APPLICATION OF UAV IMAGERY IN ENVIRONMENTAL RESEARCH AT THE UNIVERSITY OF SZEGED

Boudewijn van Leeuwen*, Ferenc Kovács, József Szatmári, László Mucsi, Zalán Tobak

University of Szeged, Department of Geoinformatics, Physical and Environmental Geography

*leeuwen@geo.u-szeged.hu

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Funded by the Horizon 2020 Framework Programme of the European Union

HARMONIOUS
uas for environmental monitoring

Advances in Environmental Monitoring with UAS, Debrecen, Hungary (30th March 2022)

Infrastructure

- Platforms
- Sensors
- Pilots
- Hardver / Software

Applications

- Nature conservation
- Environmental monitoring
- Geomorphology
- Precision agriculture
- Geodesy
- Archeology
- Smart city

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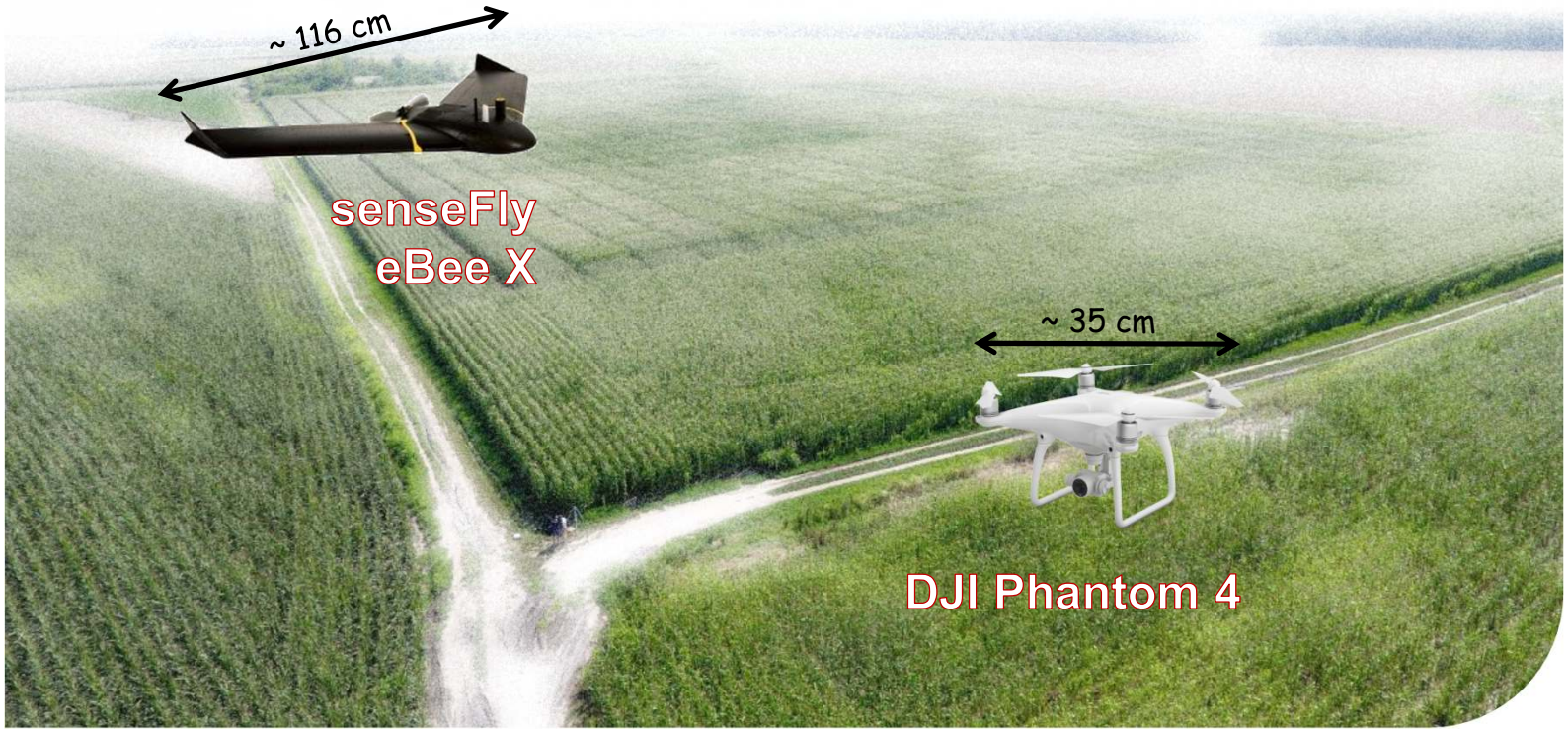
Platforms



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!!! Payload capacity – flight time – flight range !!!

Sensors

- DJI Phantom 4 (FC330)
  - RGB / 12 MP
- senseFly S.O.D.A.
  - RGB / 20 MP
- Parrot Sequoia+
  - RGB / 16 MP + MS (G,R,RE,NIR) / 1.2 MP
- senseFly DuetT
  - RGB / 20 MP + Thermal / 640x512px
- (PhaseOne iXU 150 + DJI Ronin MX gimbal)
  - RGB / 50 MP

Flight planning and navigation

- Drone Deploy (DJI)
- eMotion (eBee X)

  (+post-processing)

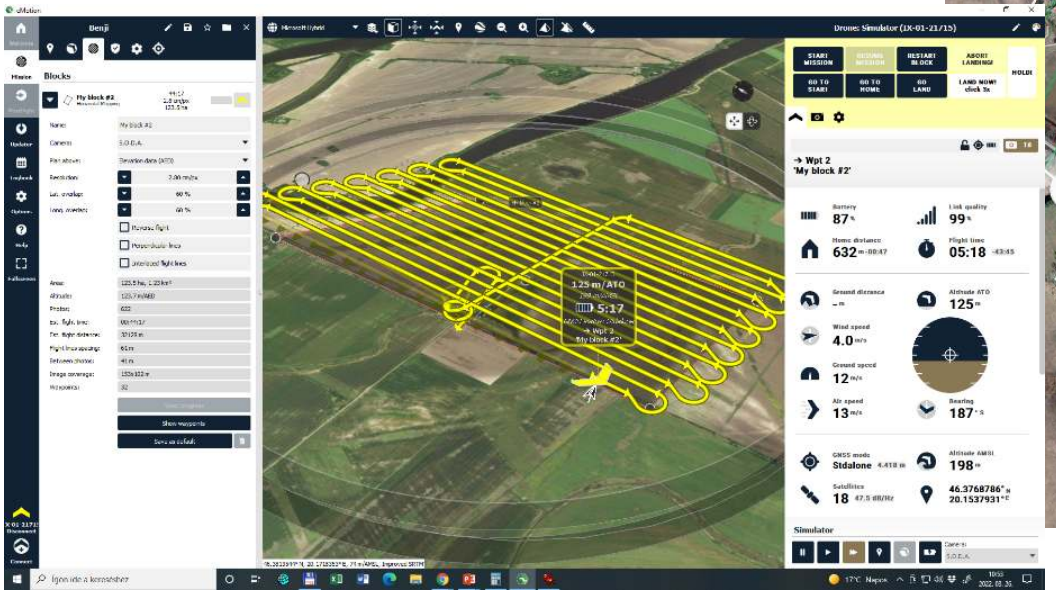
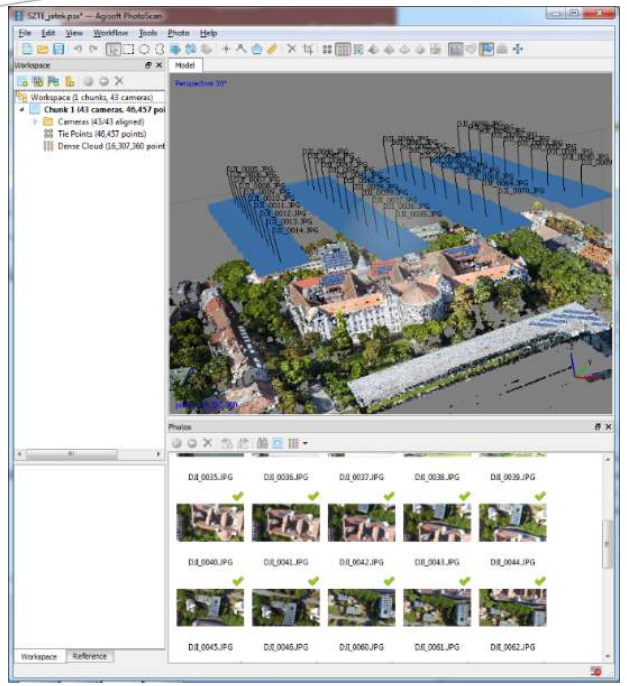
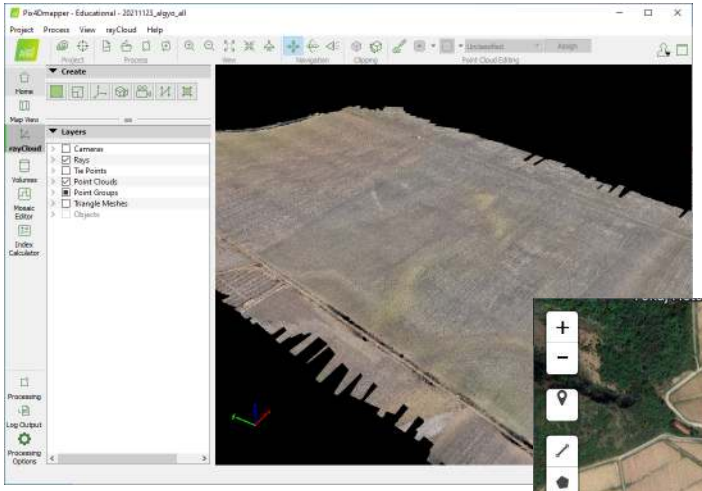


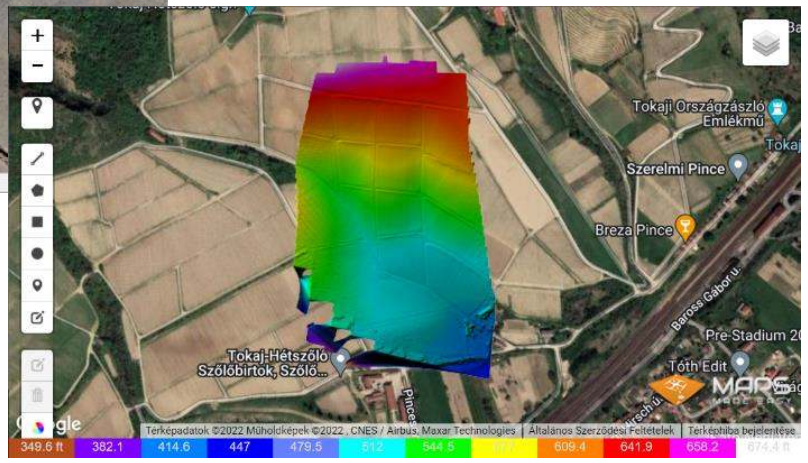
Image processing

- Agisoft Photoscan
- Pix4D
- MapsMadeEasy

- (Drone2Map)
- (WebODM)

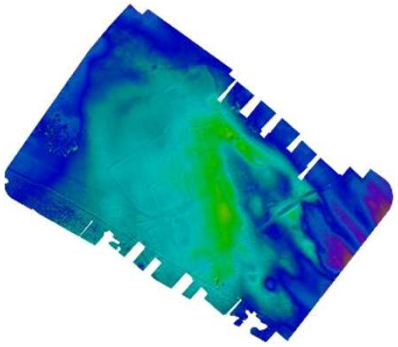


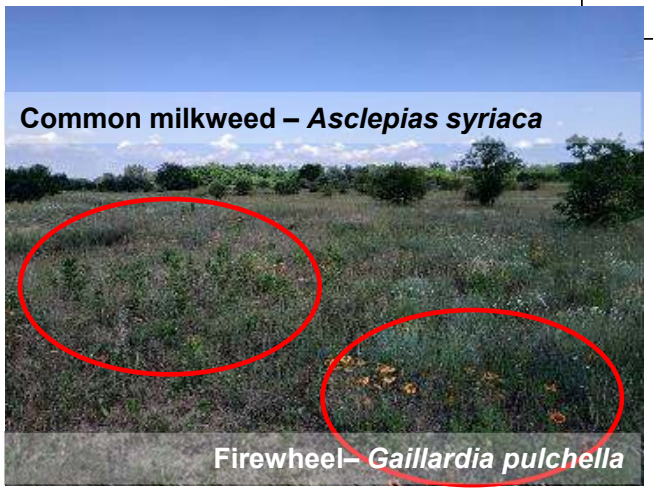


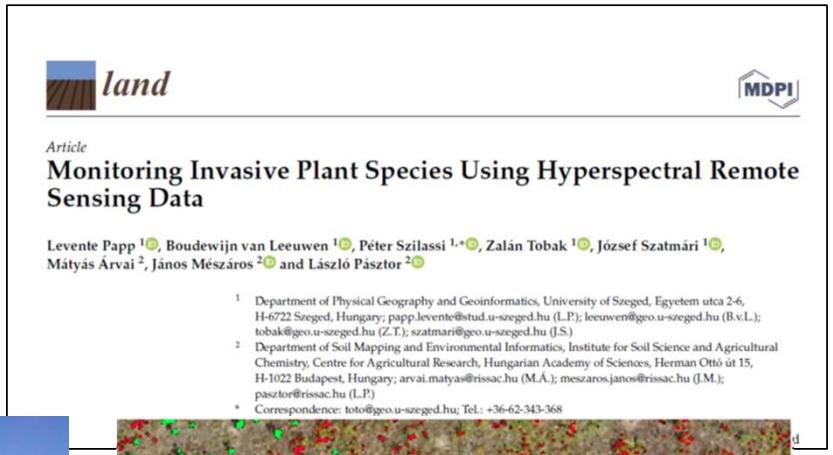


Applications (1) – Nature conservation

- Monitoring of invasive species (CIR and RGB orthomosaic, classification)
- Habitat mapping (DTM + RGB orthomosaic + GPR) –*Nannospalax (leucodon) montanosyrmiensis*







land

MDPI

Article

Monitoring Invasive Plant Species Using Hyperspectral Remote Sensing Data

Levente Papp [1], Boudewijn van Leeuwen [1], Péter Szilassi [1,*], Zalán Tobak [1], József Szatmári [1], Mátyás Árvai [2], János Mészáros [2] and László Pásztor [2]

[1] Department of Physical Geography and Geoinformatics, University of Szeged, Egyetem utca 2-6, H-6722 Szeged, Hungary; papp.levente@stud.u-szeged.hu (L.P.); leeuwen@geo.u-szeged.hu (B.v.L.); tobak@geo.u-szeged.hu (Z.T.); szatmari@geo.u-szeged.hu (J.S.)

[2] Department of Soil Mapping and Environmental Informatics, Institute for Soil Science and Agricultural Chemistry, Centre for Agricultural Research, Hungarian Academy of Sciences, Herman Ottó út 15, H-1022 Budapest, Hungary; arvai.matyas@rissac.hu (M.Á.); meszaros.janos@rissac.hu (J.M.); pasztor@rissac.hu (L.P.)

* Correspondence: toto@geo.u-szeged.hu; Tel.: +36-62-343-368

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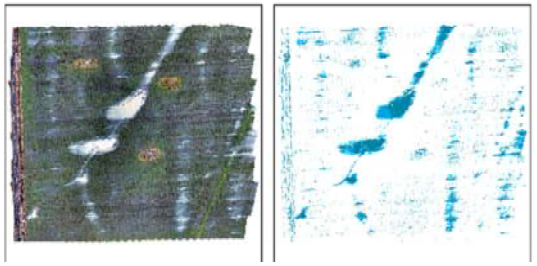
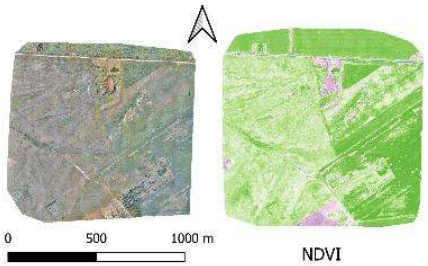
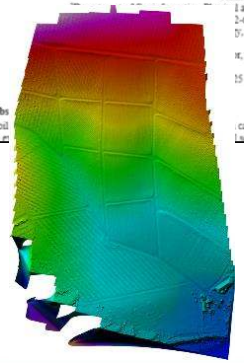
Applications (2) – Environmental monitoring



- Inland excess water floods
  - Research (DTM generation)
  - Monitoring (CIR and RGB orthomosaic, NDVI)
  - Validation data for satellite based classifications

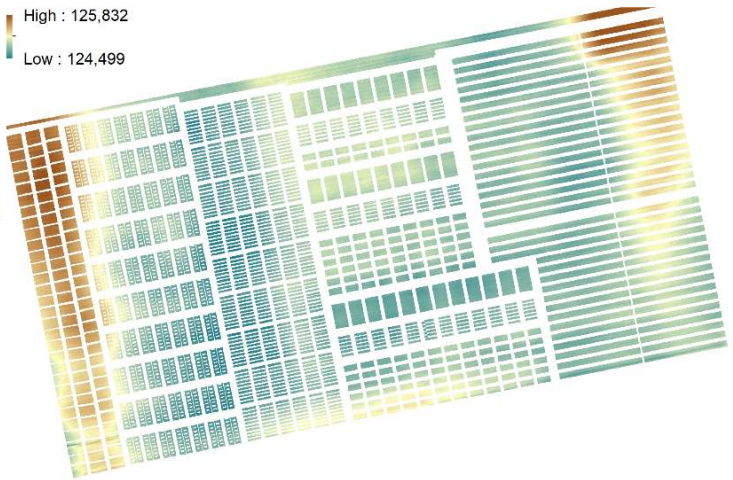


- Soil erosion
  - Research in vineyards (DTM generation)



Applications (3) – Environmental monitoring

- Vegetation phenology
  - Drought monitoring (CIR and RGB orthomosaic, NDVI - biomass, height), wheat and maize



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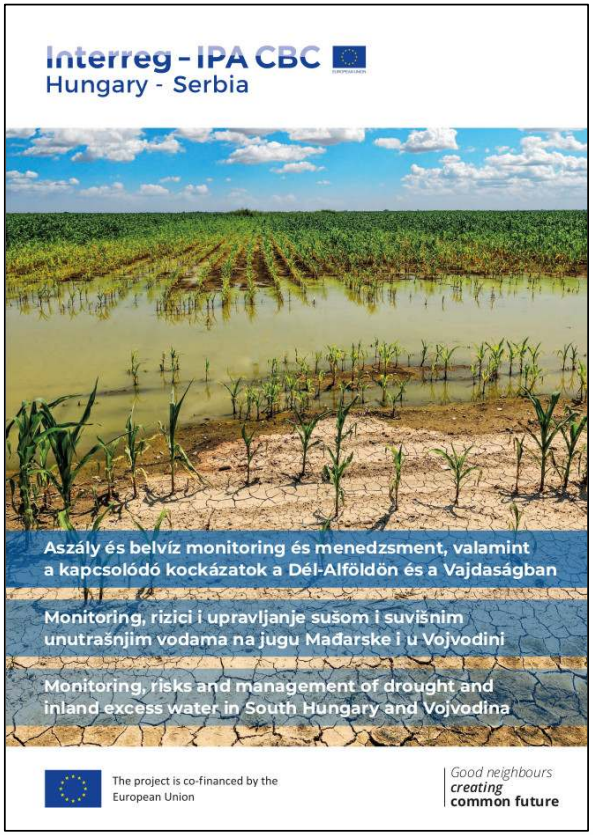
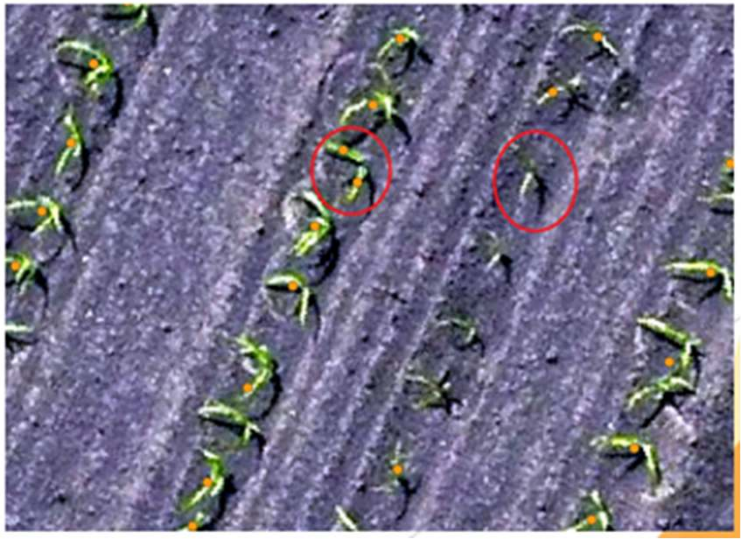
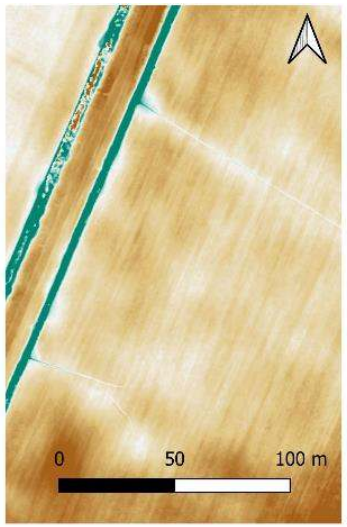
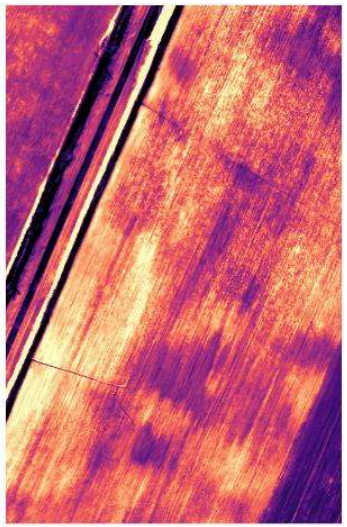


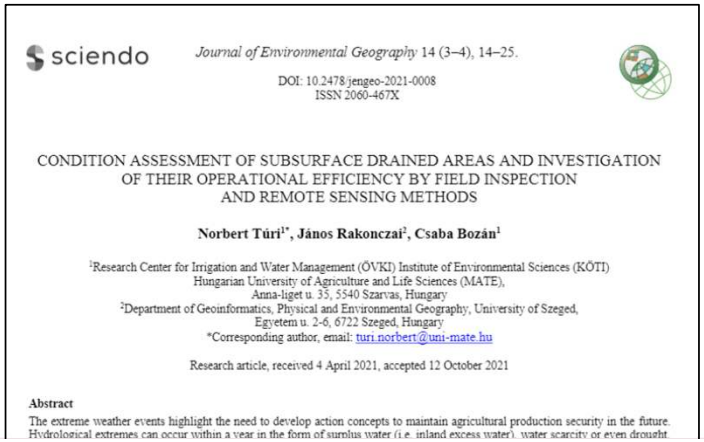
Applications (4) – Precision agriculture

- Replacing traditional plant counting methods using CNN
- Mapping of drainage systems









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CONDITION ASSESSMENT OF SUBSURFACE DRAINED AREAS AND INVESTIGATION OF THEIR OPERATIONAL EFFICIENCY BY FIELD INSPECTION AND REMOTE SENSING METHODS

Norbert Túri[1*], János Rakonczai[2], Csaba Bozán[1]

[1]Research Center for Irrigation and Water Management (ÖVKI) Institute of Environmental Sciences (KÖTI)
Hungarian University of Agriculture and Life Sciences (MATE),
Anna-liget u. 35, 5540 Szarvas, Hungary
[2]Department of Geoinformatics, Physical and Environmental Geography, University of Szeged,
Egyetem u. 2-6, 6722 Szeged, Hungary
*Corresponding author, email: turi.norbert@uni-mate.hu

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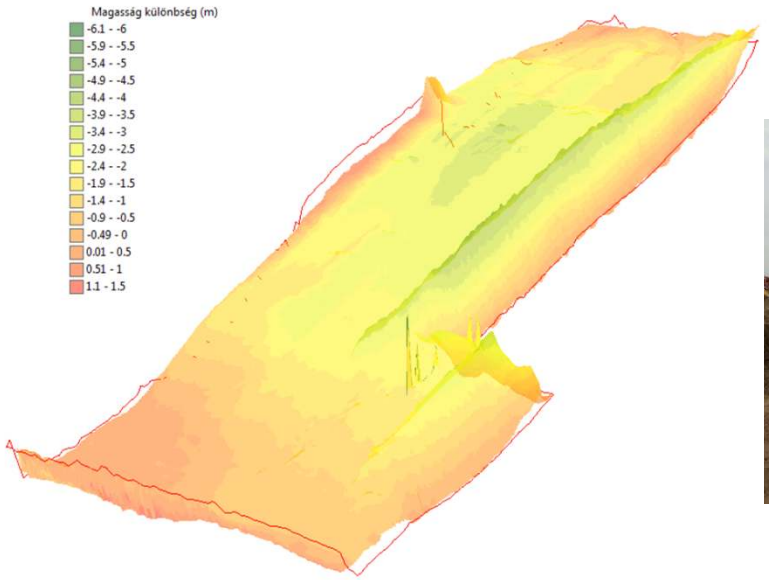
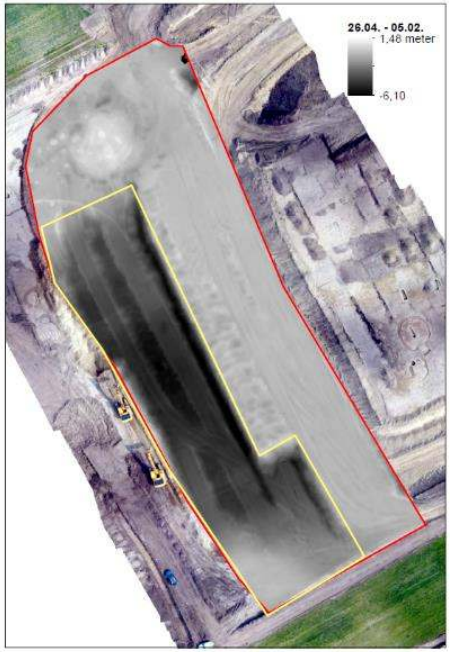
Abstract

The extreme weather events highlight the need to develop action concepts to maintain agricultural production security in the future. Hydrological extremes can occur within a year in the form of surplus water (i.e. inland excess water), water scarcity or even drought

Applications (5) – Geodesy

- Volume calculation (sand pit)





Applications (6) – Geomorphology

- Erosion of saline forms
  - Precise 3D measurement, monitoring

2016

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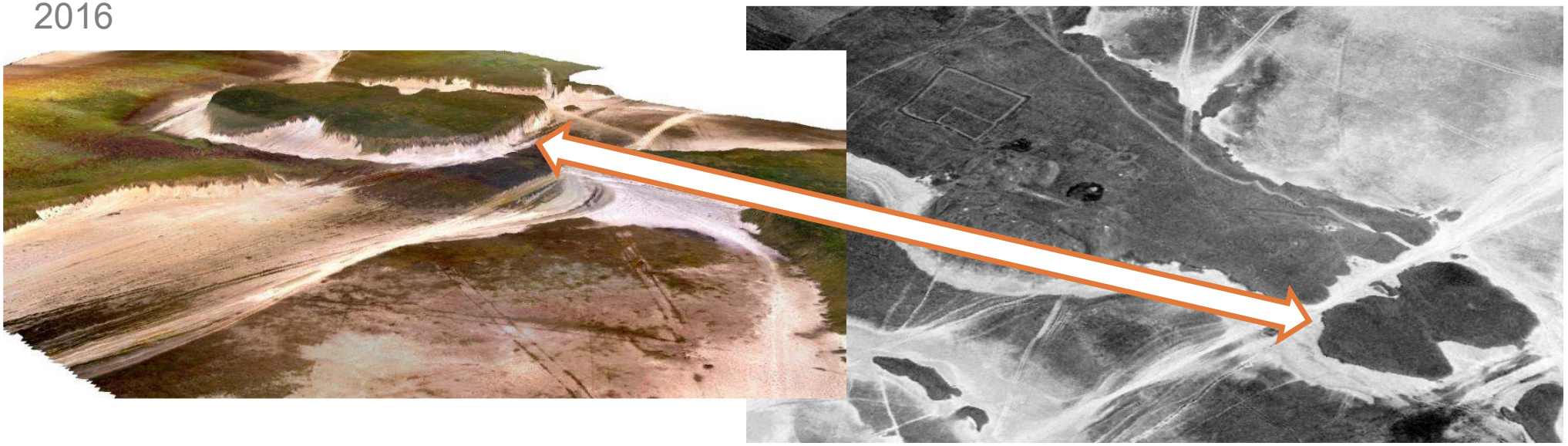
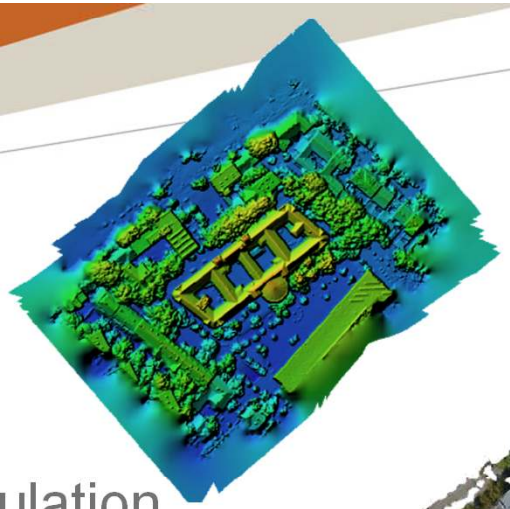
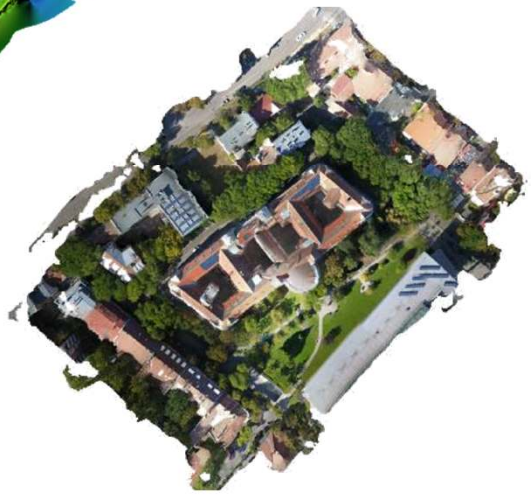


Applications (7) - other





- 3D city models
  - visualization, PV energy calculation

- Archelogy
  - site mapping, DTM

- Macro plastic in rivers - Tisza

Thank you for your attention!

leeuwen@geo.u-szeged.hu