

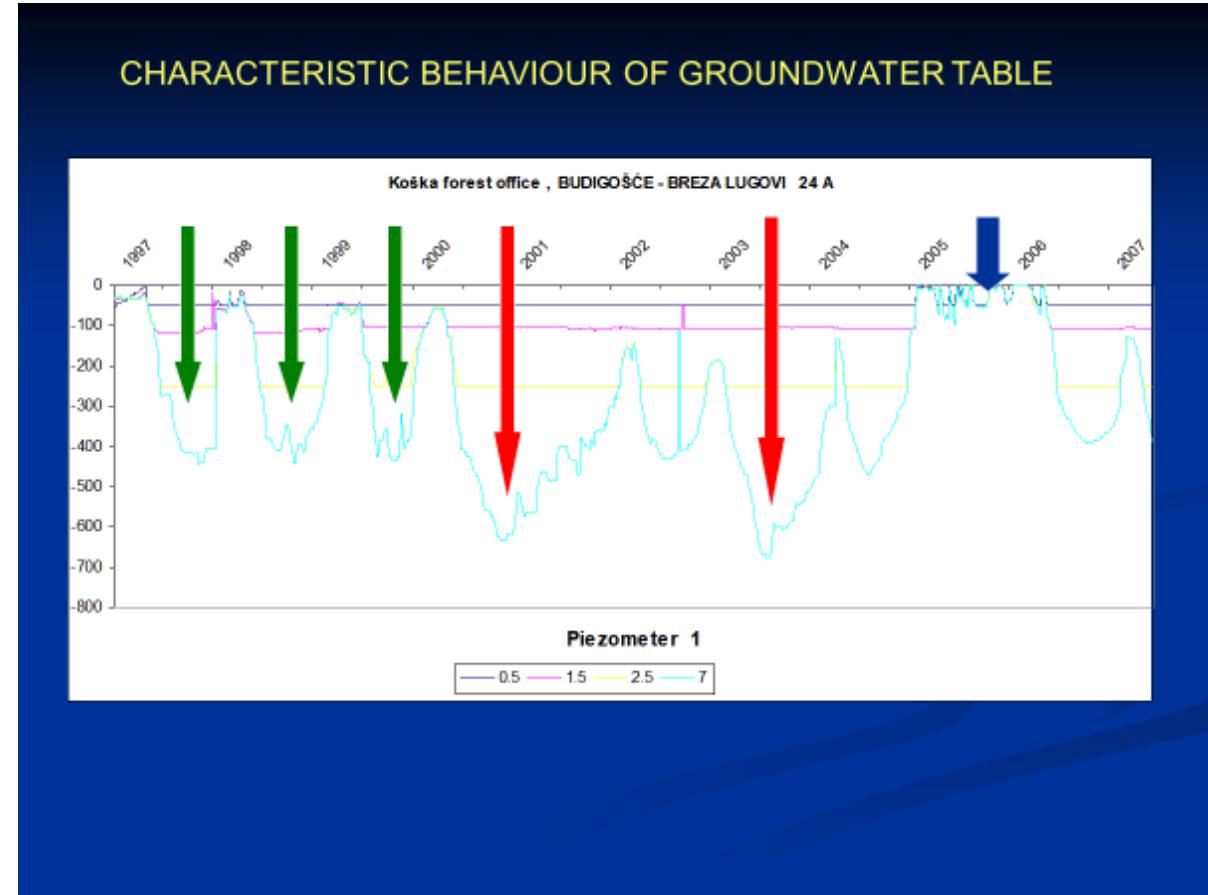
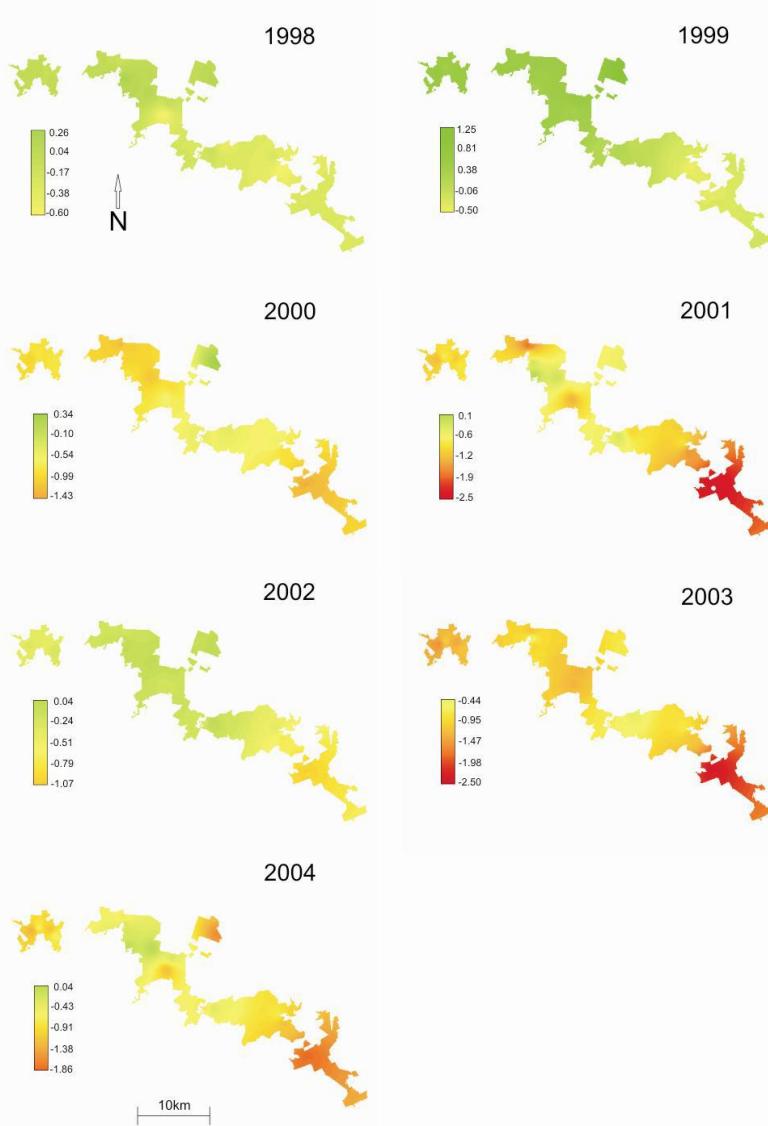
# Prekogranični sustav monitoringa podzemnih voda i WEB GIS

Ivan Pilaš

Hrvatski šumarski institut, Jastrebarsko

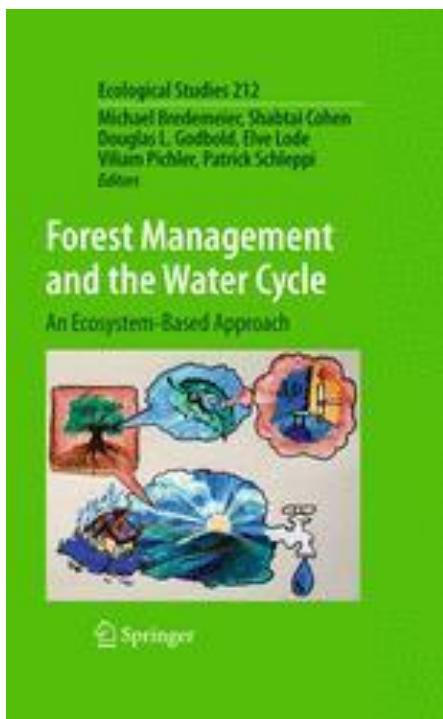


**Motiv projekta – Klimatske promjene u Slavoniji i Baranji, naglo sniženje podzemnih voda nakon ekstremno vrućih i suhih godina 2000 i 2003, ekstremno visoki vodostaji 2005. i 2006., opći trend opadanja vodostaja (Prvi put opažano na podacima piezometara UŠP Našice)**



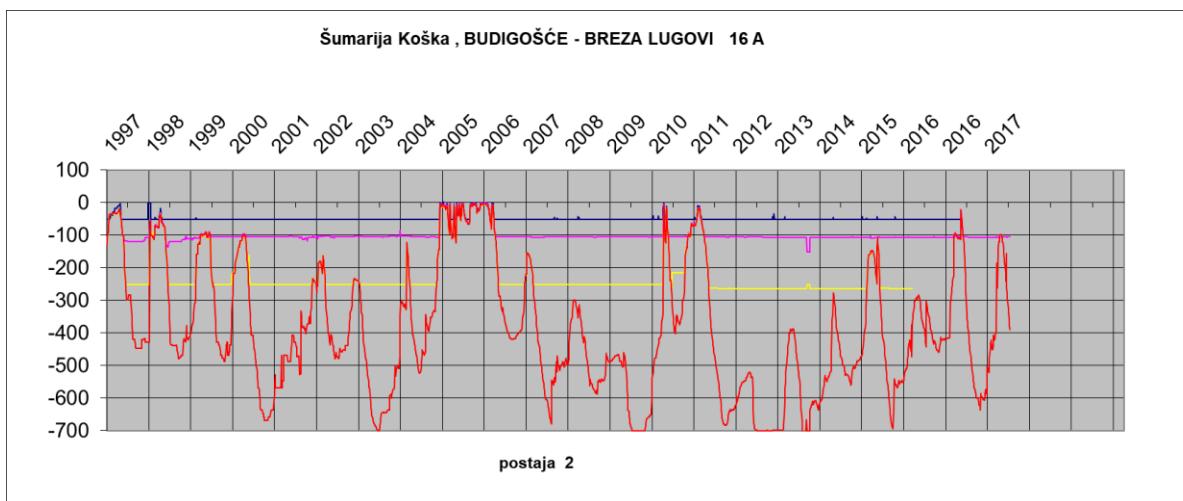
Opažanja prezentirana na IUFRO konferenciji u Pekingu, 2007. god.:

- International forest eco-hydrological Workshop on Water Management through Forest Management CAF (Chinese Academy of Forestry), Beijing - IUFRO Division 8.01.04 – Water supply and quality and jointly organized by CAF and the Forest Ecosystems Research Center of Goettingen University, Germany. Pilaš. I. TRENDS AND SEASONALITY OF GROUNDWATER TABLES IN LOWLAND HARDWOOD FORESTS IN CROATIA

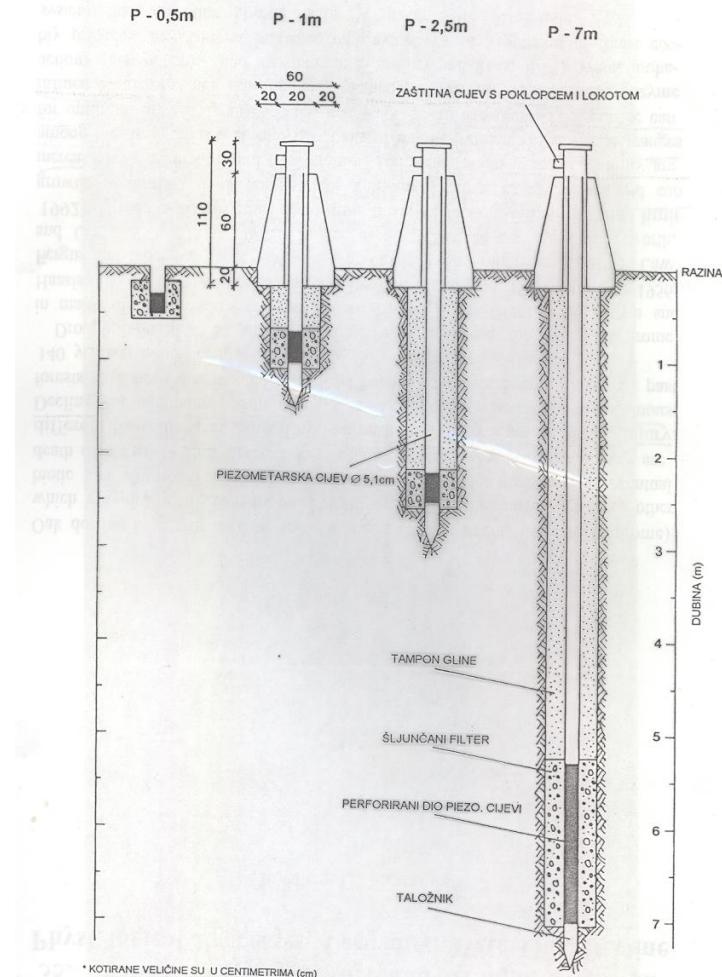


A screenshot of the COST (European Cooperation in Science &amp; Technology) website. The header features the COST logo and navigation links for News, Events, Multimedia, Publications, Contact us, e-COST, and a search bar. Below the header, there are dropdown menus for Who we are, Funding, COST Actions, and Academy. The main content area has a large orange background image of a modern building. The text 'FP0601 - Forest Management and the Water Cycle (FORMAN)' is prominently displayed in white. Below it, a breadcrumb trail shows 'Home &gt; Browse Actions &gt; Forest Management and the Water Cycle (FORMAN)'. At the bottom left, there are links for the website address (www.forestandwater.eu), downloads, and the team.

# „Stari“ sustav praćenja podzemnih voda (fućka, vrpca i motritelj, dva puta na tjedan)



SKICA BATERIJE PIEZOMETARA NA JEDNOJ VODOMJERNOJ LOKACIJI  
(STACIONARU) U NIZINSKIM ŠUMAMA U.Š. NAŠICE (1994)

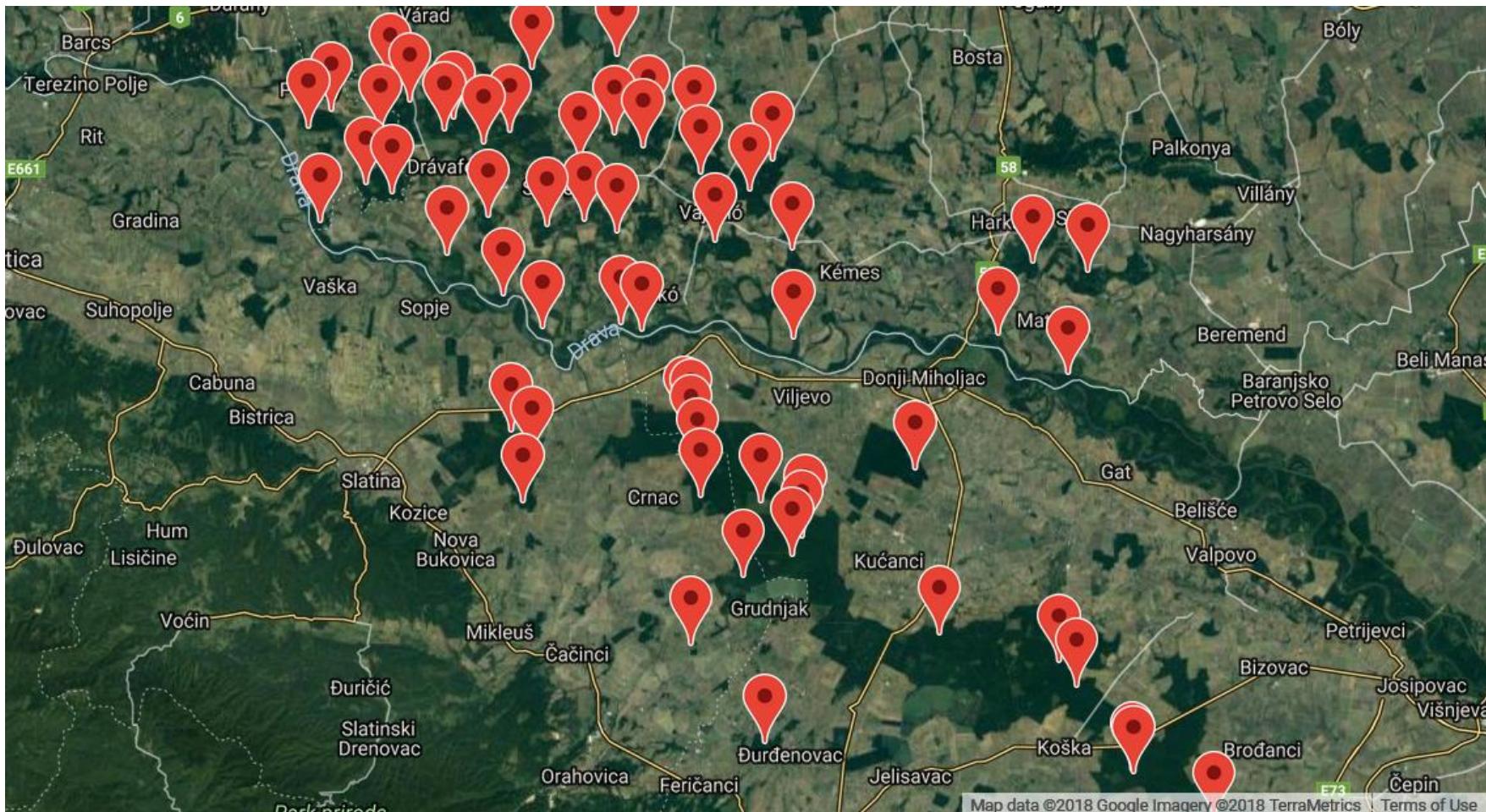


## Ideja i preuvjeti za novi sustav praćenja – „Oak protection” Uprava šuma Podružnica Našice i Mecsekerdő Zrt. Pécs

- automatizirani sustav praćenja, smanjenje terenskih obilazaka (redukcija troškova), povećanje pouzdanosti i višegodišnja održivost sustava
- dinamični prikaz podataka tijekom sezone (upozorenje na sušu i pojačano sušenje šuma...), nadopuna s klimatskim podacima s meteo postaja
- priprema za uspostavu aktivnih vodno-retencijskih adaptivnih mjera za umanjenje učinka klimatskih promjena

# Ostvareni ciljevi INTERREG Oak protection projekta:

I) Uspostava prekograničnog automatiziranog sustava praćenja podzemnih voda  
**(Uspostavljeni 60 postaja, 38 u Mađarskoj, 22 u Hrvatskoj)**

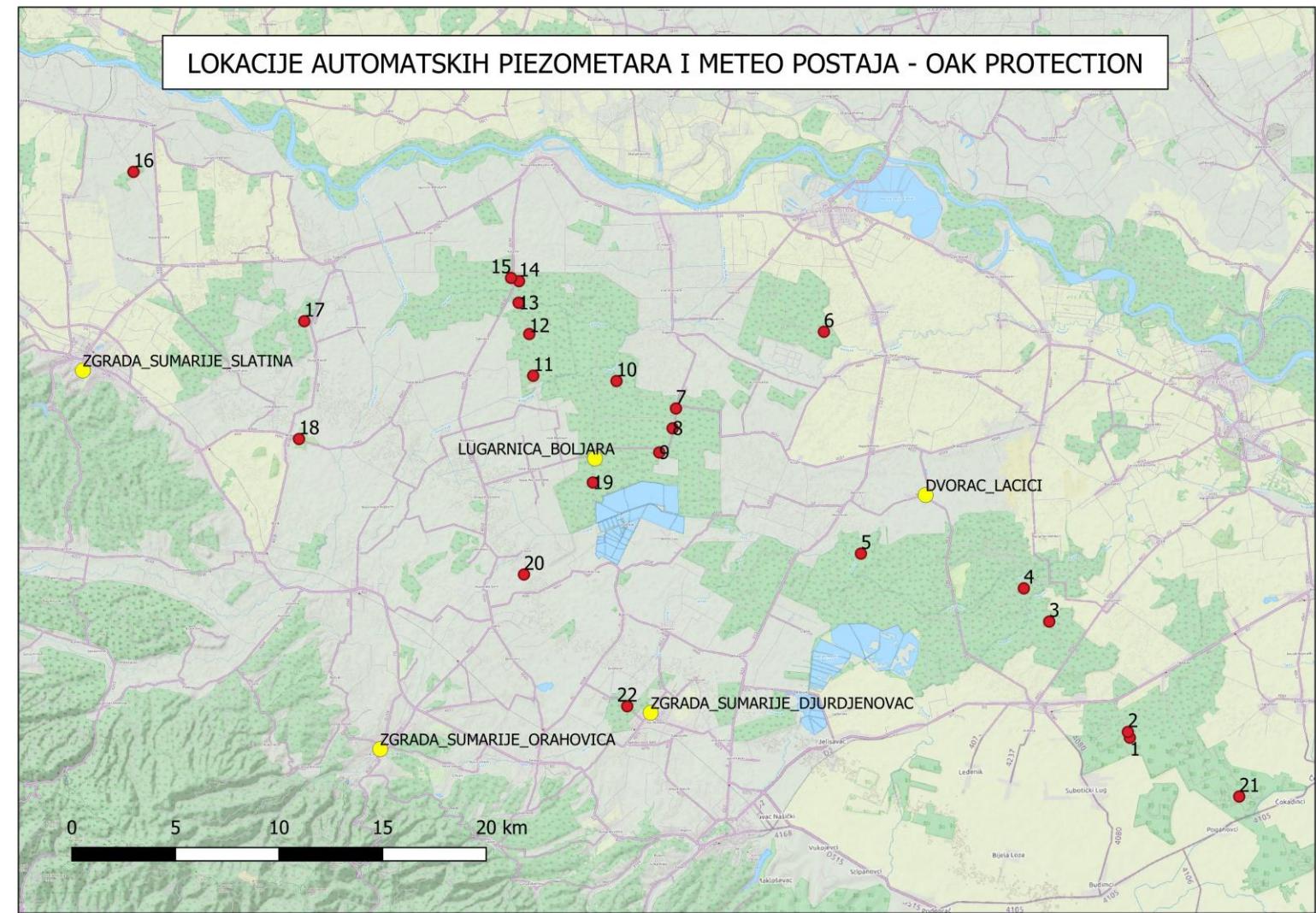




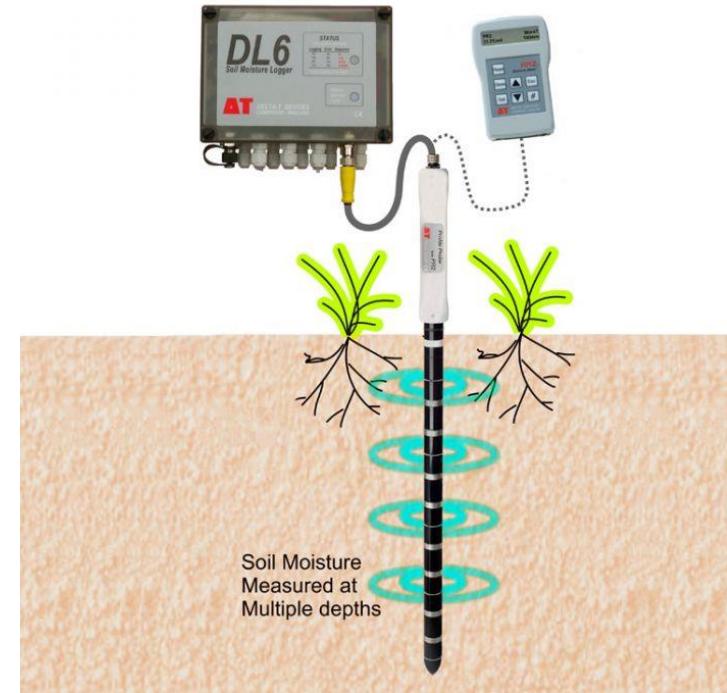
**Eijkelkamp**  
Soil & Water



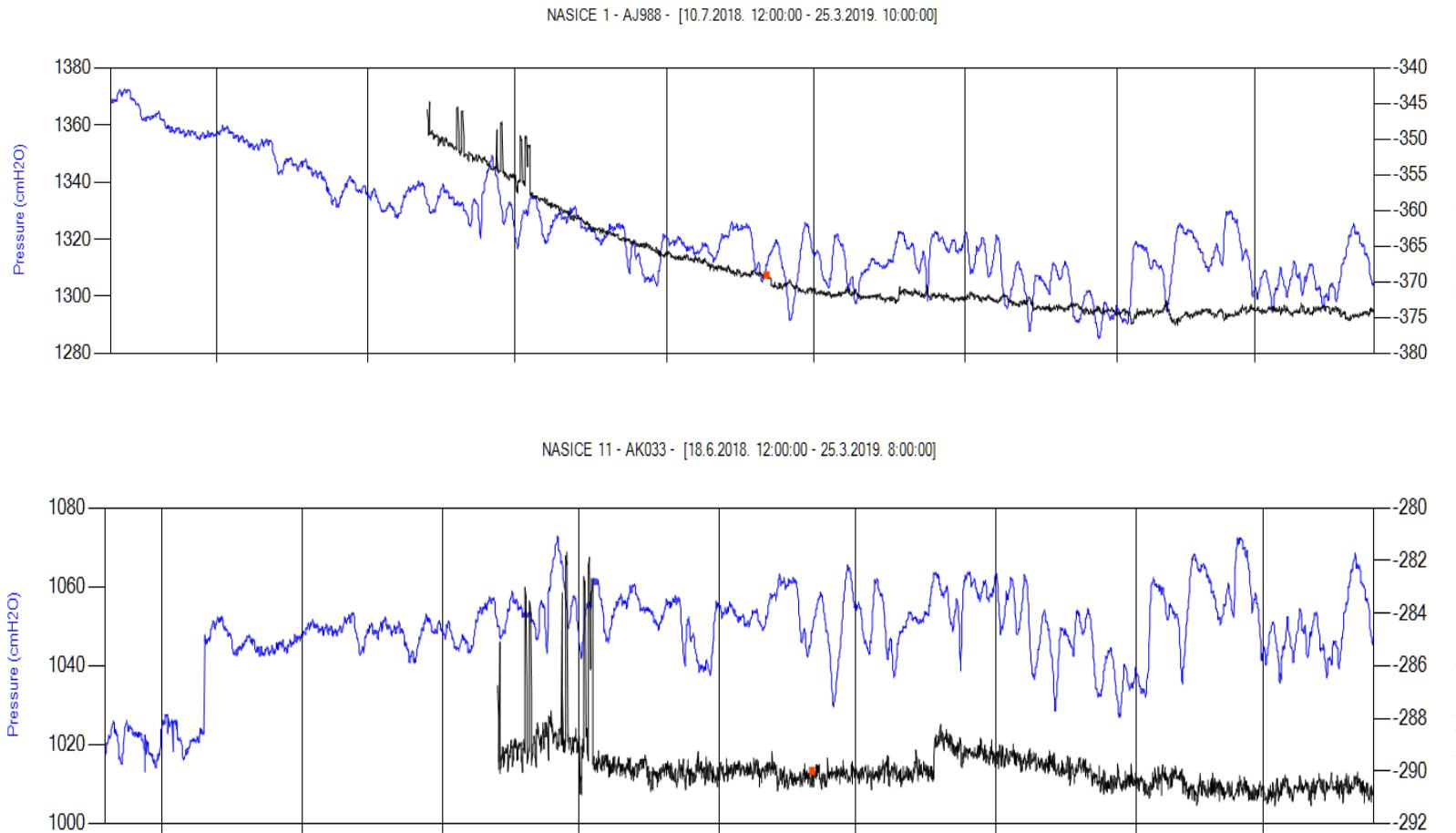
## II) Uspostava 5 automatskih meteo postaja u Hrvatskoj, 2 u Mađarskoj



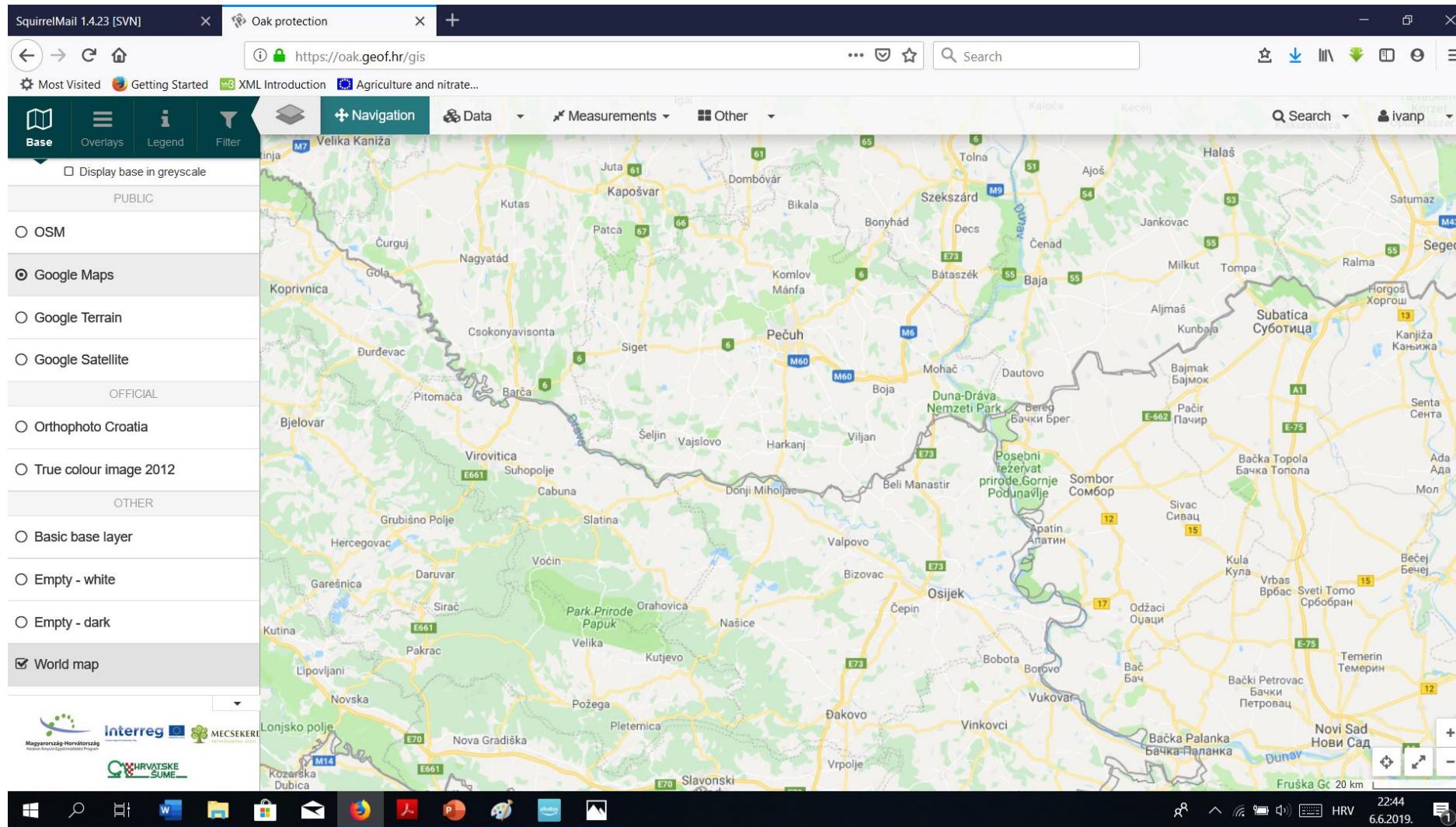
### III) Uređaj za analizu kvalitete vode na terenu i sonda za praćenje vlažnosti tla



# Prvi rezultati automatiziranog sustava praćenja podzemnih voda !!!



# WEB – GIS „Oak Protection” <https://oak.geof.hr/gis>



SquirrelMail 1.4.23 [SVN] × Oak protection × +

https://oak.geof.hr/gis

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Base Overlays Legend Filter

Navigation Data Measurements Other

Search ivanp

Display base in greyscale

PUBLIC

OSM

Google Maps

Google Terrain

Google Satellite

OFFICIAL

Orthophoto Croatia

True colour image 2012

OTHER

Basic base layer

Empty - white

Empty - dark

World map

Magyarország-Horvátország Interreg MECSEKERELT termelékesítés után

Hrvatske SUME

5 km

+

-

22:46 HRV 6.6.2019.

The screenshot shows a web-based GIS application for oak protection mapping. The main view is an aerial orthophoto of a rural landscape with numerous agricultural fields. A large, irregular dark green polygon is overlaid on the map, representing the area of interest for oak protection. The map interface includes a legend bar on the left with options like 'Base', 'Overlays', 'Legend', and 'Filter'. Below the legend is a list of base map sources, with 'Orthophoto Croatia' selected. The right side of the interface has a search bar and user authentication information ('ivanp'). The bottom of the screen shows the Windows taskbar with various pinned icons and the system clock.

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Display base in greyscale

## PUBLIC

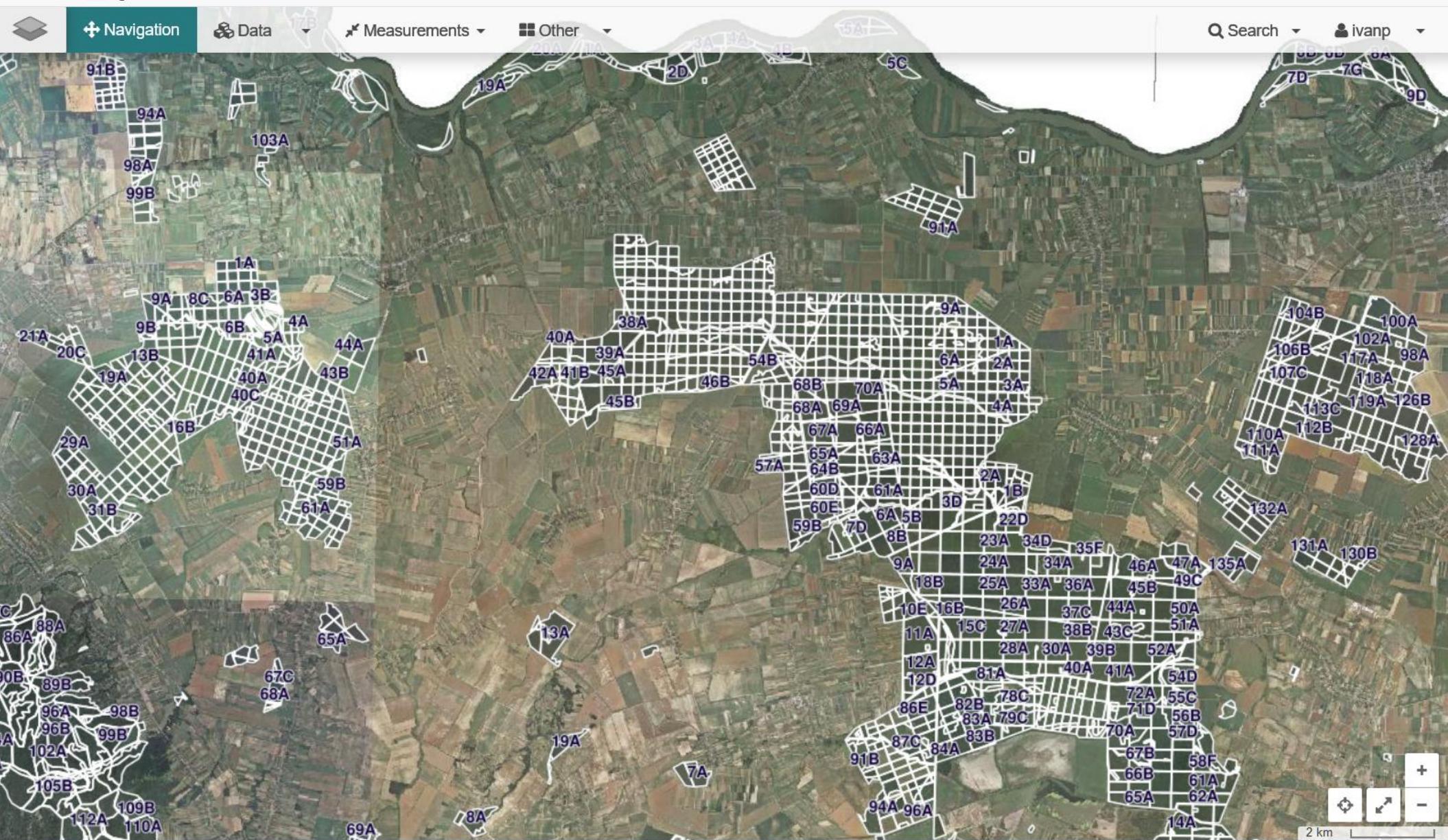
- OSM
  - Google Maps

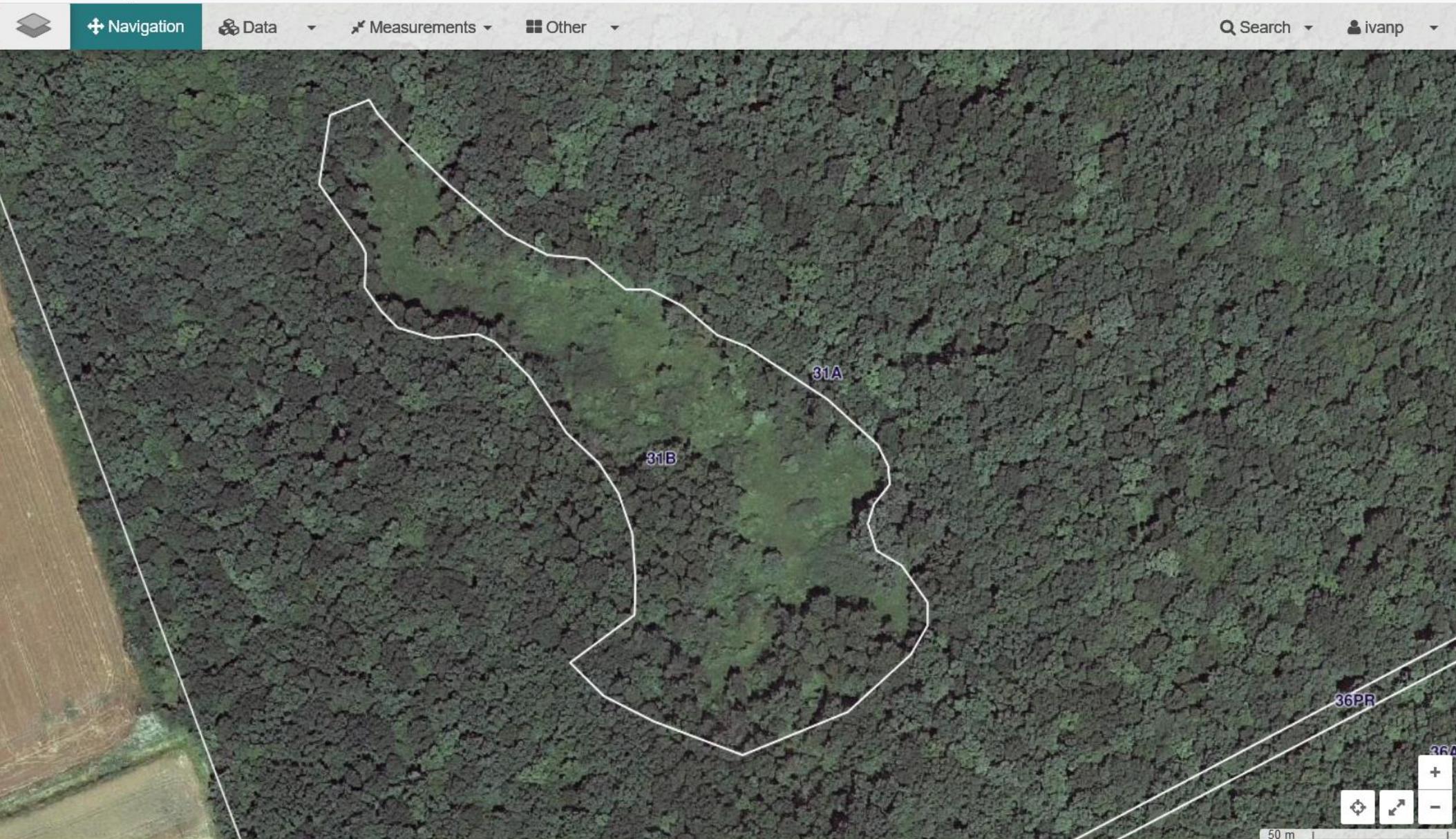
- Google Satellite

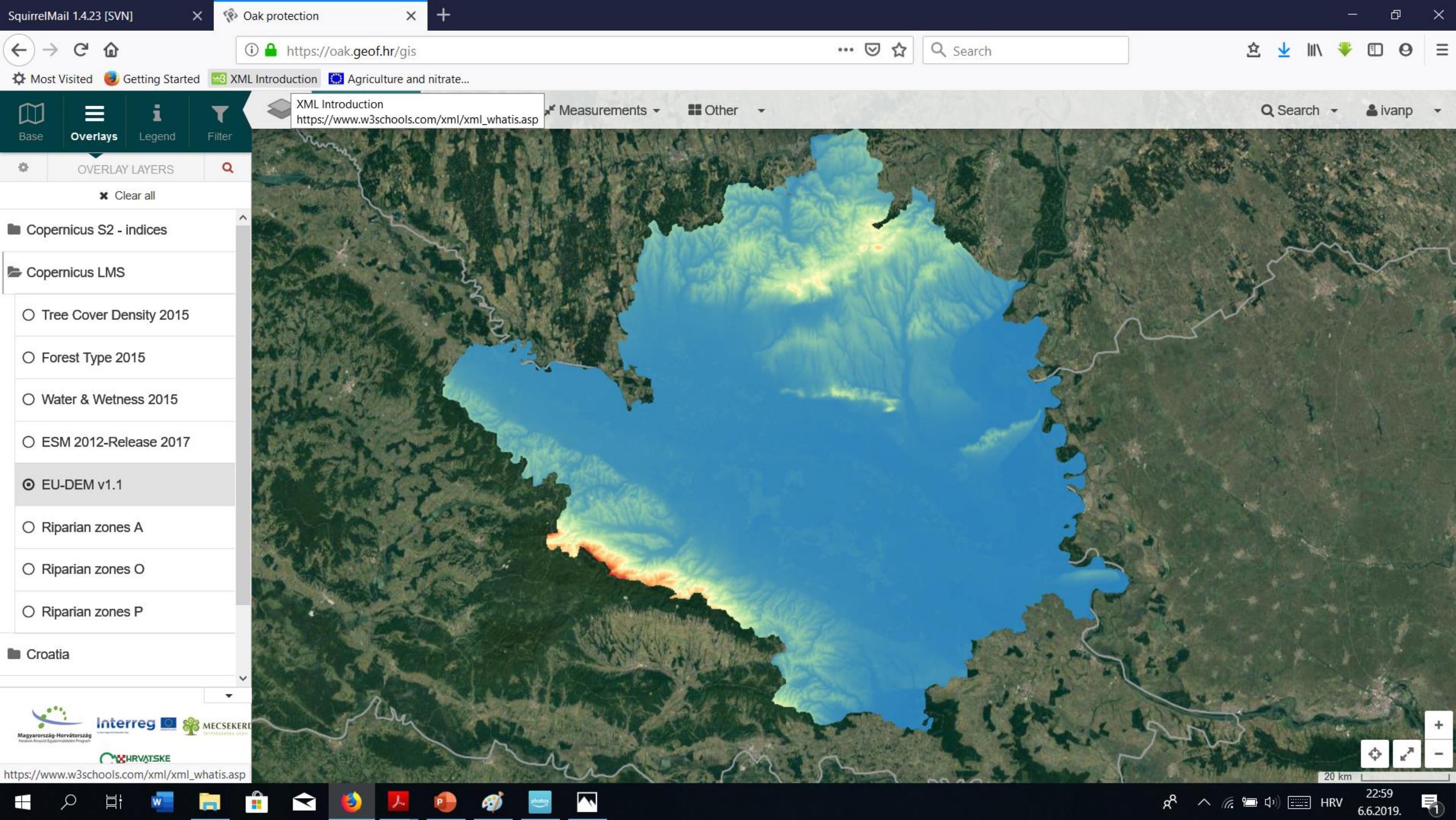
- True colour image 2012
  - OTHER
  - Basic base layer
  - Empty - white

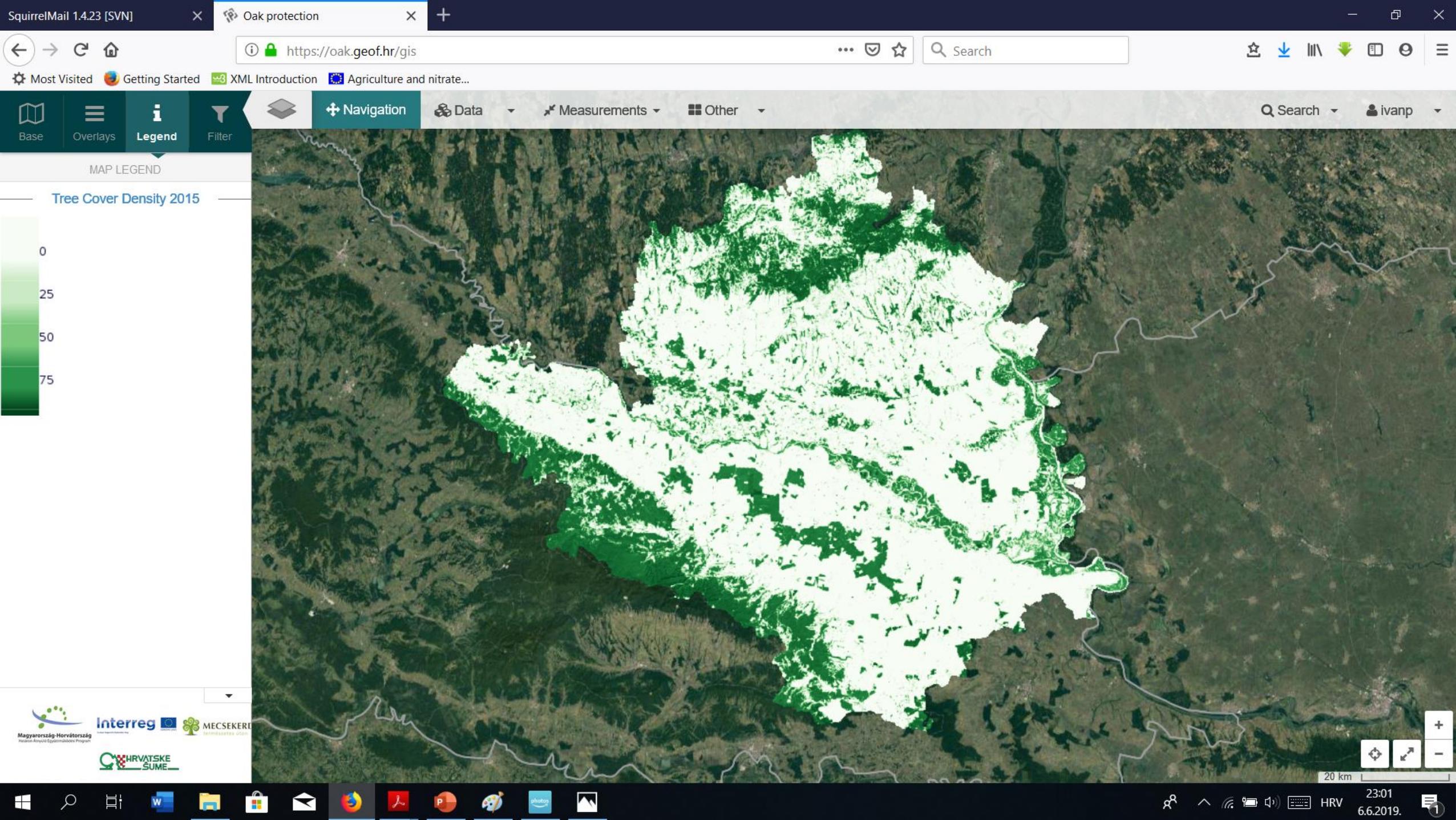
 Interreg  
Európa-szövetség program  
 MECSEKER  
Termeszeti úton

HRVATSKE ŠUME









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https://oak.geof.hr/gis

... ⌂ ⌂ ⌂ Search

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Base Overlays Legend Filter

Navigation Data Measurements Other

Search ivanp

MAP LEGEND

Water & Wetness 2015

No water/no wet area

Permanent water

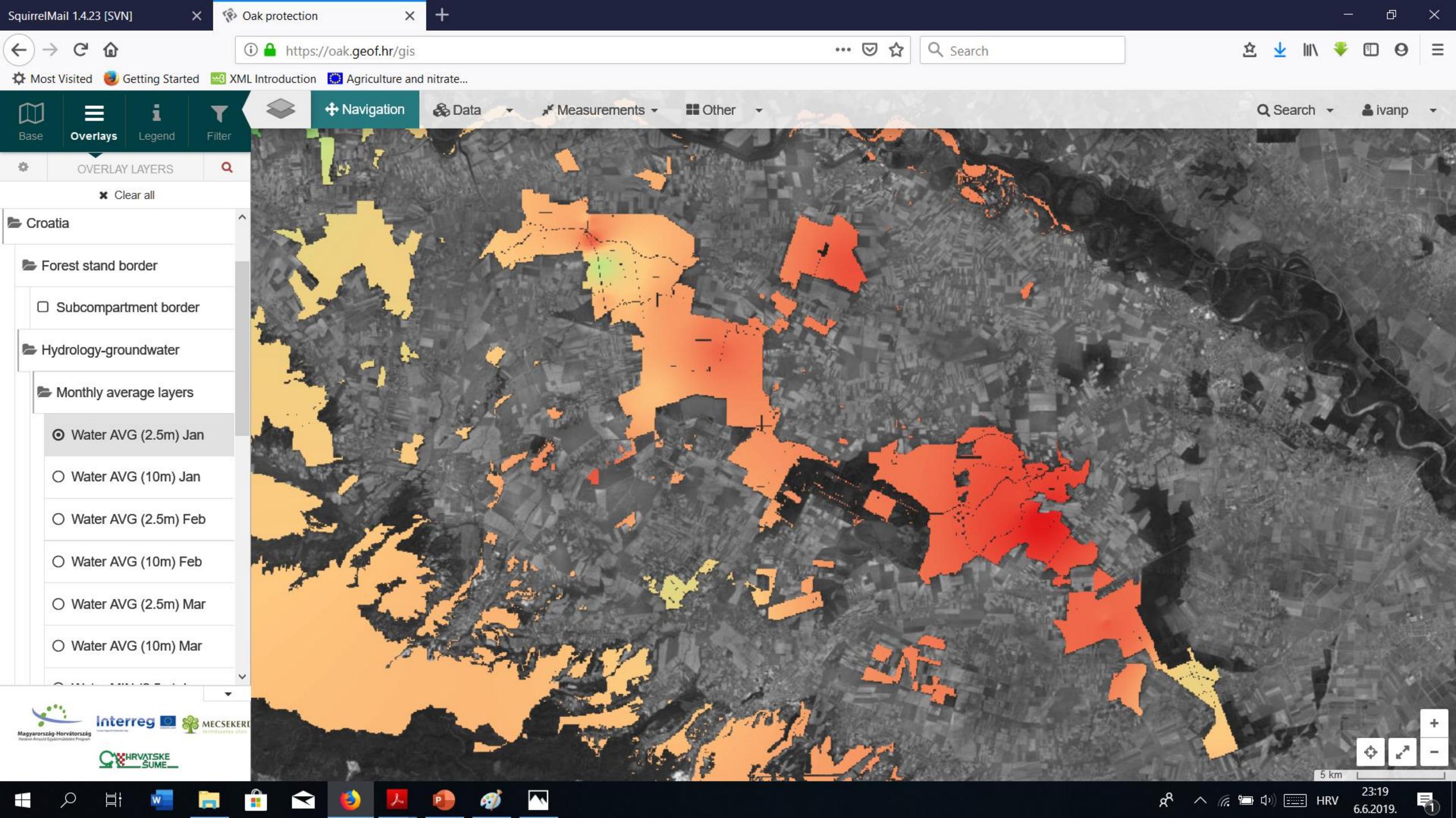
Temporary water

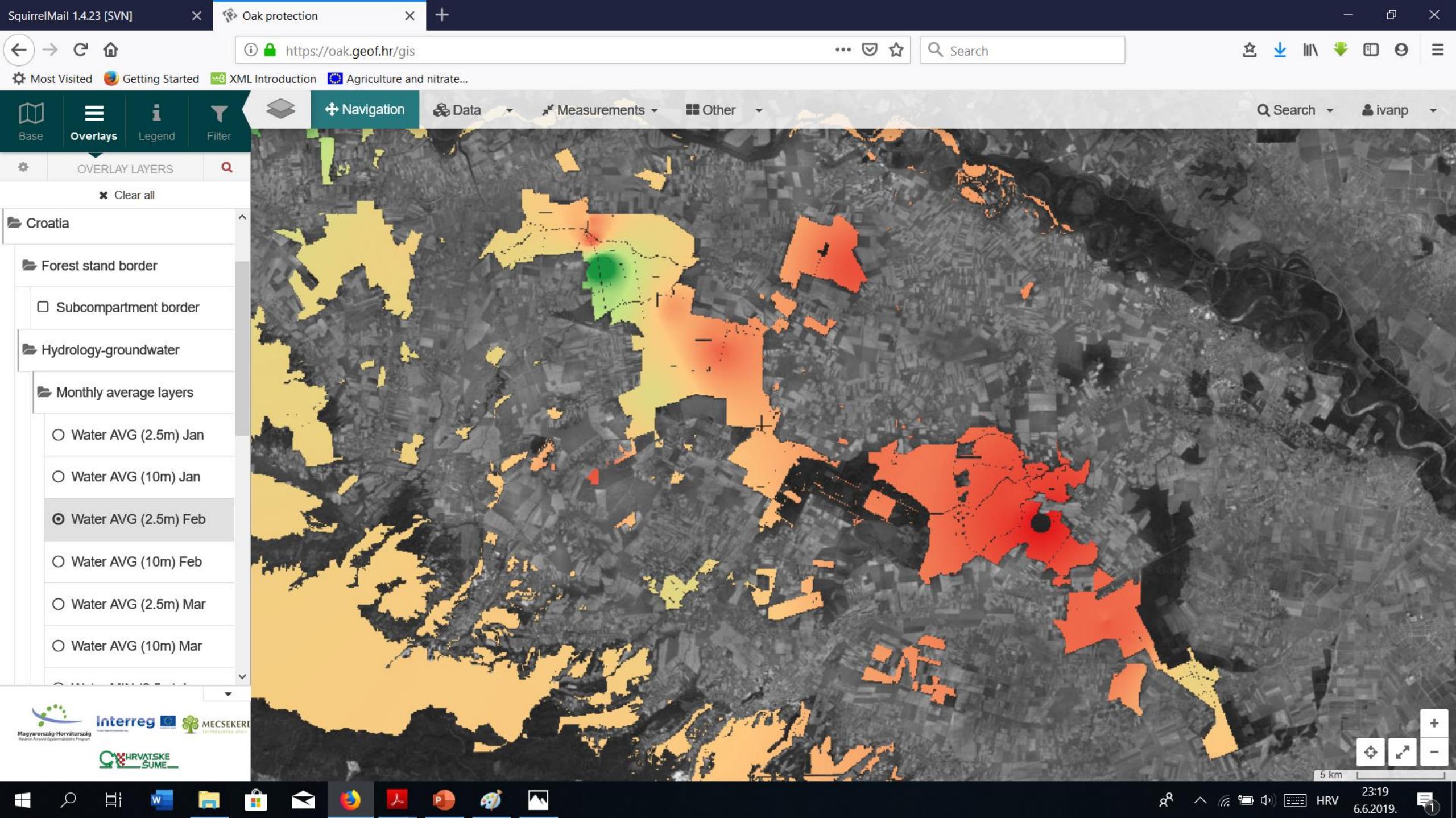
Permanently wet area (wetness)

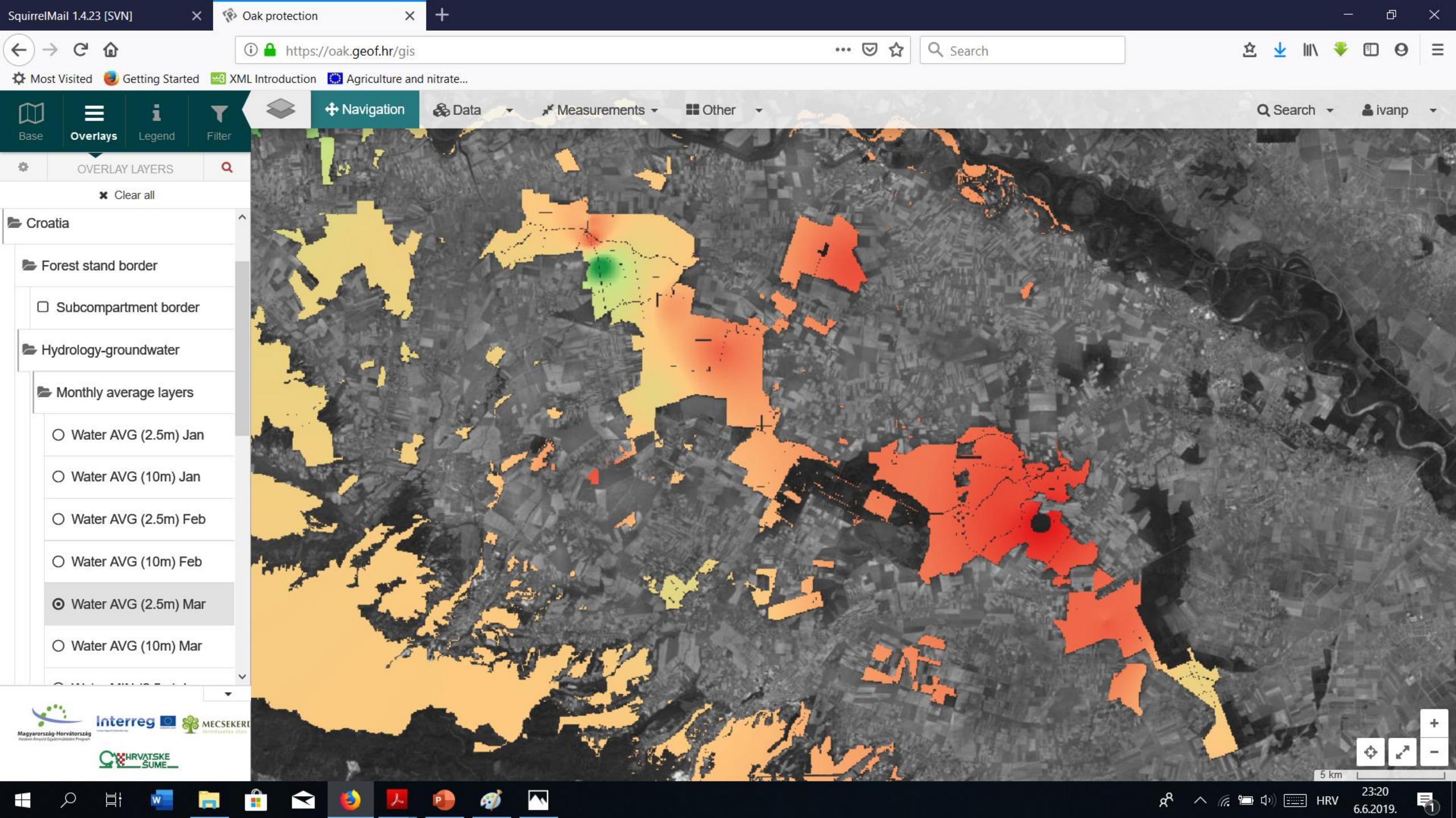
Magyarország-Horvátország Interreg MECSEKERÉTER termelékesítés után HRVATSKE SUME

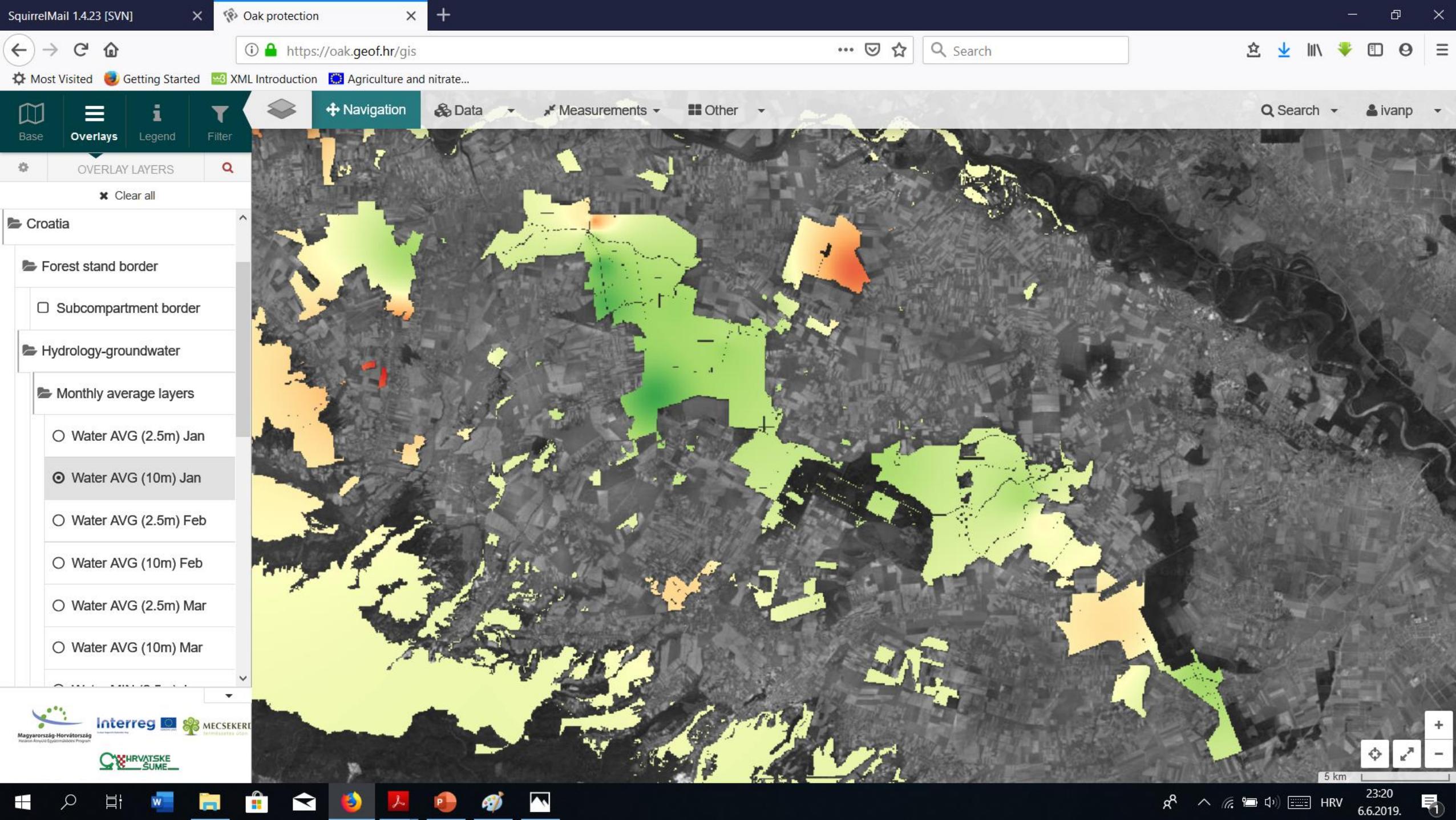
20 km 23:01 6.6.2019.

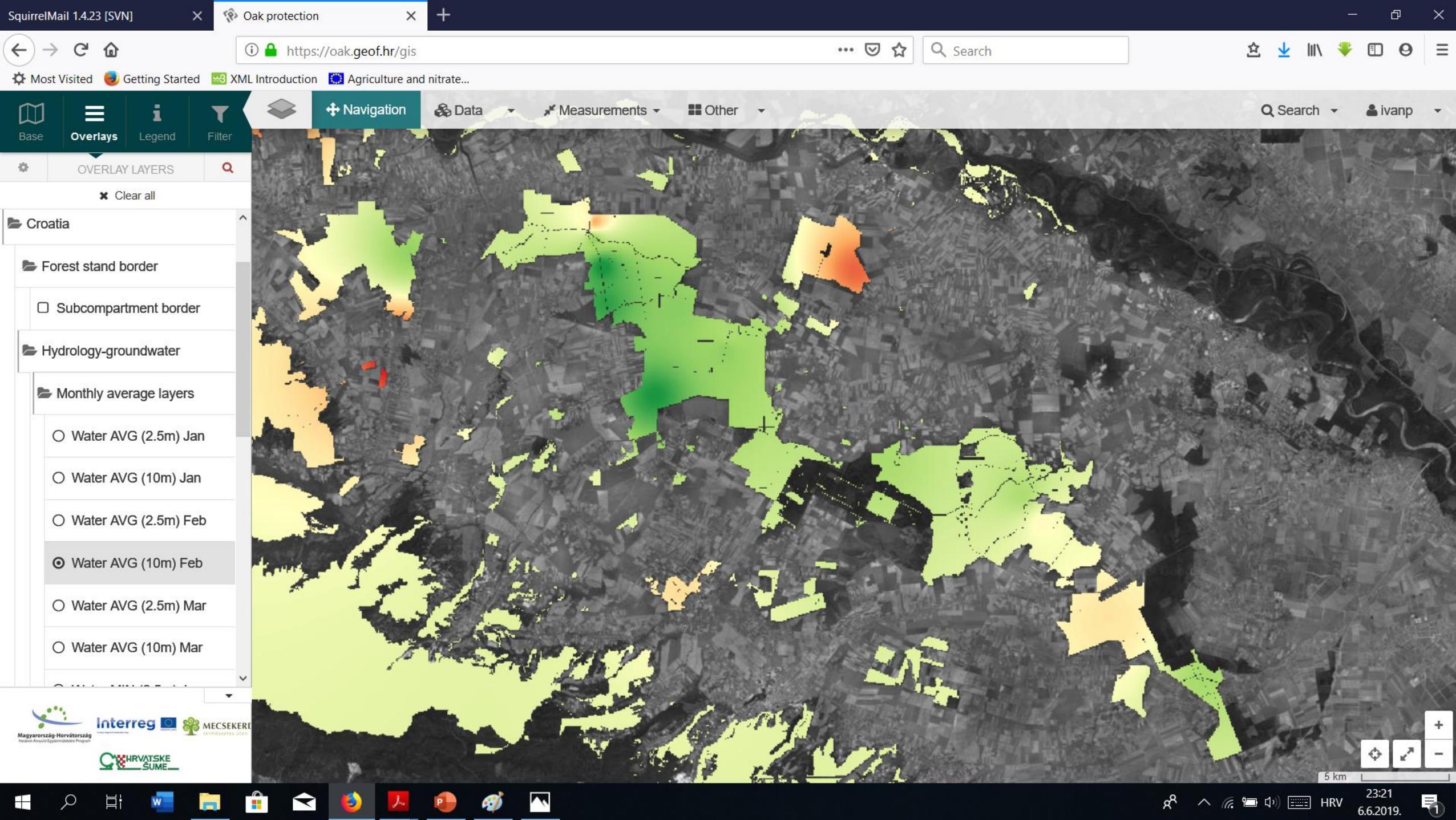
A detailed description of the map content: The map displays a geographical area with a complex network of water bodies. A large, light-gray polygon covers the central and southern parts of the map, representing 'No water/no wet area'. This is bordered by a dark blue polygon representing 'Permanent water', which follows the coastline and some inland areas. Within the central light-gray area, there are numerous smaller, irregularly shaped medium-blue polygons representing 'Temporary water'. Scattered throughout the map are small, isolated patches of light blue, representing 'Permanently wet area (wetness)'. The map also features several white roads and boundaries. In the bottom left corner, there are logos for 'Magyarország-Horvátország' (Hungary-Croatia), 'Interreg', 'MECSEKERÉTER termelékesítés után', and 'HRVATSKE SUME'. The bottom right corner shows a scale bar indicating 20 km and a timestamp of 23:01 on 6.6.2019. The top navigation bar includes links for 'Navigation', 'Data', 'Measurements', and 'Other', along with a search bar and user authentication information.

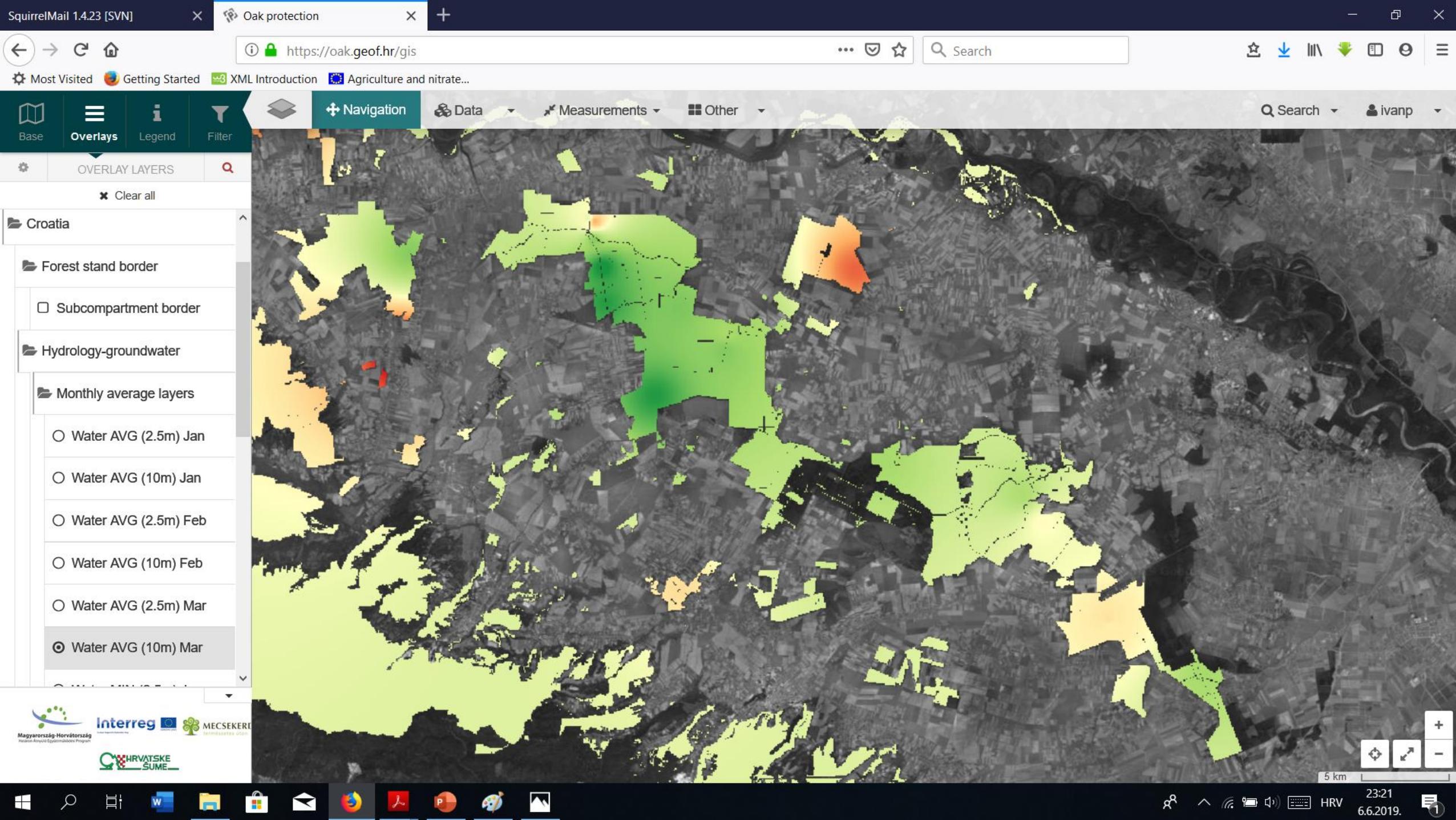


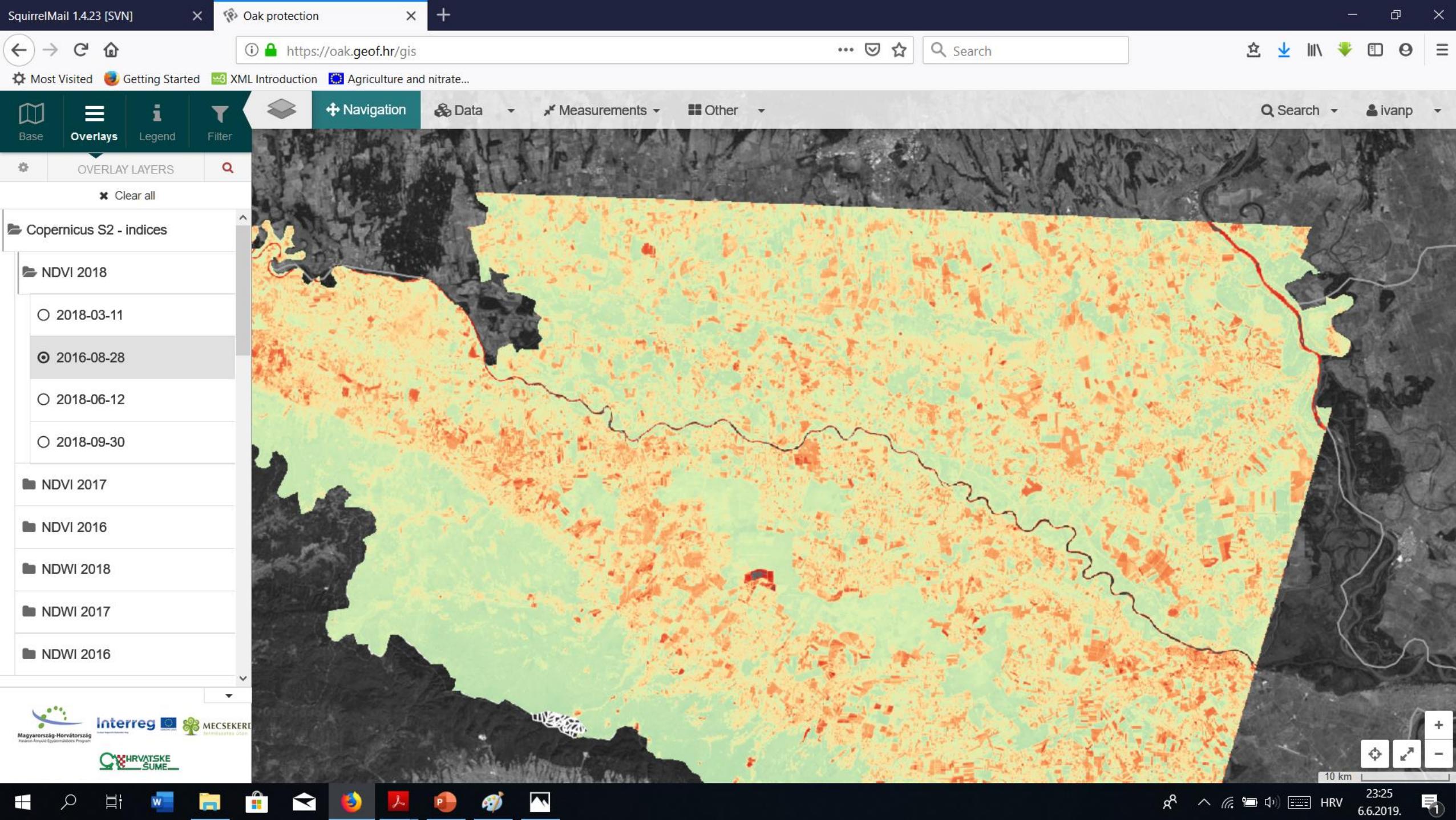


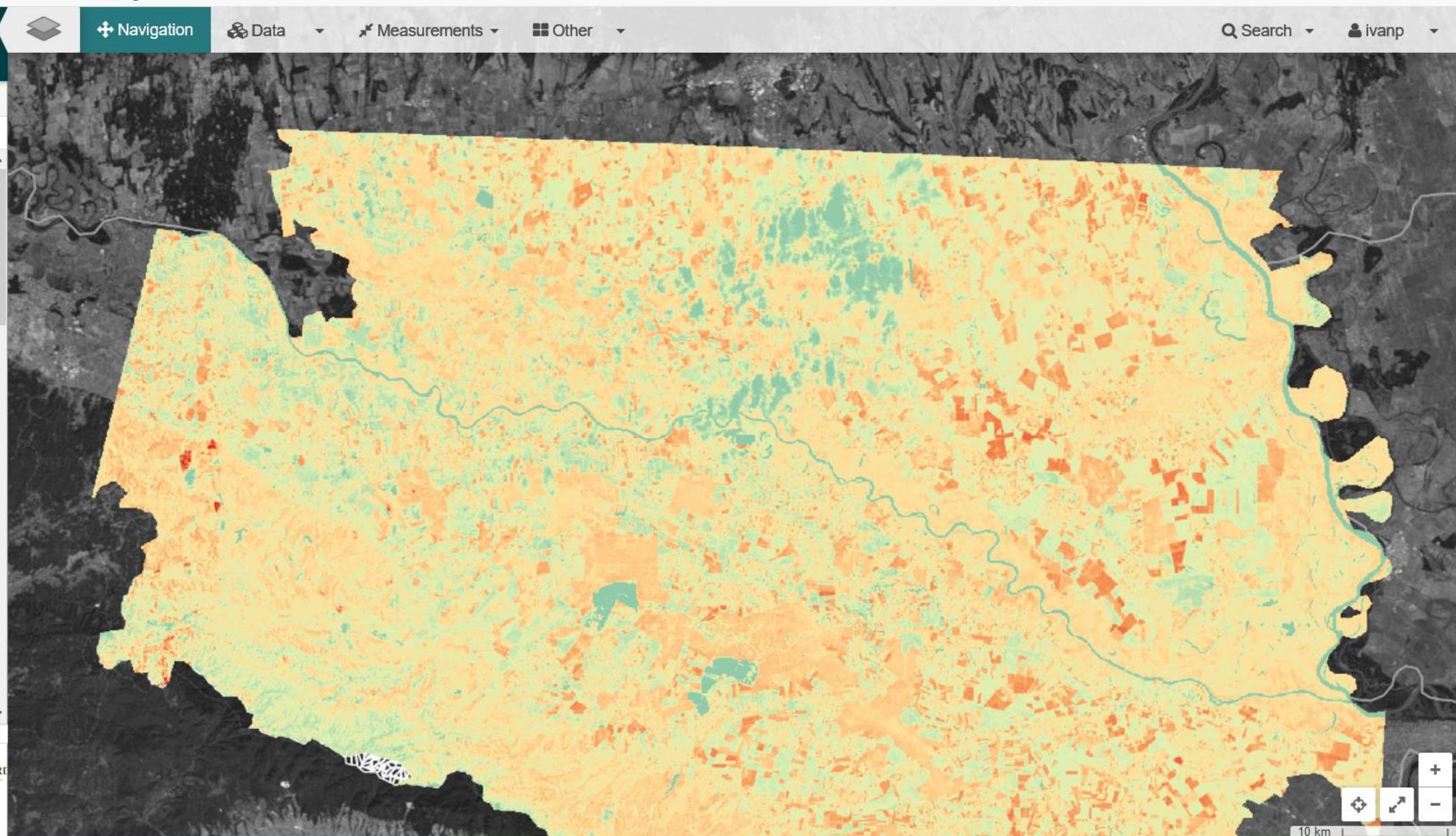


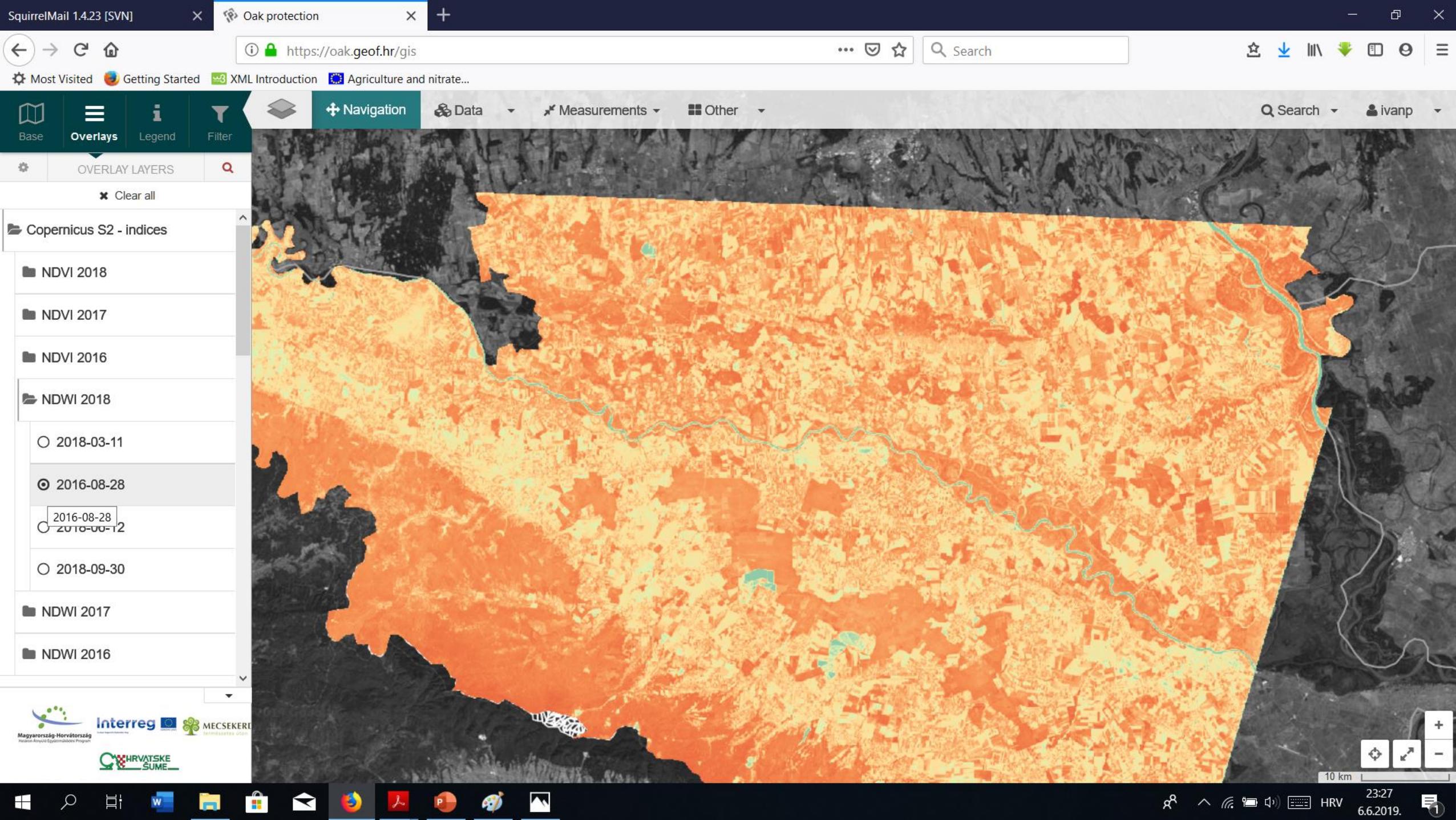


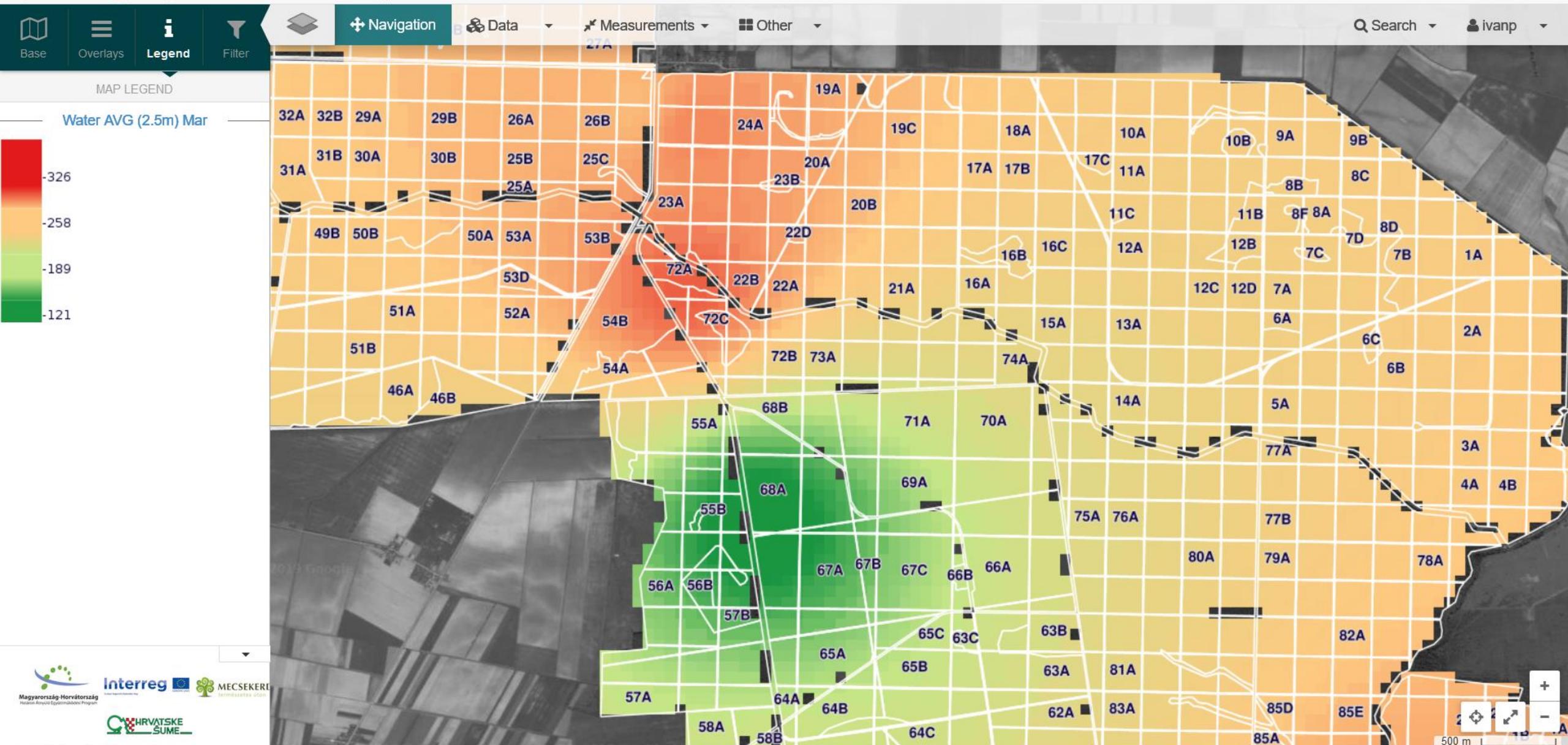




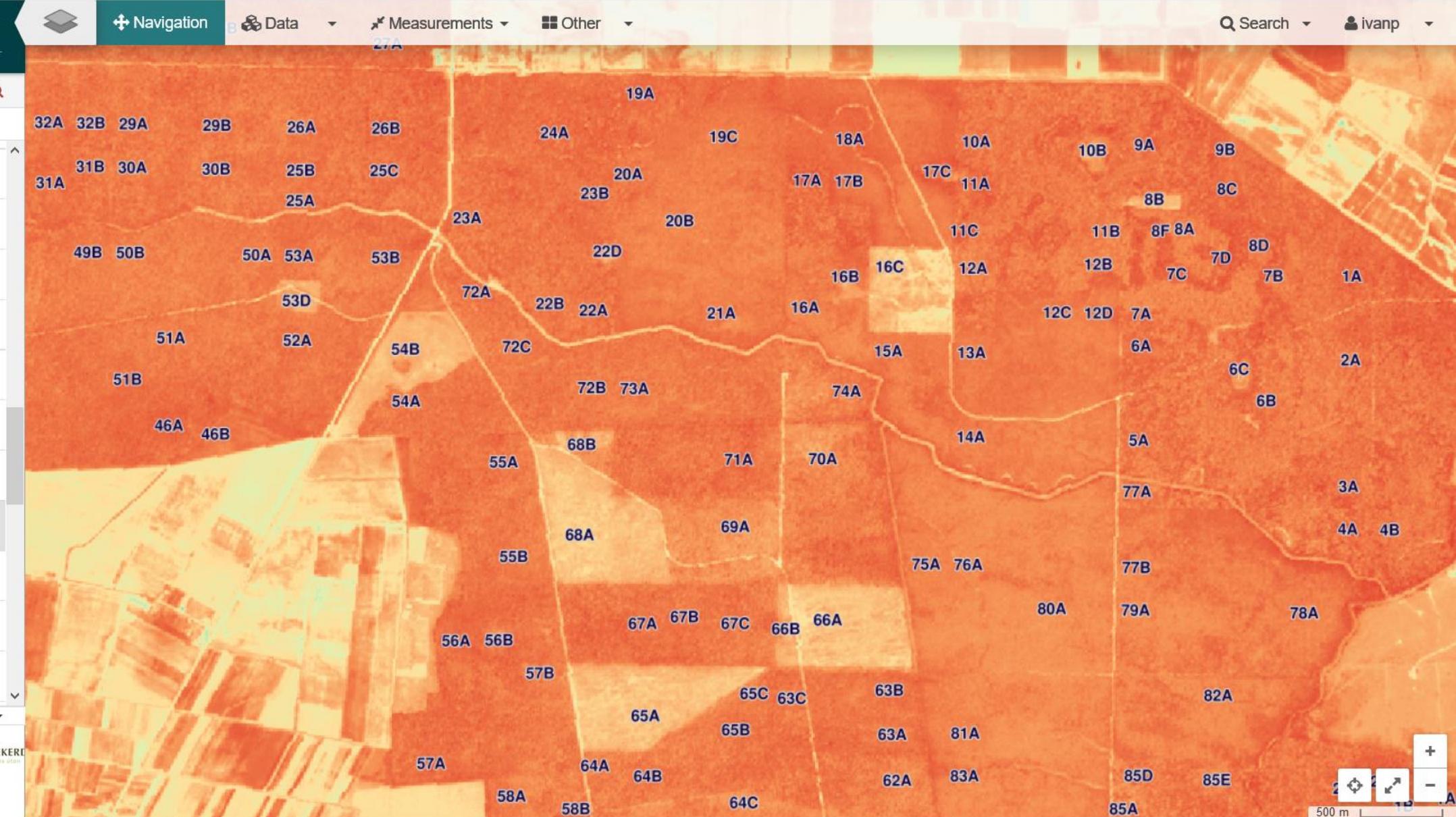


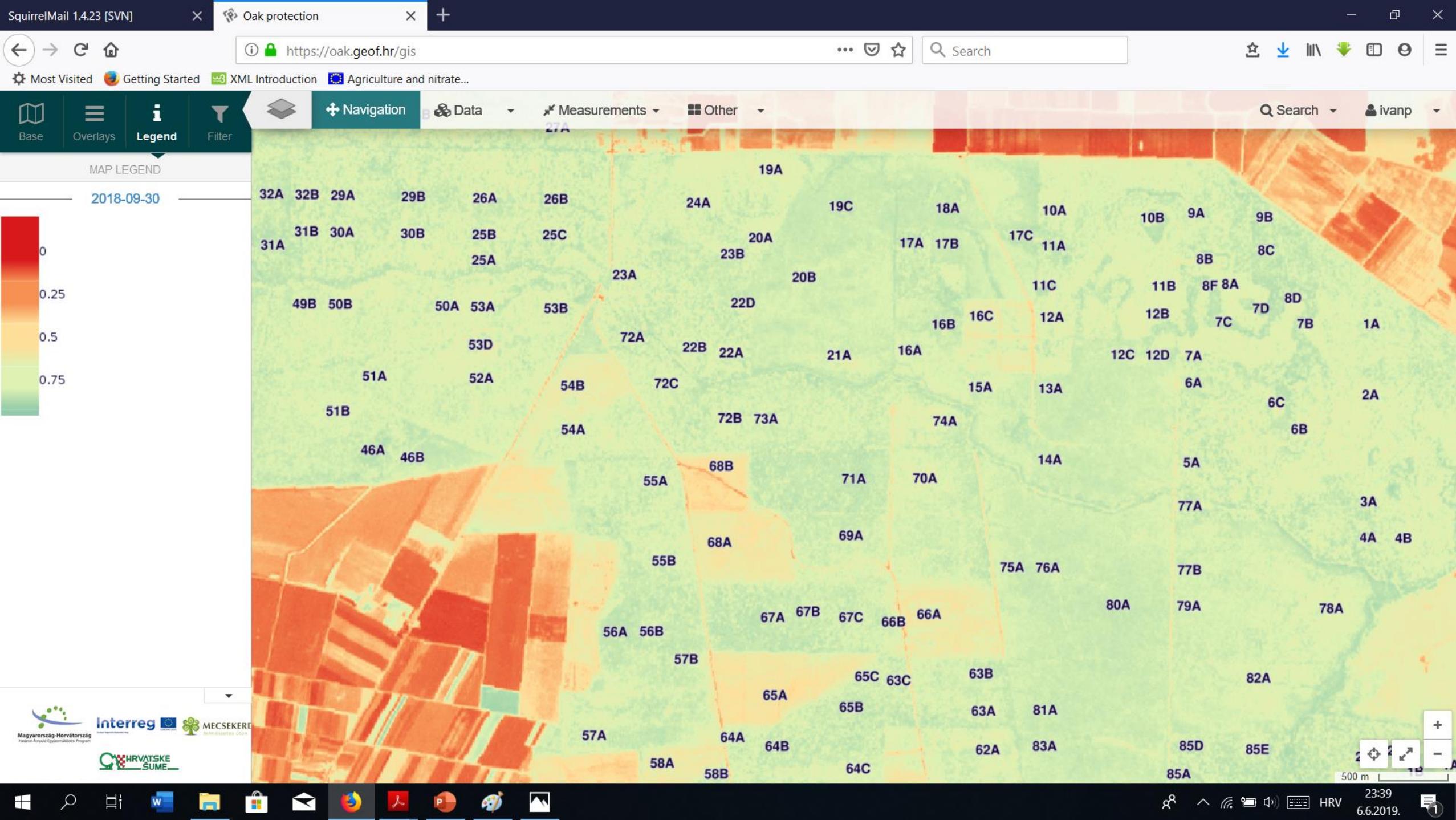












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https://oak.geof.hr/gis

... ⌂ ⌂ ⌂ Search

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Base Overlays Legend Filter

OVERLAY LAYERS

- ESM 2012-Release 2017
- EU-DEM v1.1
- Riparian zones A
- Riparian zones O
- Riparian zones P

Croatia

- Forest stand border
- Subcompartment border
- Hydrology-groundwater
- Monthly average layers
  - Water AVG (2.5m) Jan
  - Water AVG (10m) Jan

Magyarország-Horvátország Interreg MECSEKERELT termelékesítés után

HRV 6.6.2019. 23:41

Navigation Data Measurements Other

Search ivanp

Search

5 km

+ -

Navigation Data Measurements Other

Search ivanp

Search

5 km

+ -

The map displays a satellite view of a rural landscape with a grid pattern of fields. Numerous blue water drop icons, each containing a small tree symbol, are scattered across the map, primarily concentrated in the center and right side. These icons represent specific locations where oak protection measures have been applied or monitored. The background shows various shades of gray and black, representing different types of terrain and vegetation.

SquirrelMail 1.4.23 [SVN] × Oak protection × +

https://oak.geof.hr/gis

... ⌂ ⌂ ⌂ Search

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Base Overlays Legend Filter

Navigation Data Measurements Other

Search ivanp

Display base in greyscale

PUBLIC

OSM

Google Maps

Google Terrain

Google Satellite

Orthophoto Croatia

True colour image 2012

OFFICIAL

Basic base layer

Empty - white

Empty - dark

World map

Magyarország-Horvátország Interreg MECSEKERÉD HRV 6.6.2019. 23:44 100 km

The map displays a satellite view of the Balkan Peninsula, focusing on the Adriatic Sea and the landmasses to its north. A prominent blue polygon, representing the 'Oak protection' area, is centered over the northern coastal region of Croatia. The map also includes the coastlines of Montenegro and the northern part of Serbia. Major rivers are depicted as blue lines winding through the terrain. Political boundaries are shown as thin white lines. The map interface includes a navigation bar at the top with tabs for 'Navigation', 'Data', 'Measurements', and 'Other'. On the left, there is a sidebar with various base map options like OSM, Google Maps, and Google Satellite, along with other layers and overlays. Logos for 'Interreg' and 'MECSEKERÉD' are visible at the bottom left, along with a 'HRV' indicator and a date/time stamp.

Hvala na pažnji!