

arbonaut



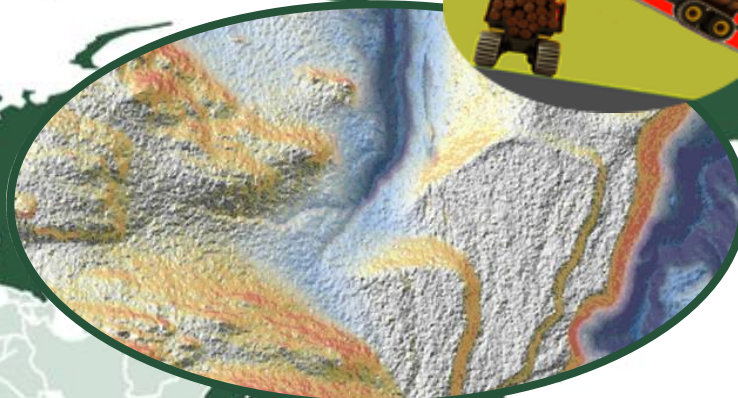
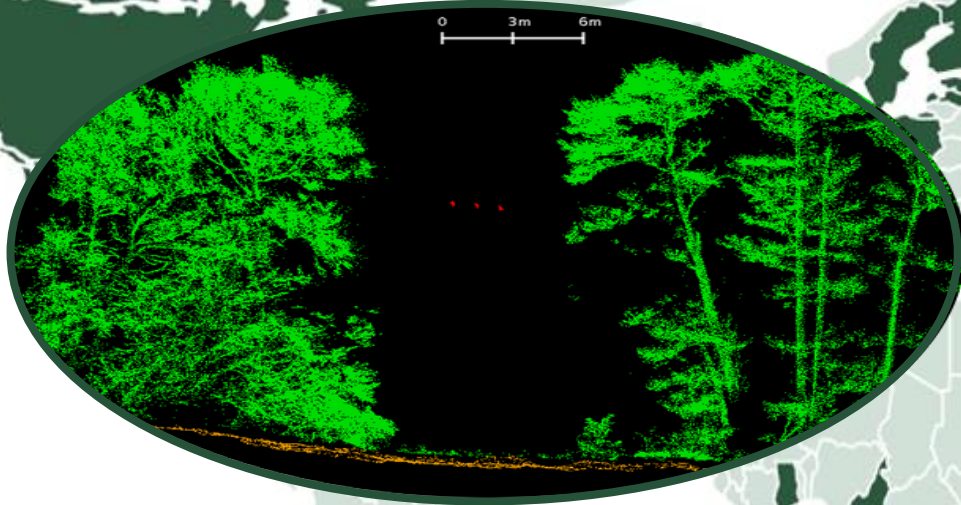
Piloto Sobre Produtos de Analise, com Recurso a LiDAR, Para a Gestao do Territorio, da Floresta e dos Fogos Rurais

Vesa Leppänen

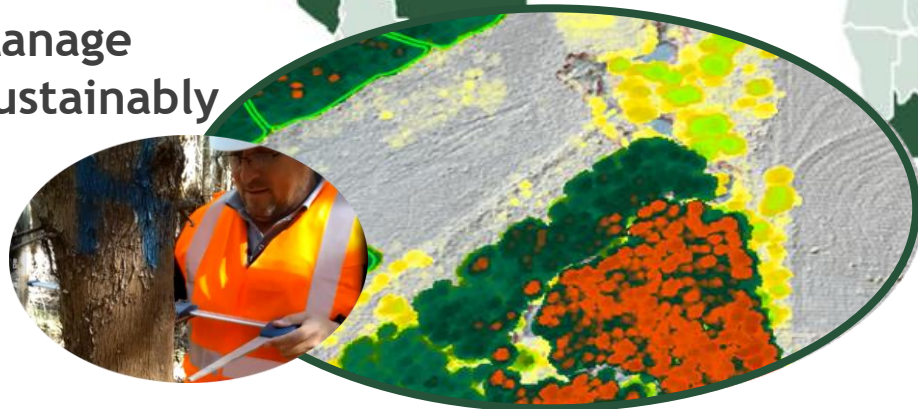
Abilio Pereira Pachego



Operate
Efficiently

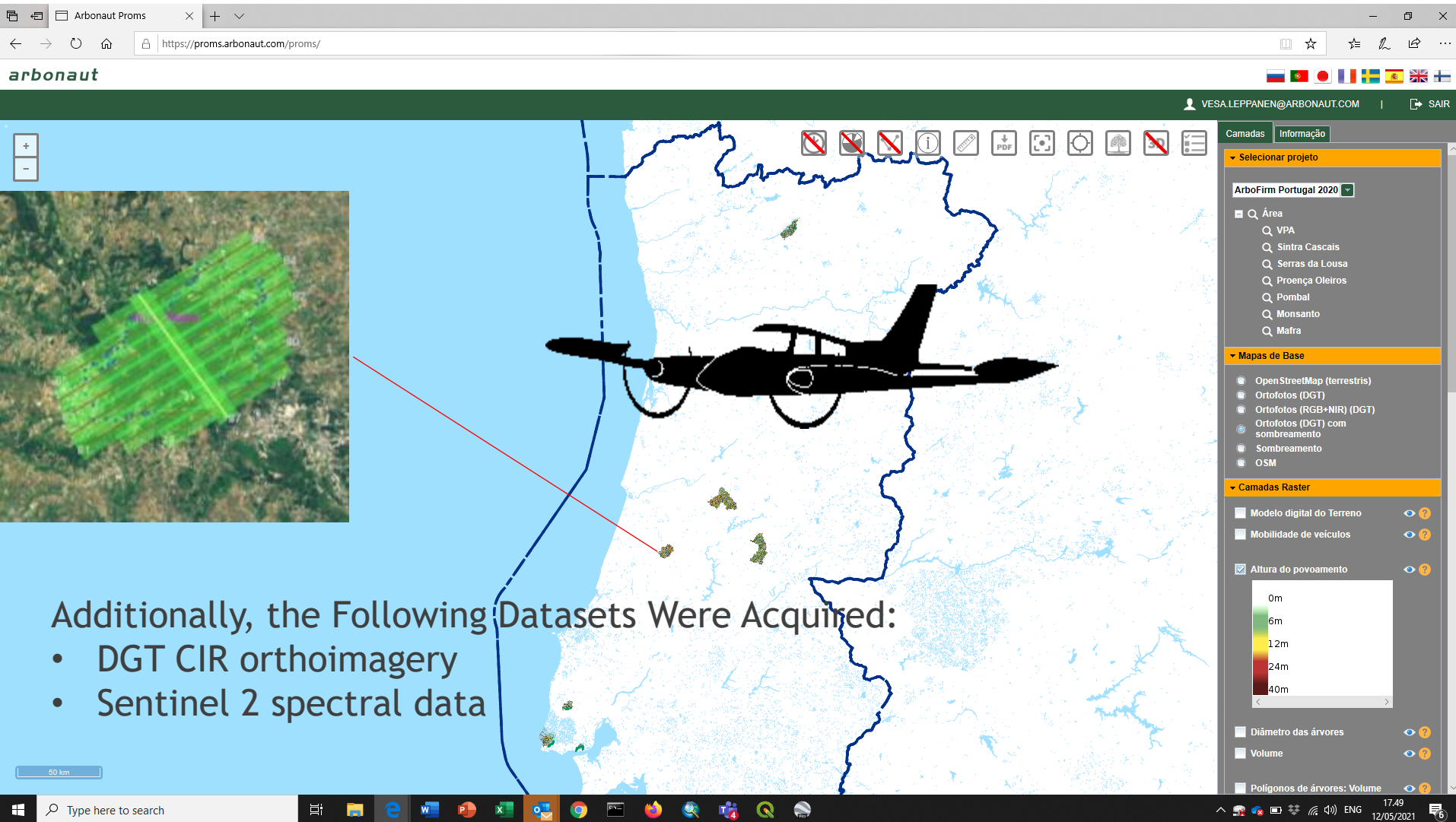


Manage
Sustainably



Protect Public

7 Pilot Areas Were Acquired with LiDAR



The screenshot displays the Arbonaut Proms web application interface. The main map shows a geographical area with a green-shaded region indicating a LiDAR pilot area. An inset image on the left provides a detailed view of the LiDAR data, showing a grid of green lines. A black silhouette of a plane is overlaid on the map, likely representing the aircraft used for data acquisition. The right sidebar contains a 'Selecionar projeto' (Select project) section with a dropdown menu set to 'ArboFirm Portugal 2020'. Below this, there is a 'Mapas de Base' (Base Maps) section with options like 'OpenStreetMap (terrestre)', 'Ortofotos (DGT)', and 'Ortofotos (RGB+NIR) (DGT)'. The 'Camadas Raster' (Raster Layers) section is also visible, showing options for 'Modelo digital do Terreno', 'Mobilidade de veículos', and 'Altura do povoamento' (set to 'Altura do povoamento'). A color scale for 'Altura do povoamento' ranges from 0m to 40m. The bottom of the screen shows a Windows taskbar with various application icons and a search bar.

Arbonaut Proms

https://proms.arbonaut.com/proms/

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VESA.LEPPANEN@ARBONAUT.COM

SAIR

Camadas Informação

Selecionar projeto

ArboFirm Portugal 2020

Área

VPA

Sintra Cascais

Serras da Lousa

Proença Oleiros

Pombal

Monsanto

Mafr

Mapas de Base

OpenStreetMap (terrestre)

Ortofotos (DGT)

Ortofotos (RGB+NIR) (DGT)

Ortofotos (DGT) com sombreamento

Sombreamento

OSM

Camadas Raster

Modelo digital do Terreno

Mobilidade de veículos

Altura do povoamento

0m

6m

12m

24m

40m

Diâmetro das árvores

Volume

Polígonos de árvores: Volume

50 km

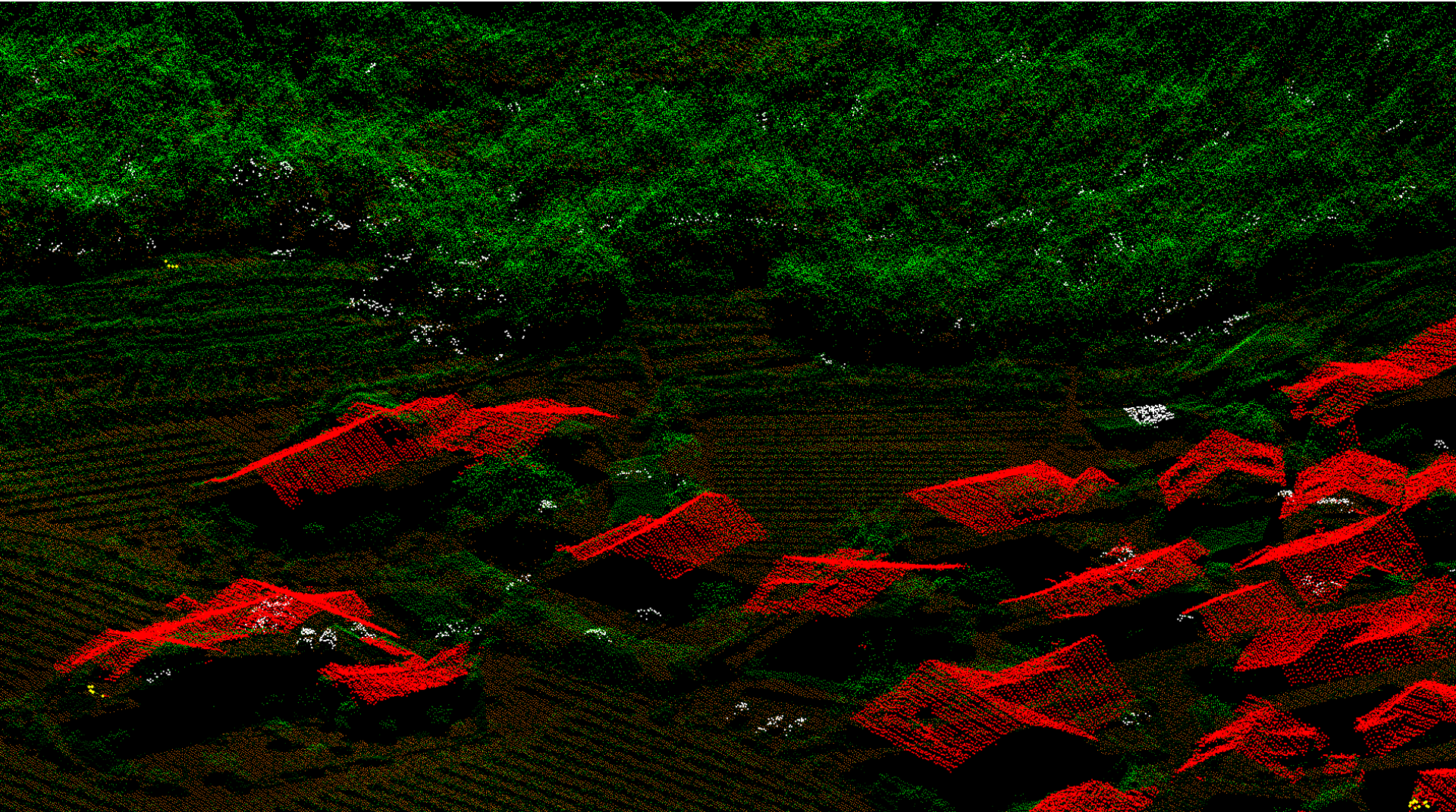
Type here to search

17.49 12/05/2021

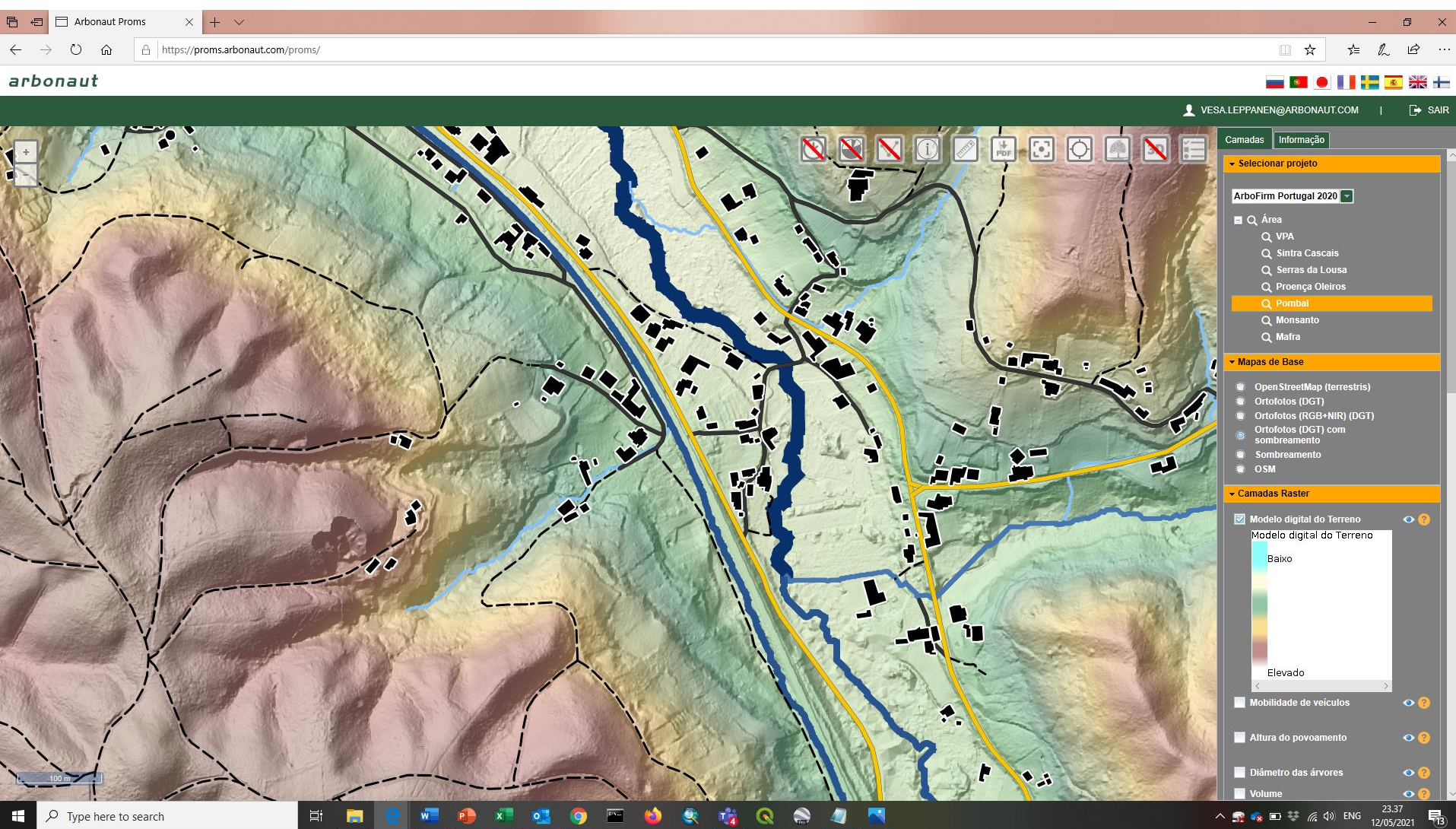
Additionally, the Following Datasets Were Acquired:

- DGT CIR orthoimagery
- Sentinel 2 spectral data

Classified LiDAR Point Cloud



Digital Terrain Model, Roads, Houses, Water Flow



Fuel Model

Fuel class name	Fuel Description
F-EUC	Eucalypt litter
F-FOL	Compact litter of deciduous or evergreen hardwoods
F-PIN	Litter of intermediate to long needle pines
M-CAD	Deciduous hardwoods litter and shrub understory with a substantial live component
M-ESC	Evergreen hardwoods litter and shrub understory
M-EUC	Eucalypt litter and shrub understory
M-PIN	Litter of intermediate to long needle pines and shrub understory
V-Hb	Low grass (<0.5m)
V-MAa	Tall shrubs (>1m), fine and/or dead fuels are substantial
V-MAb	Low shrubs (<1m), fine and/or dead fuels are substantial
Non-Burnable	Non burnable areas

Fuel Model



F-PIN



M-PIN



M-EUC

Fuel Model



V-Ha

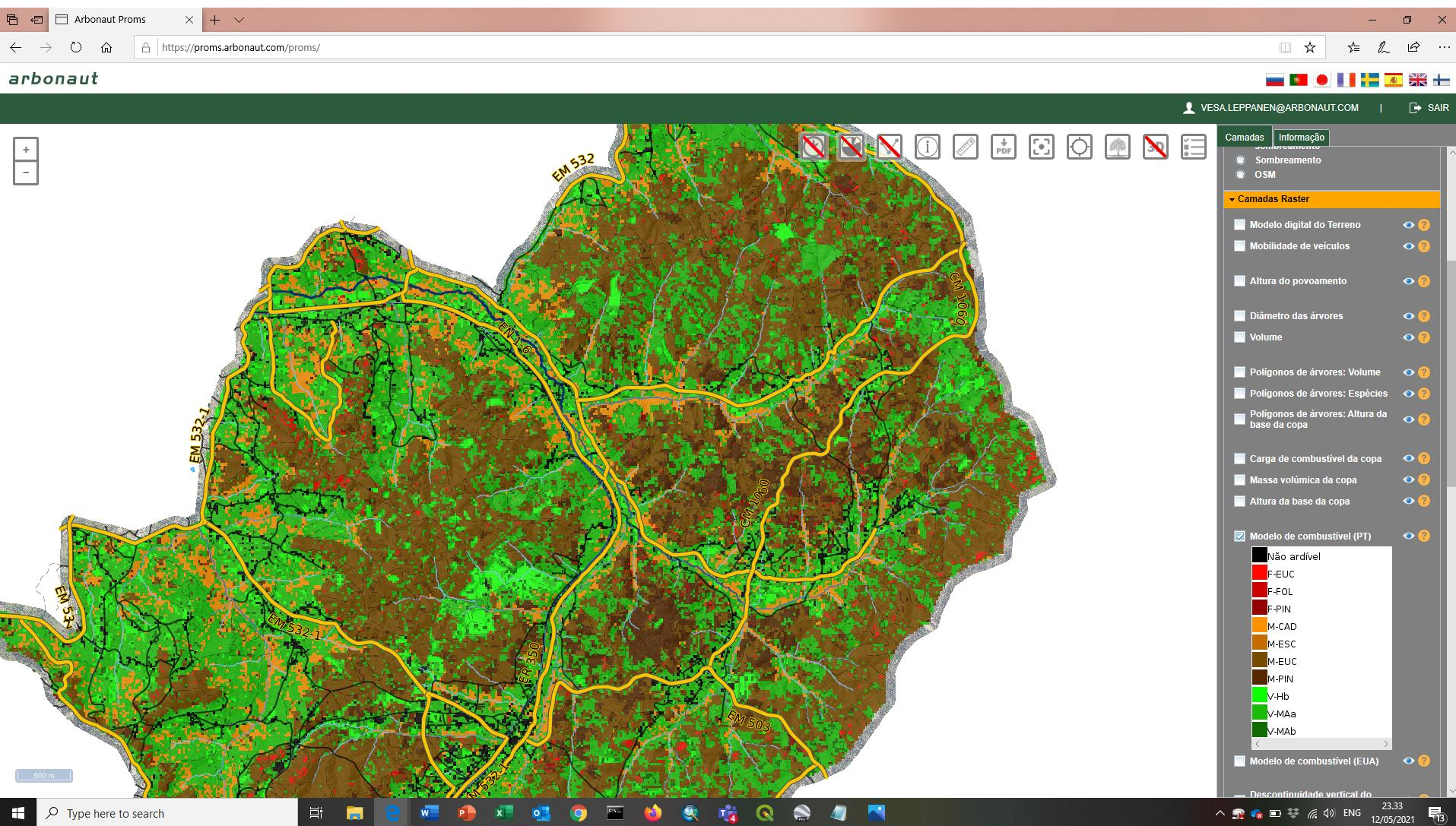


V-Hb

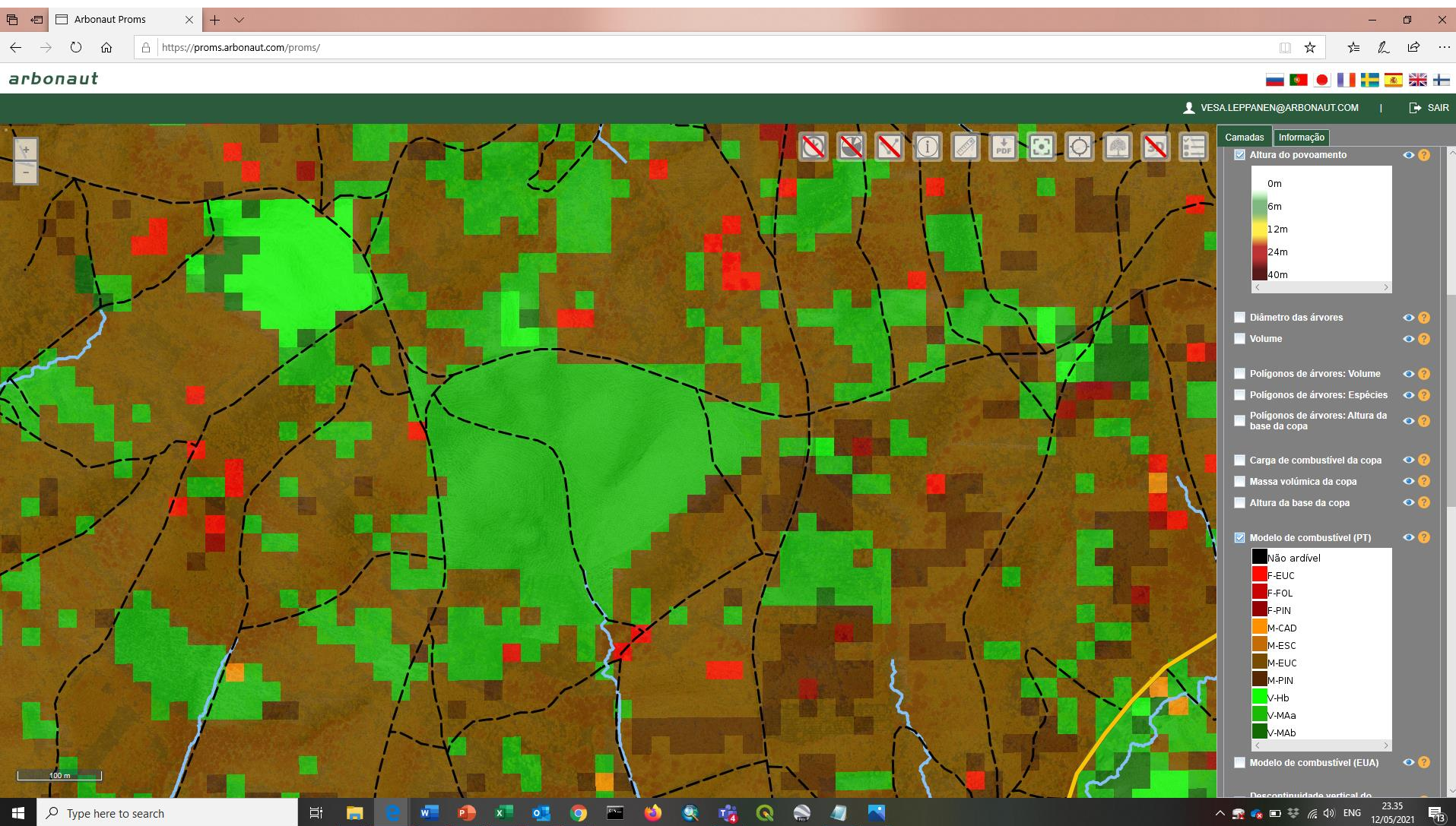


V-MAa

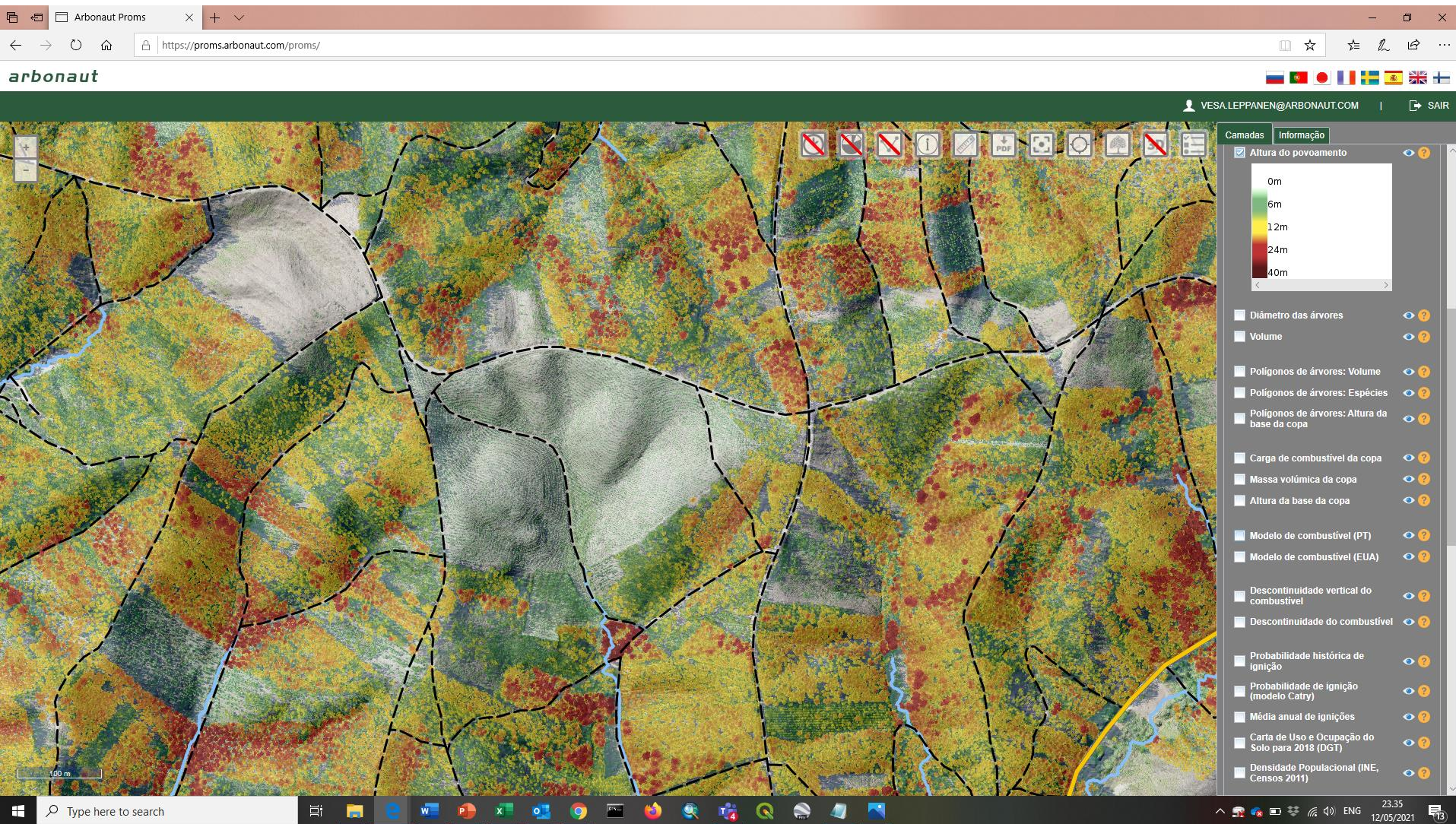
Fuel Model Classification on LiDAR and Spectral data



Fuel Model Classification on LiDAR and Spectral data



Canopy Height Model



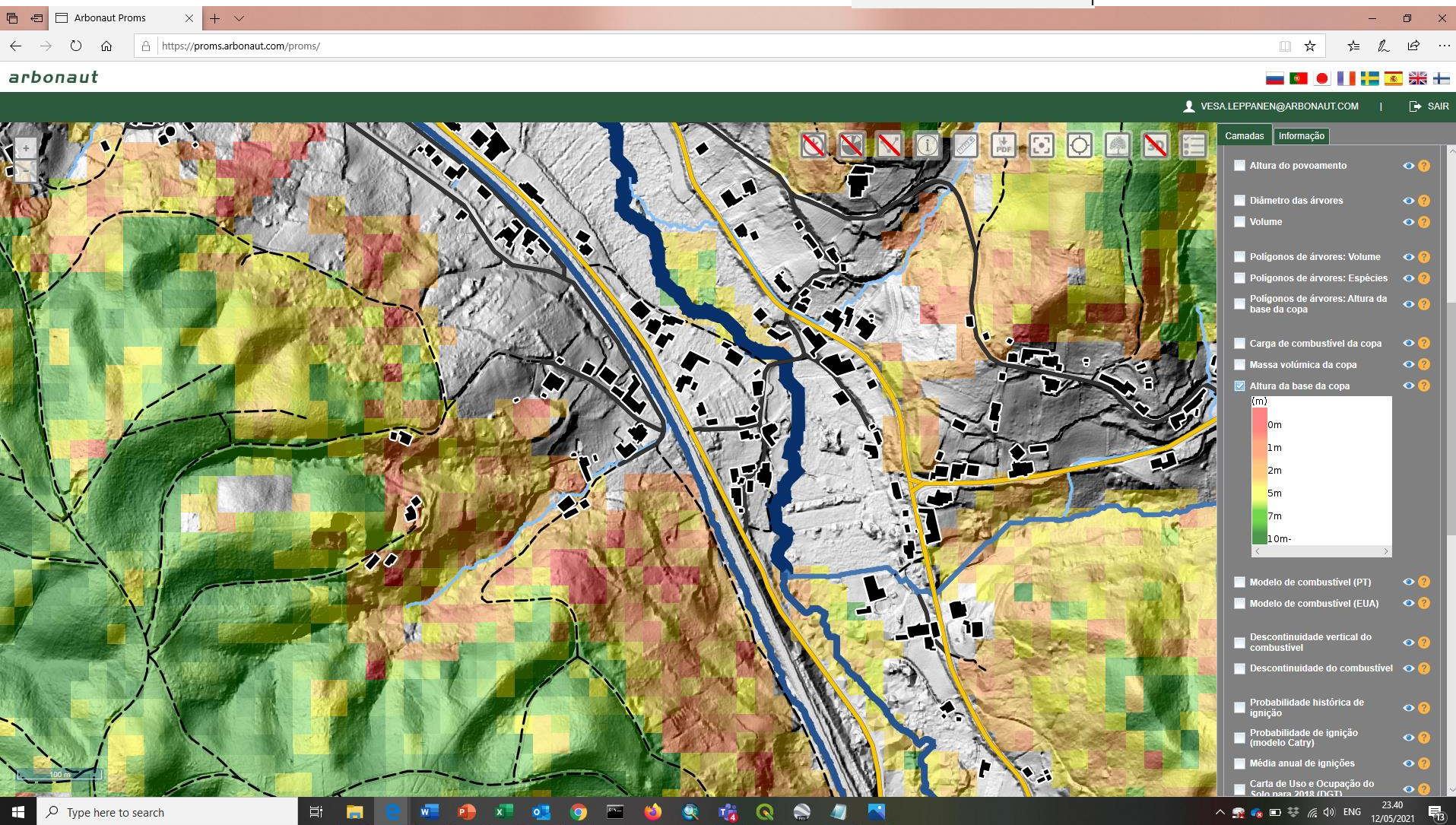
Fuel Model Classification Performance

	F	M	V	
F	47	1	1	49
M	15	172	15	202
V	4	17	225	246
	66	190	241	89%

	F-EUC	F-FOL	F-PIN	M-CAD	M-ESC	M-EUC	M-PIN	V-Hb	V-Maa	V-Mab	
F-EUC	5	0	1	0	0	0	0	0	0	0	6
F-FOL	1	13	5	0	1	0	0	1	0	0	21
F-PIN	0	3	19	0	0	0	0	0	0	0	22
M-CAD	1	7	0	35	27	5	5	0	1	1	82
M-ESC	0	0	0	0	2	0	0	0	0	0	2
M-EUC	3	0	0	0	0	49	13	0	3	4	72
M-PIN	0	1	3	0	5	3	24	0	3	3	42
V-Hb	0	0	0	0	0	0	1	3	0	15	19
V-MAA	0	0	4	7	1	4	6	31	97	70	220
V-Mab	0	0	0	1	0	1	0	0	1	8	11
	10	24	32	43	36	62	49	35	105	101	51%

	RMSE	RMSE_R	BIAS	BIAS_R
All Spec	1.99	49.84	0.21	0.05
Eucalyptus	1.55	25.13	0.15	2.48
All Except Euca	1.5	34.04	0.26	5.89
Pinus Pinaster	1.73	36.83	0.27	5.79
All Except Euca	2.69	53.92	1.31	26.29
Pinus Pinea	3.45	45.22	2	26.17

Canopy Base Height



R^2	72%	66%
θ_0	3655.93	0.0548

Canopy Fuel Weight

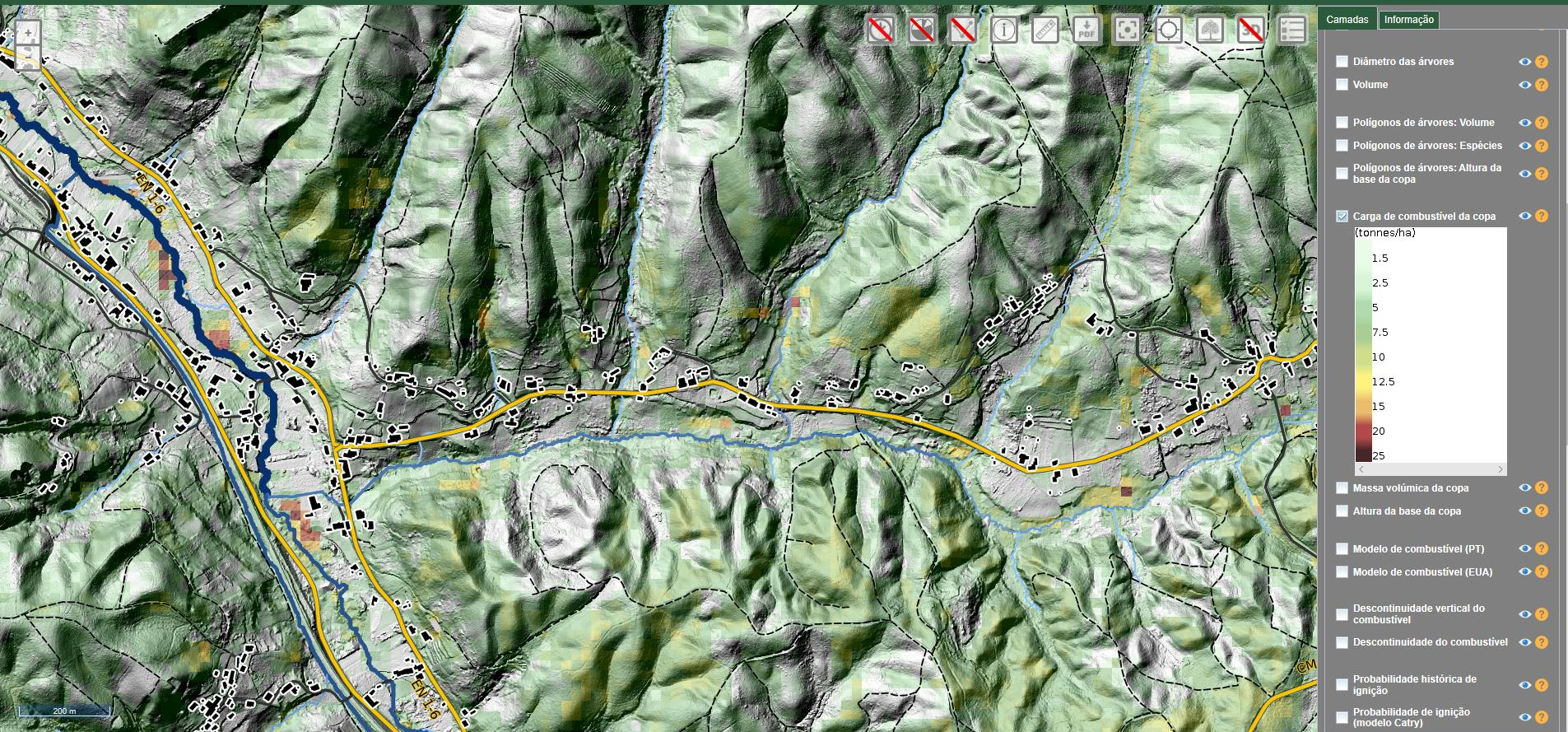
← → ↺ 🏠 | You're not connected | Monsanto_Pilot_Final_Repoi | 20200410_pv_Port_v2_proje | You're not connected | SwathTRAK Info Sheet.pdf | NL2_ForestWISE.pdf | HotSpot | Arbnaut Proms

← → ↺ 🏠 | <https://proms.arbnaut.com/proms/#>

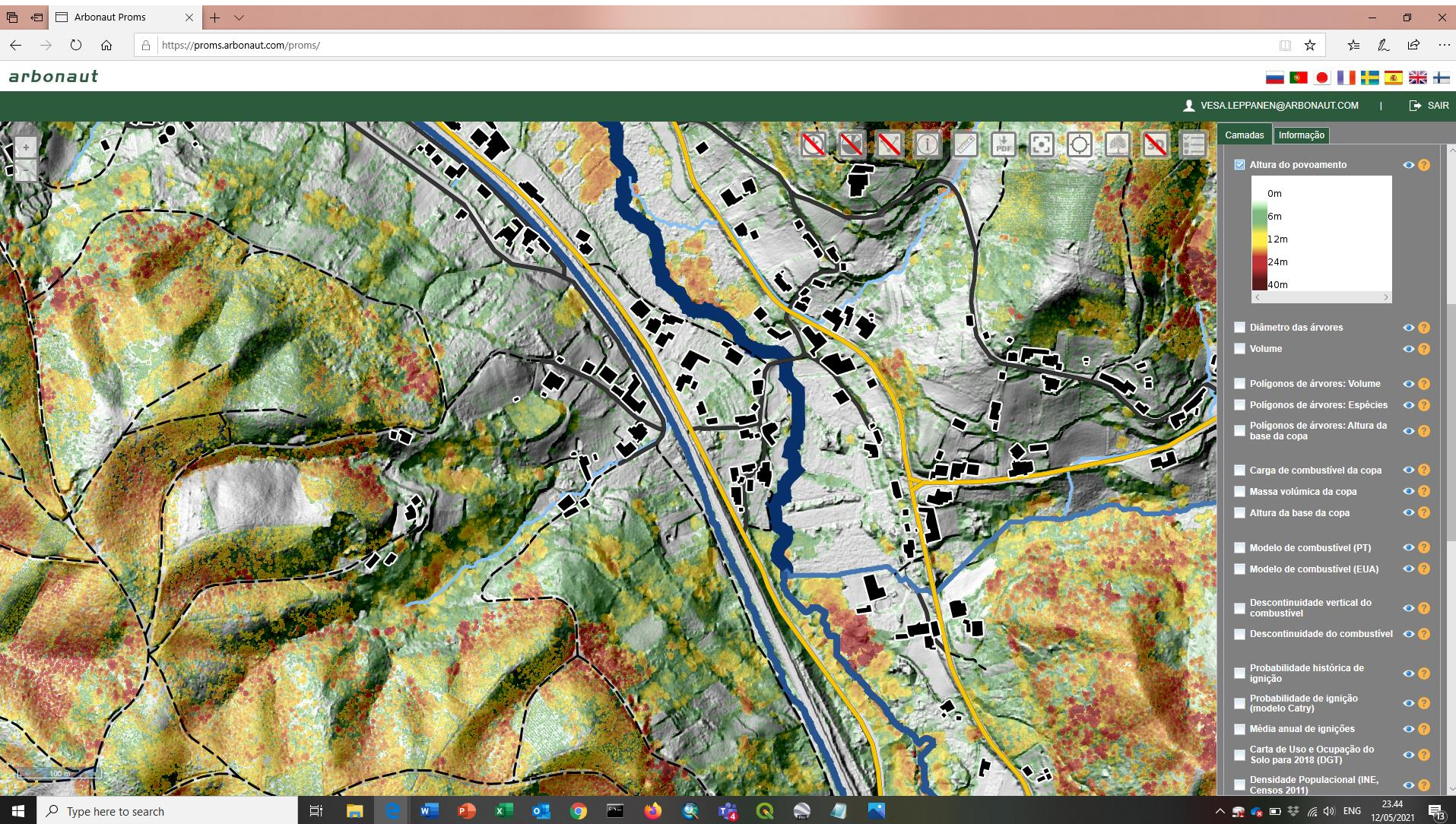
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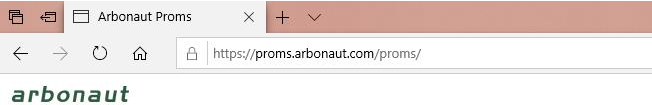
👤 VESA.LEPPANEN@ARBNAUT.COM | 📡 SAIR



Canopy Height



Tree Crowns, Species



Pinus pinaster
Pinus pinea
Eucalyptus
Other species
Evergreen oaks

<i>Pinus pinaster</i>	<i>Pinus pinea</i>	<i>Eucalyptus</i>	Other species	Evergreen oaks	
62	1	5	9	8	85
0	33	0	0	2	35
20	1	83	4	6	114
12	16	12	98	21	159
0	0	0	1	8	9
94	51	100	112	45	71%

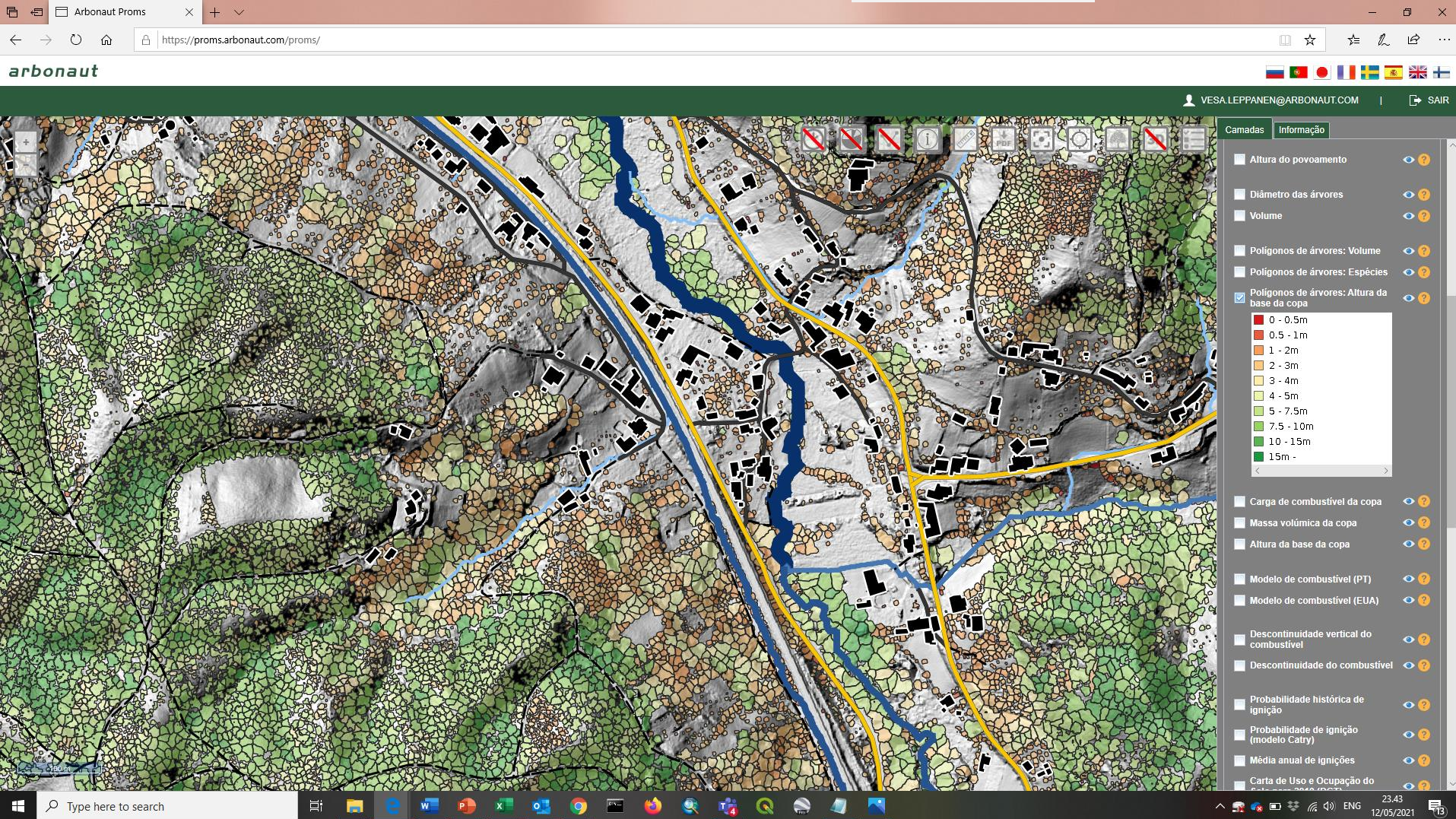


Camadas Informação

- ☐ Altura do povoamento
- ☐ Diâmetro das árvores
- ☐ Volume
- ☐ Polígonos de árvores: Volume
- ☒ Polígonos de árvores: Espécies
 - ☒ Pinheiro bravo
 - ☐ Pinheiro manso
 - ☐ Eucalipto
 - ☐ Outros
 - ☐ Carvalhos de folha pequena
- ☐ Polígonos de árvores: Altura da base da copa
- ☐ Carga de combustível da copa
- ☐ Massa volumétrica da copa
- ☐ Altura da base da copa
- ☐ Modelo de combustível (PT)
- ☐ Modelo de combustível (EUA)
- ☐ Descontinuidade vertical do combustível
- ☐ Descontinuidade do combustível
- ☐ Probabilidade histórica de ignição
- ☐ Probabilidade de ignição (modelo Catry)
- ☐ Média anual de ignições
- ☐ Carta de Uso e Ocupação do Solo para 2018 (DGT)
- ☐ Densidade Populacional (INE, Censos 2011)
- ☒ Camadas de base

	RMSE	RMSE_R	BIAS	BIAS_R
All Spec	1.99	49.84	0.21	0.05
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Canopy Base Height



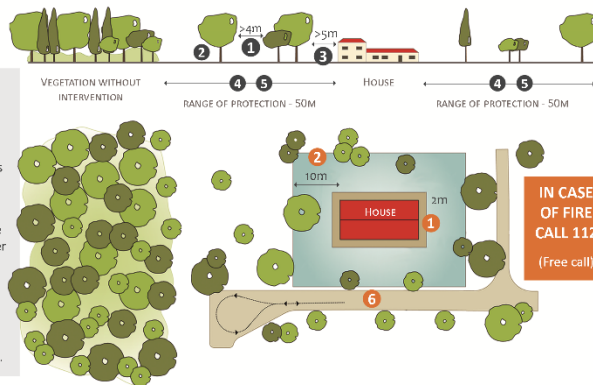
Vegetation Management Code

REDUCE THE RISK TO YOUR HOUSE

By **31st May 2018** it is mandatory to manage the vegetation measured from the exterior wall of the house.

MANDATORY

- 1 The space between treetops should be, at least, **4m**. In maritime pine and eucalyptus stands, the minimum distance between tree-crowns must be, at least, of **10m**.
- 2 **Prune** trees **4m** above the ground. For trees with a height of less than 8m, prune the **lower half** (50%) of the tree.
- 3 Trees and bushes must be **5m** away from the **buildings** and treetops must not extend over the roof.
- 4 Shrubs must not be higher than **50 centimeters**.
- 5 **Do not keep firewood, debris** or any type of inflammable material within this area.



**IN CASE OF FIRE
CALL 112**
(Free call)

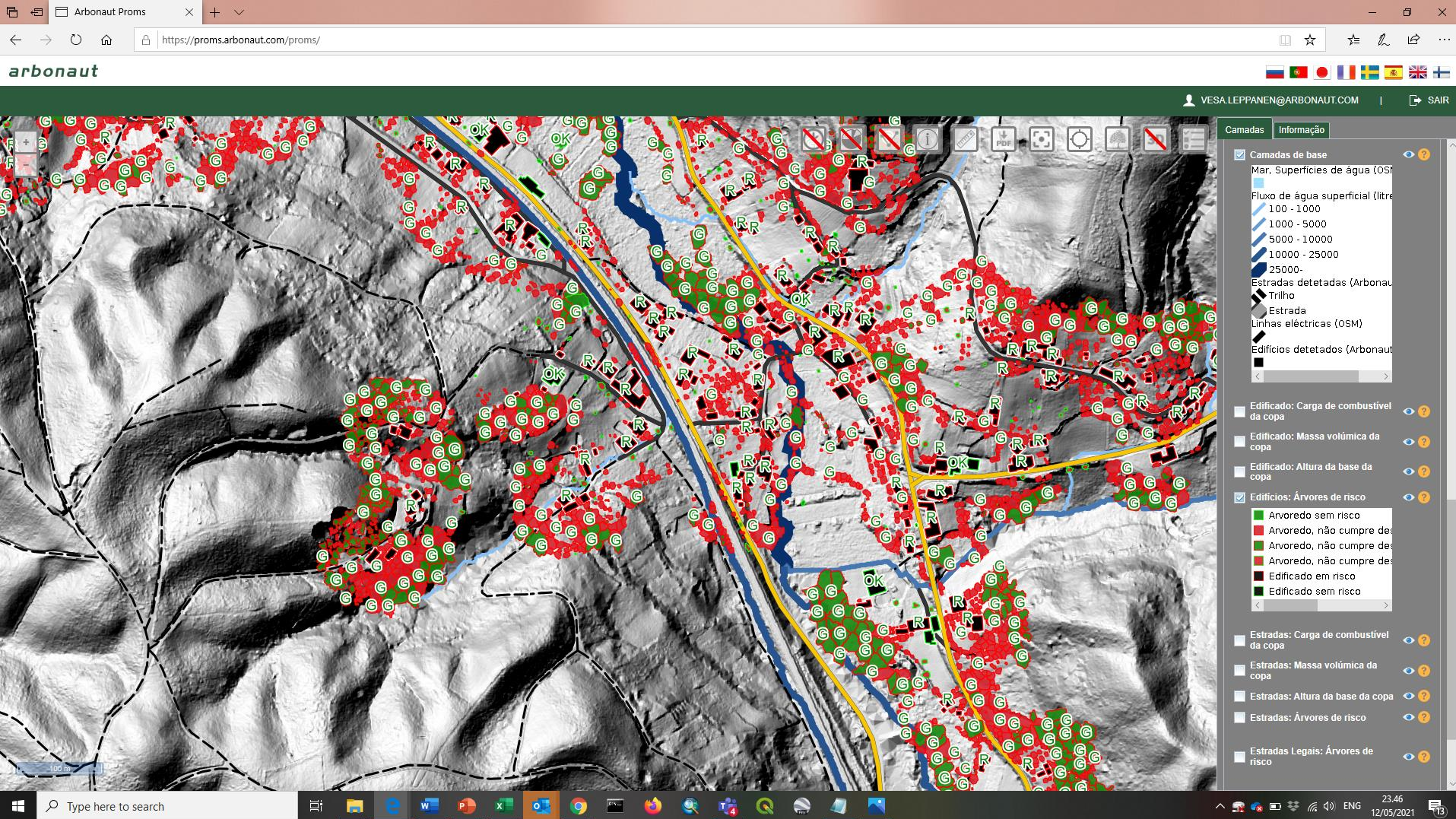
ADVISABLE

- 1 Have a strip of **non-inflammable paving**, between one and two metres in width, around the building.
- 2 Avoid having very inflammable vegetation or plants that dry easily within **10 metres** of your house. Avoid having **hedges** made of species that accumulate lots of dry woody material inside, or which contain oils or resins, and avoid enclosures made of cane or dry heather.
- 3 Check that the **watering system** and hoses are in working order.
- 4 The **roof** is one of the most vulnerable parts of the house. Remove grass, leaves, branches and moss from rooftops, gutters and drain pipes. Fit a spark screen in the chimneys.
- 5 Protect **doors and windows** with blinds or shutters. Use **double-glazing** and tempered glass and choose sliding windows.
- 6 Keep the **access** to your house unobstructed and create a space that will permit U-turns.
- 7 Keep an up-to-date list of **emergency contacts** at hand.

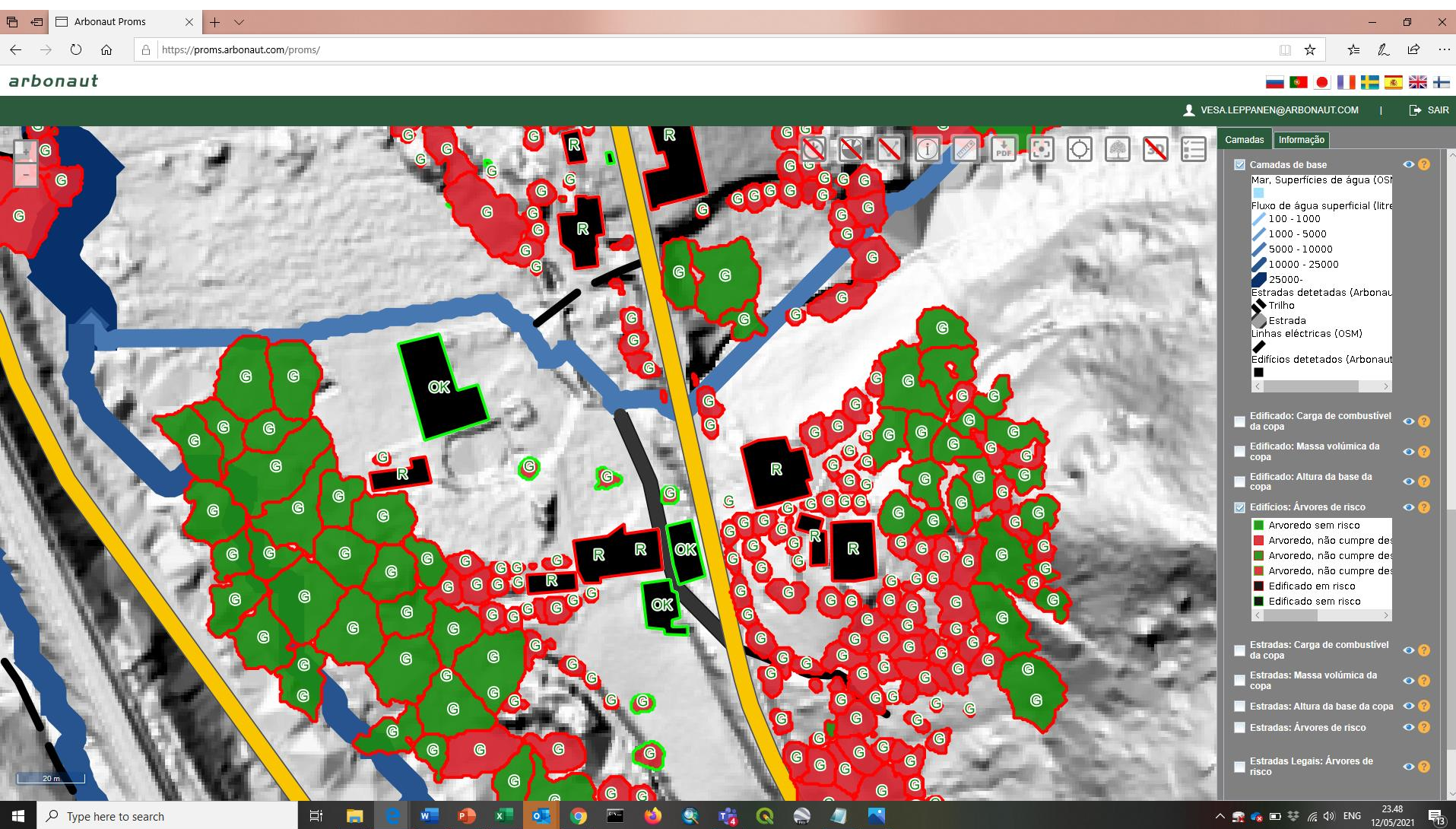
IN CASE OF FIRE NEAR YOUR HOUSE

- 1 **Wear loose cotton clothing** (avoid synthetic fabrics) in order to cover your arms and legs, and wear closed footwear. **Avoid exposure to smoke** and fumes and cover your mouth and nose with a damp cloth.
- 2 Close all doors leading to the exterior and all interior doors too, as well as all windows and any other openings (ventilation grids, for example). Switch off automatic door- and gate-opening mechanisms. Put wet, rolled-up towels along the bottom of doors and windows. **Any open crack could prove fatal** by allowing the fire into your home.
- 3 Close **gas valves**. **Move combustible materials away** from windows (e.g. curtains, sofas, etc.) and remove garden furniture and any wood that may be on the porches or next to the house.
- 4 **Water the area around the house**. If you have a watering system, turn it on. Gather **buckets of water** indoors and outdoors. If a fire breaks out, put it out immediately with water, earth or branches.
- 5 Keep a vehicle in a state of constant readiness for emergency evacuation. Stay indoors and **follow the instructions given to you by the authorities**.
- 6 After the fire has passed, check to see if there are any small areas still alight; look for smoke and/or flames next to doors, windows, roofs, chimneys and gutters. **Remain alert over the following days**.

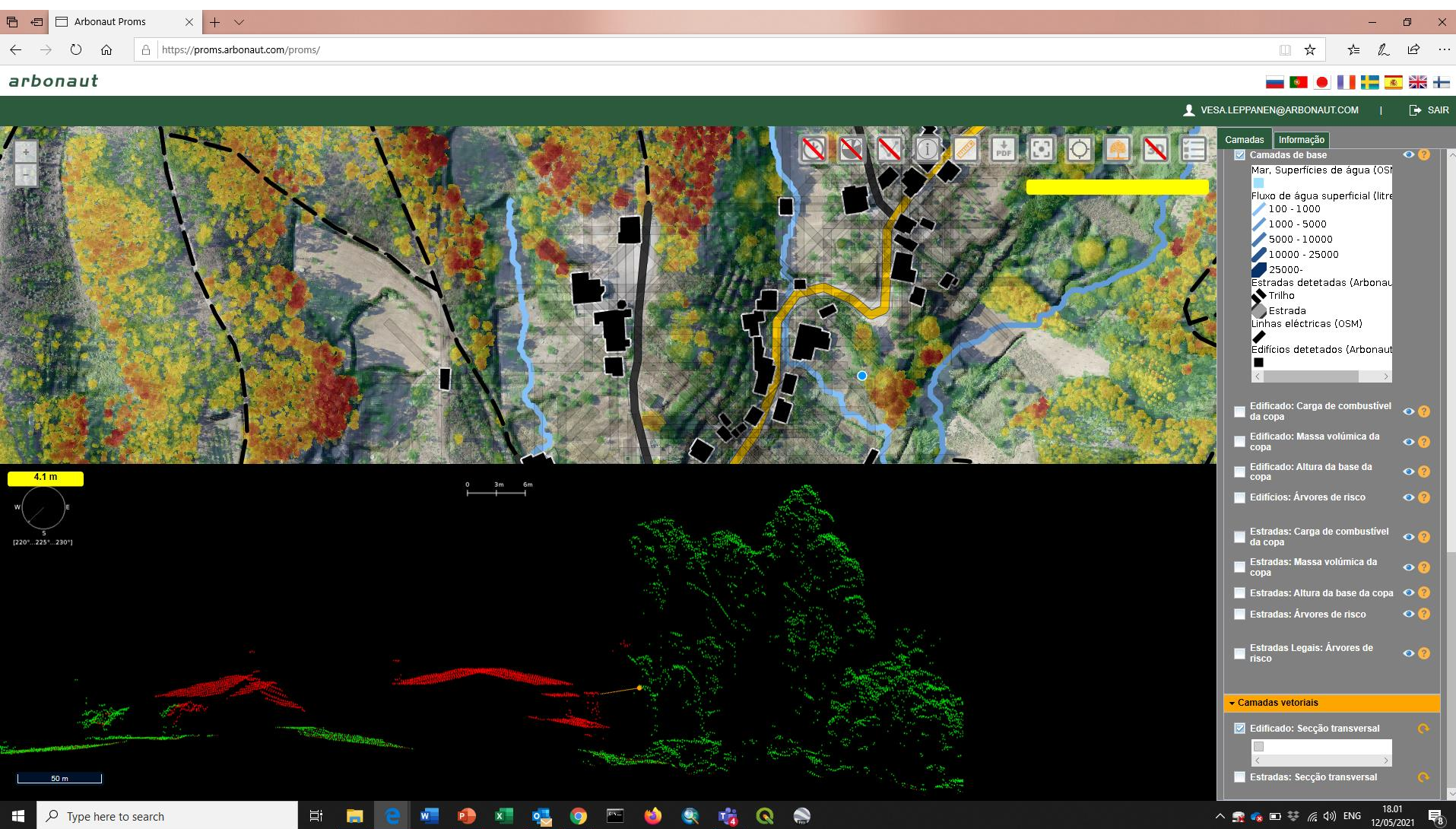
Risk Trees Around Houses



Risk Trees Around Houses



LiDAR Cross-Section of a House





Thank you!

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CTO

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