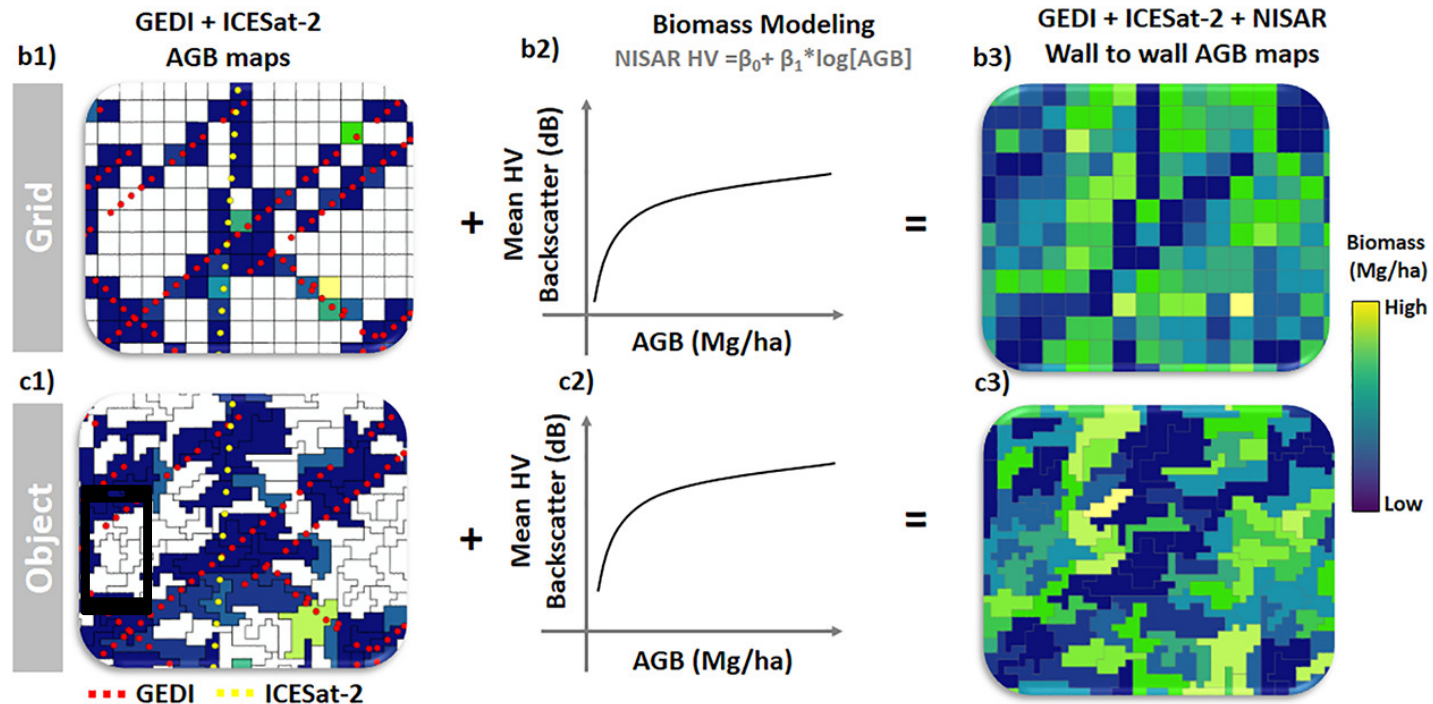
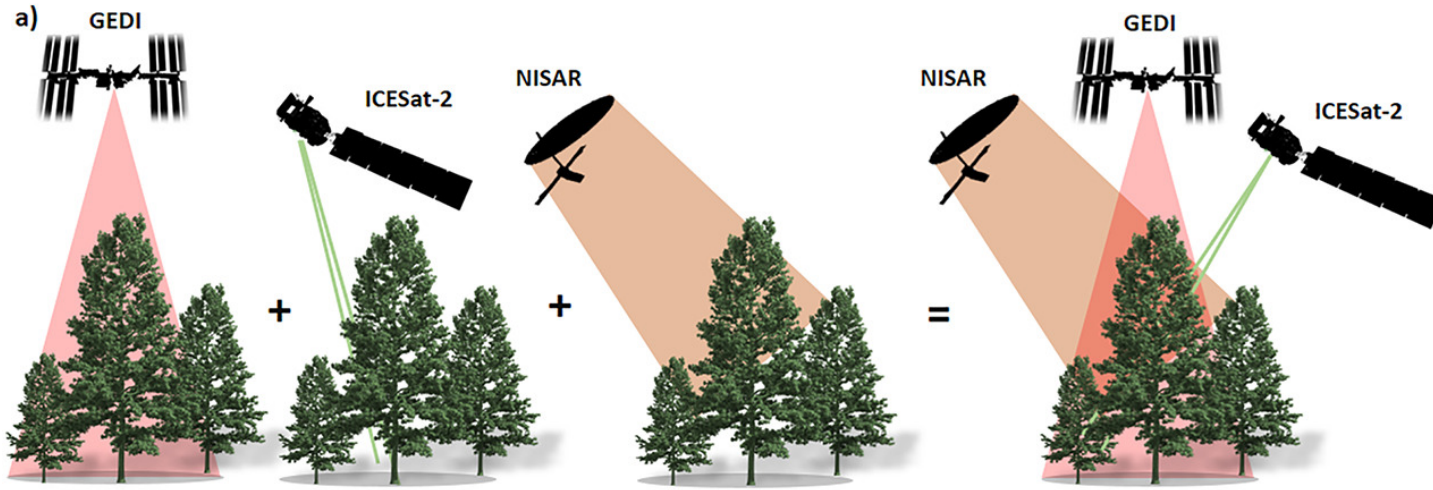
Date: 04. October 2024

GLOBAL CARBON BUDGET

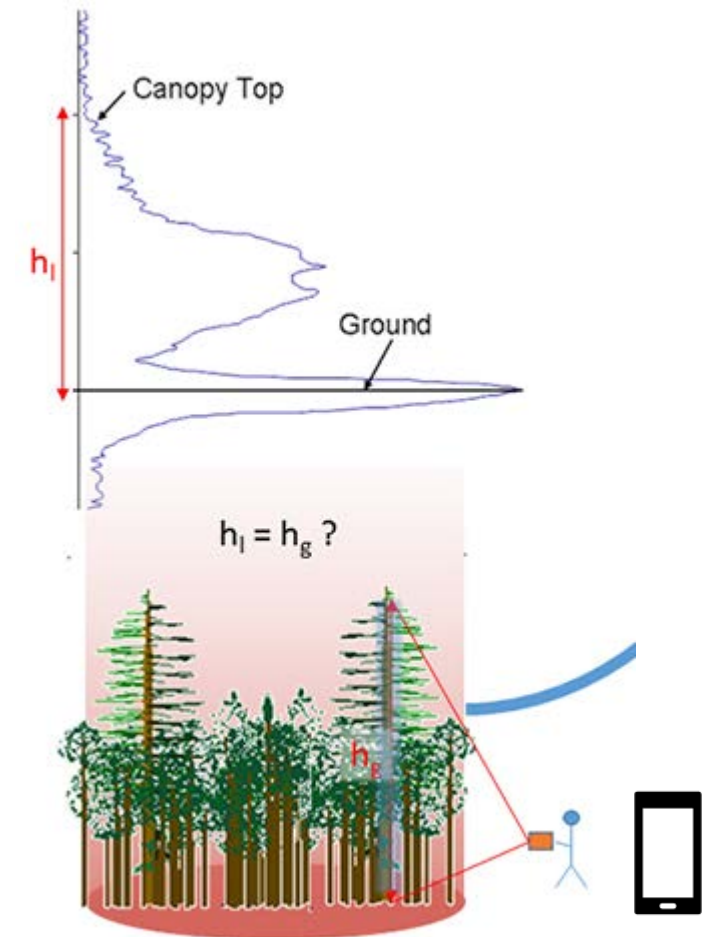


Credit: ESA
data source: Global Carbon Project

Biomass mapping from Satellite data



Local measurement and validation



Credit: University of Maryland/ NASA

Aim...



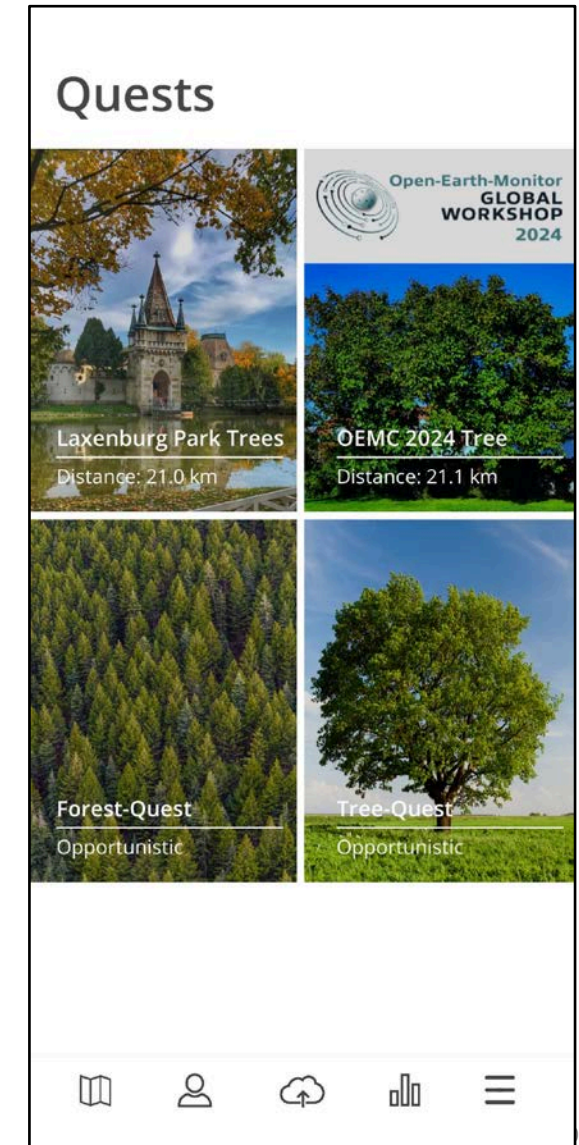
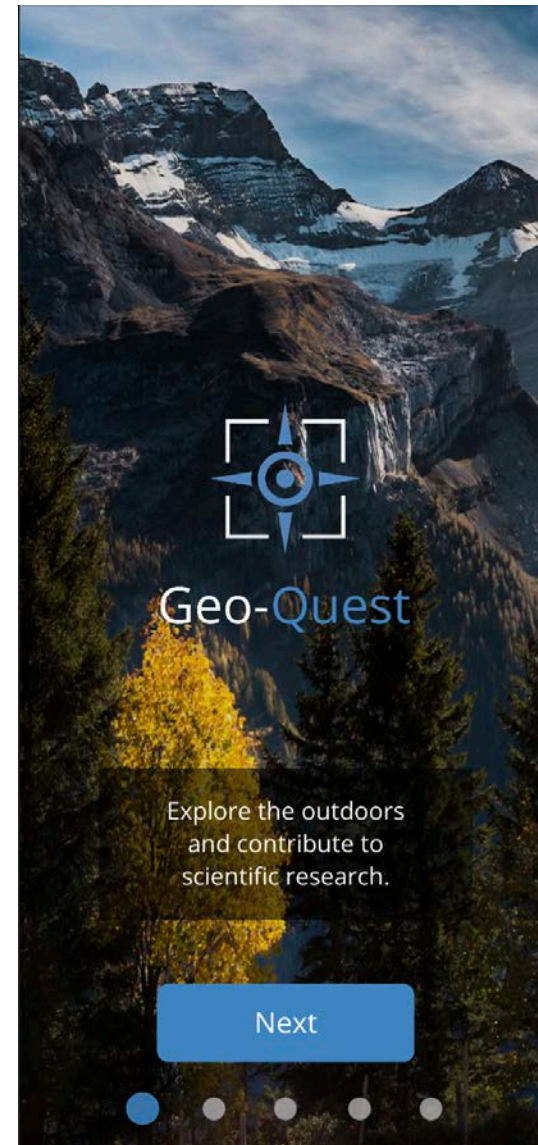
Image source: <https://fennerschool-associated.anu.edu.au/>



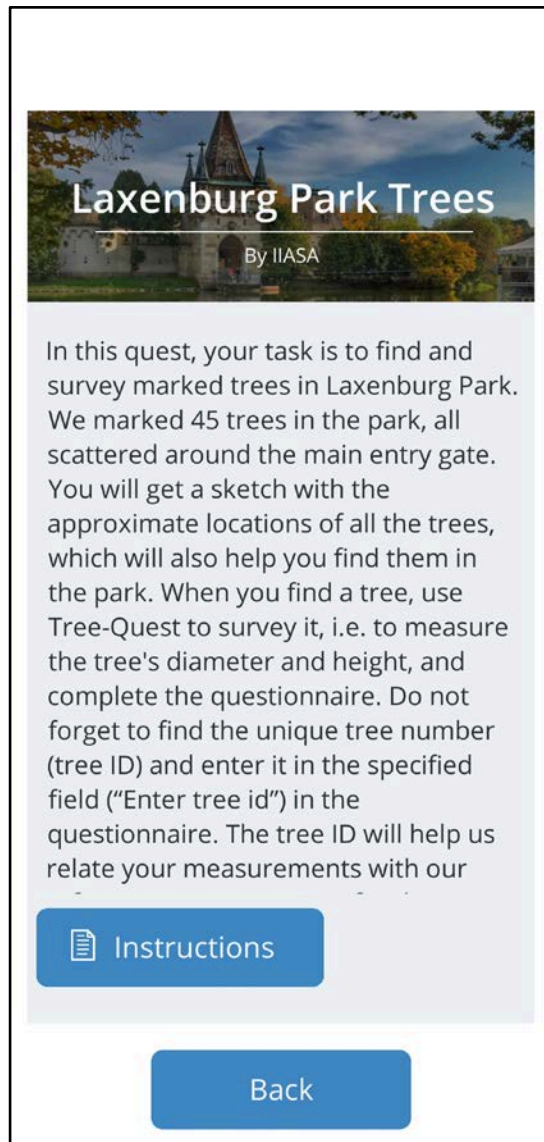
Mobile app measurements and data storage

Geo-Quest:

- New citizen science app for iOS and Android
- Users can do quests to collect in-situ ground data
- 2 quest types:
 - Opportunistic
 - Predefined locations
- Engagement: Leaderboards, Achievements
- Currently in closed testing:
 - <https://testflight.apple.com/join/JDFZdPEh>
 - <https://play.google.com/store/apps/details?id=com.iiasa.geoquest>



Tree-Quest: Single Tree Measurements

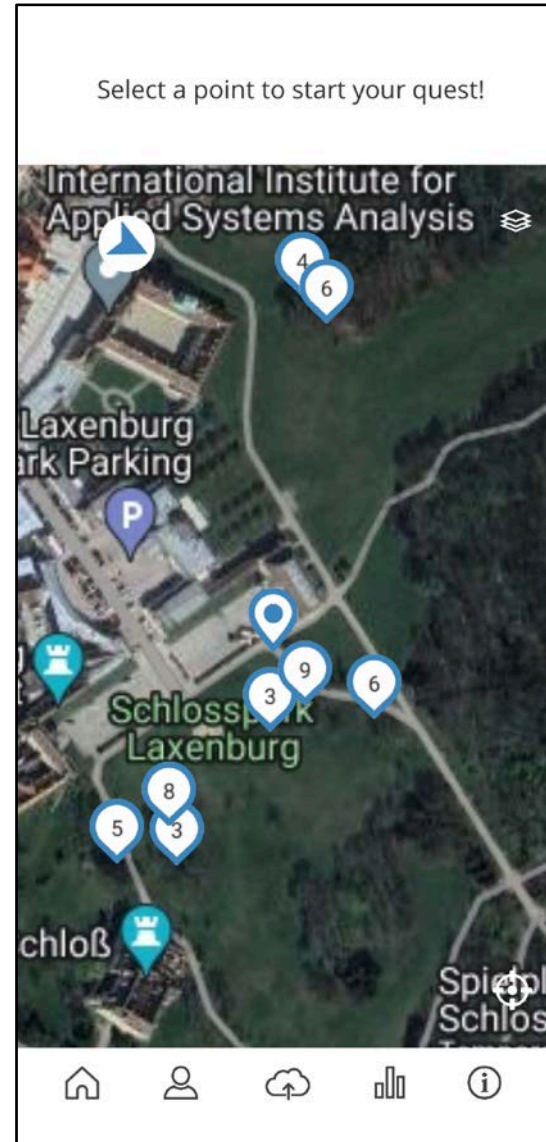


Laxenburg Park Trees
By IIASA

In this quest, your task is to find and survey marked trees in Laxenburg Park. We marked 45 trees in the park, all scattered around the main entry gate. You will get a sketch with the approximate locations of all the trees, which will also help you find them in the park. When you find a tree, use Tree-Quest to survey it, i.e. to measure the tree's diameter and height, and complete the questionnaire. Do not forget to find the unique tree number (tree ID) and enter it in the specified field ("Enter tree id") in the questionnaire. The tree ID will help us relate your measurements with our

[Instructions](#)

[Back](#)



Select a point to start your quest!

International Institute for Applied Systems Analysis


Laxenburg Park Parking

Schlosspark Laxenburg

Schloß

Spiegel Schloß

[Home](#) [Profile](#) [Cloud](#) [Stats](#) [Info](#)

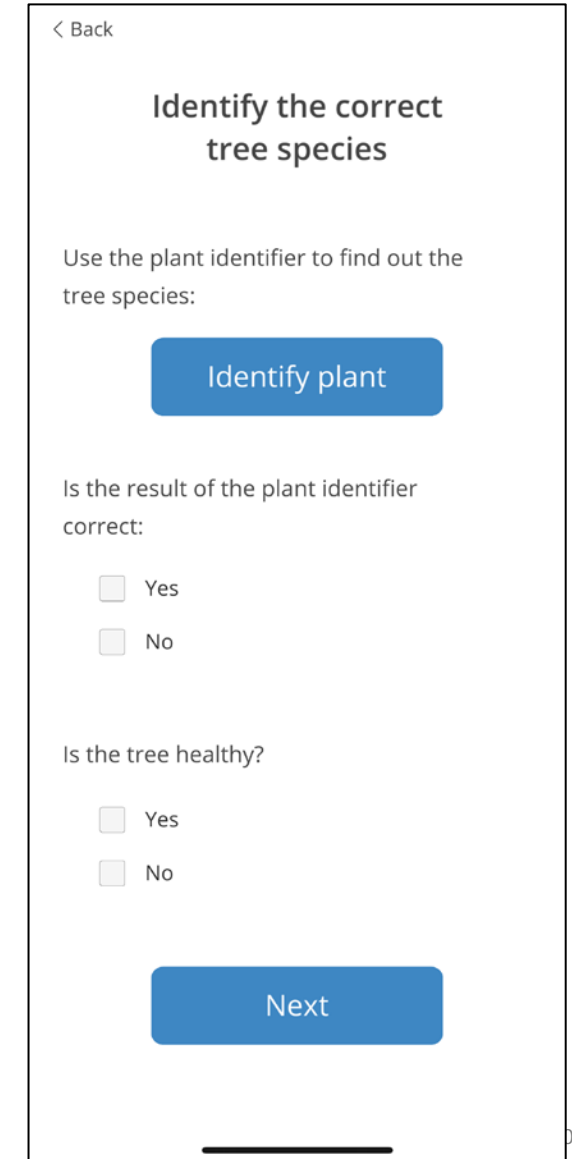


Tree-Quest 

Step 3: Match the line with the left edge of the trunk!

Distance: 0.136 m
Diameter: 0.058 m

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[Back](#)

Identify the correct tree species

Use the plant identifier to find out the tree species:

[Identify plant](#)

Is the result of the plant identifier correct:

Yes
 No

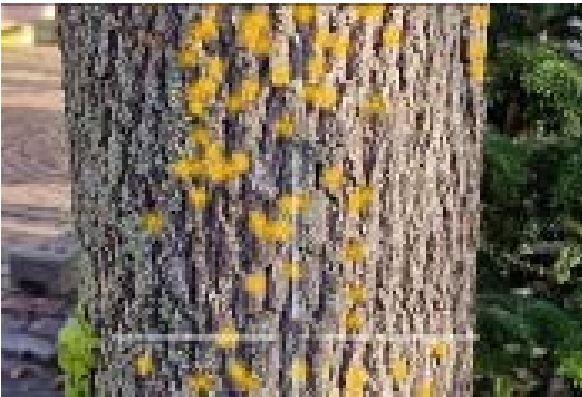
Is the tree healthy?

Yes
 No

[Next](#)

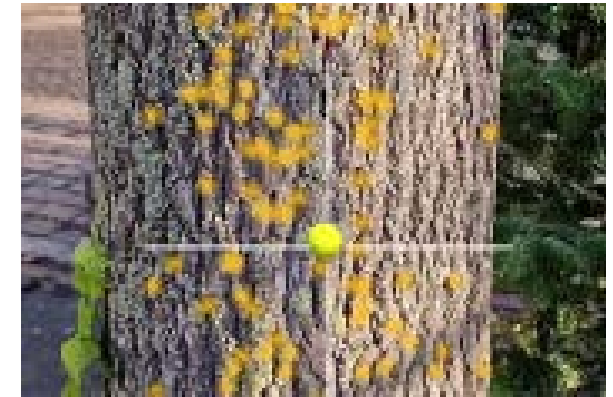
Tree-Quest: Single Tree Module

Feature points



- 3D AR session
- continues evaluation of camera pose
- features parsed and visualized by the app
- seedpoint selection and relative measurements
- AR user interaction

Seedpoint

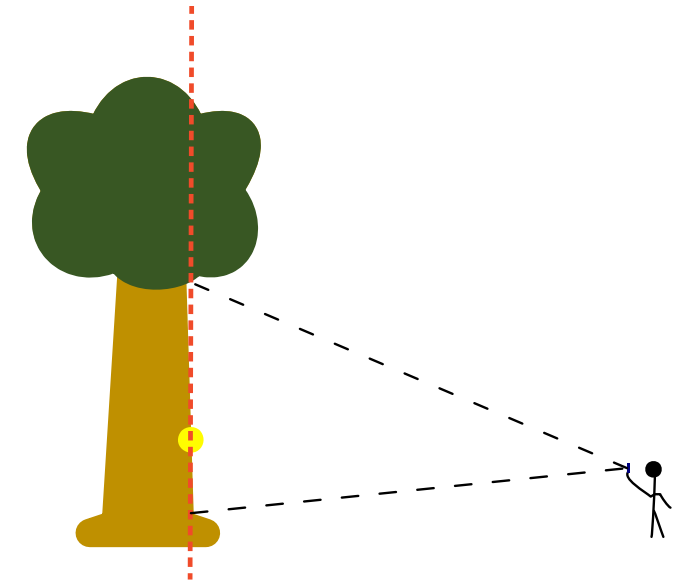


Tree-Quest: Single Tree Module

Tree height calculation



- based on the setpoint vertical plane
- bottom and top tree points defined by the user
- intersection points between the bottom and top vectors with the vertical plane
- distance between the intersection points



Volume calculation



- basal area x height

Laxenburg Park Campaign

Aim:

- Survey all 45 trees or as much as possible, but only once!

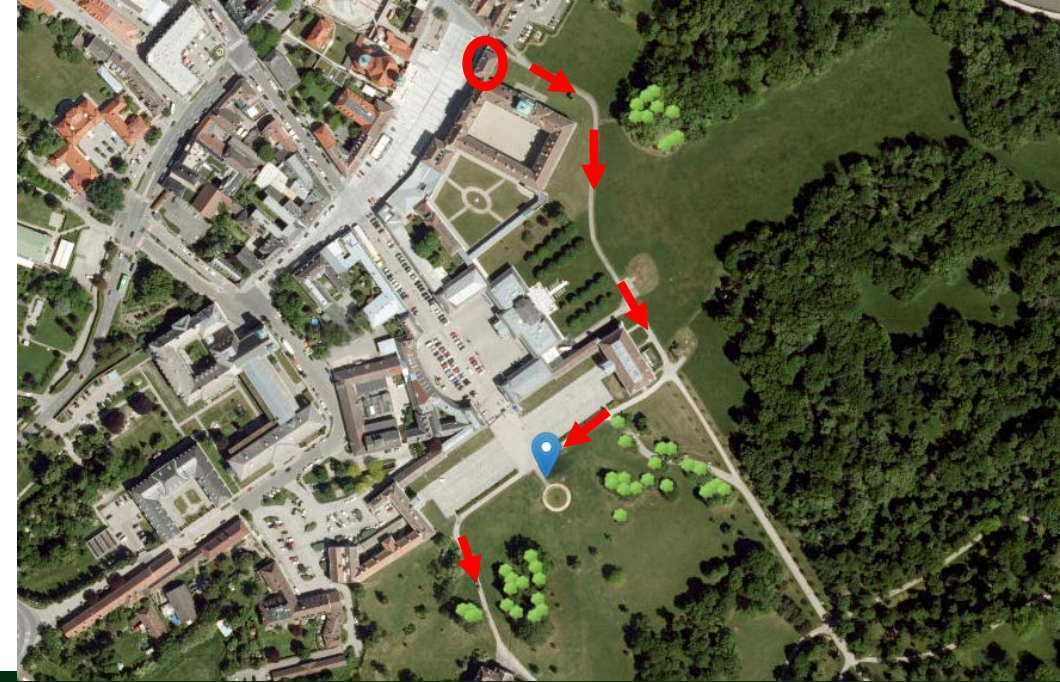
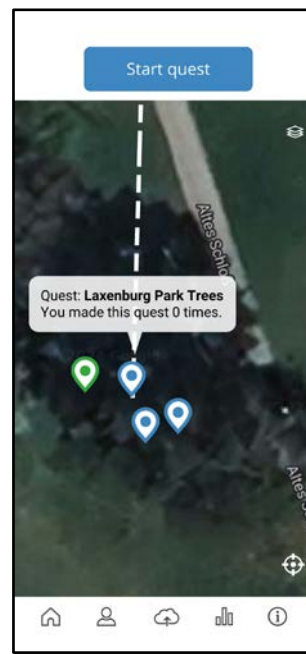
Participants

- 23 persons attending GEO-OPEN-HACK 2024 event

Ranking

- Score (0, 1] is calculated for each tree
 - based on your measurement accuracy (TLS ref.)
- Scores for all surveyed trees are summed up for ranking

Prices to the top 3 ranked participants

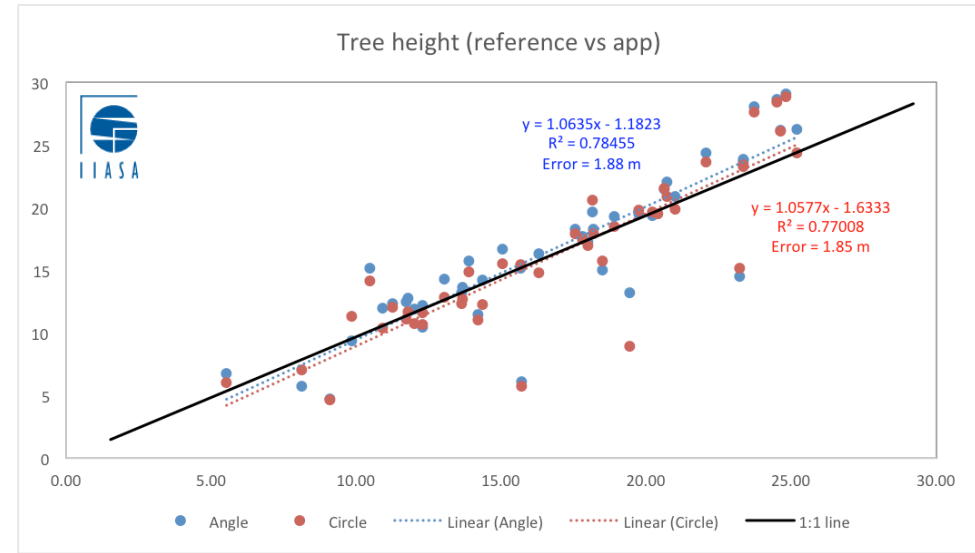
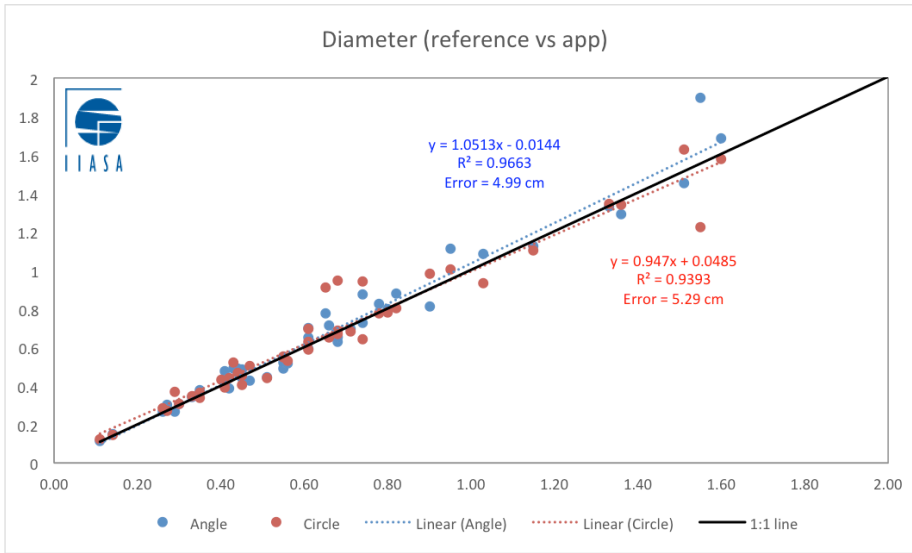


Leaderboard

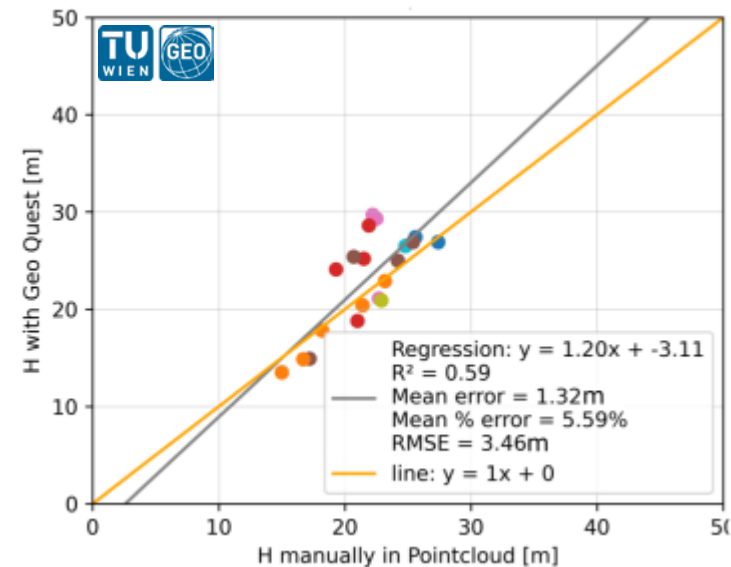
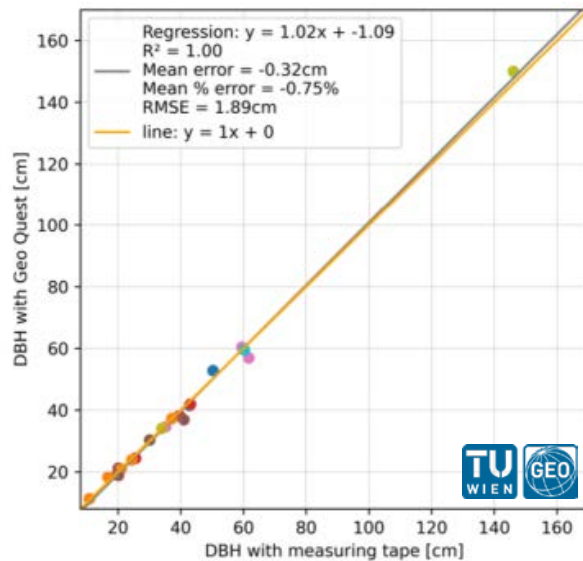
Rank	User Name	AggregatedQualityScore	Submissions	Images
1	FloH	44.97064	91	720
2	weihaodong	20.10067	35	396
3	geostudent002	16.86896	24	308
4	geostudent030	13.37418	35	438
5	Milutin	12.65919	28	386
6	nilsdi	8.2393	22	238
7	olkachalova	7.37951	14	118
8	student014	7.06426	15	178
9	Faen	4.67507	15	122

App Validation: Preliminary Results

Laxenburg
Park



Prater Park



OEMC 2024 Tree Campaign

Aim:

- Survey only ONE tree but as accurate as possible

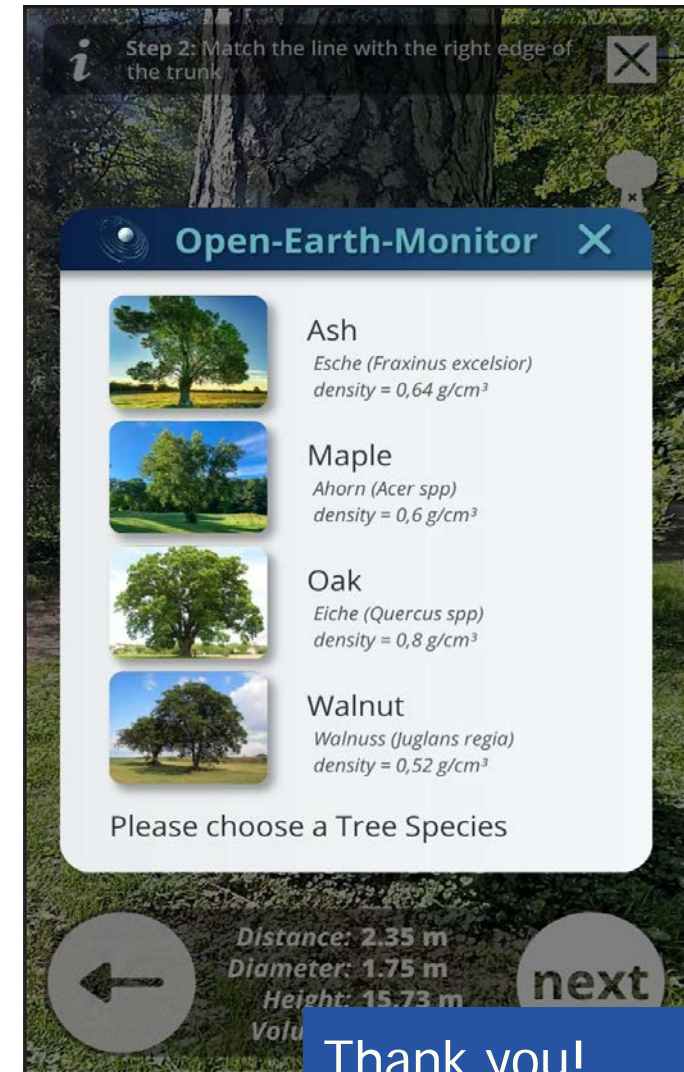
Participants

- The participants of the OEMC social event (50)

Ranking

- based on the residual to the reference tree biomass
- reference was acquired with NFI-like measurements

Price to the most accurate measurement



Thank you!