

# The GOFC-GOLD South Central and Eastern European Network (SCERIN)

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## SCERIN

### *overview and status update*

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SCERIN-7, 24th - 27th June 2019  
Novi Sad, Serbia



Land-Cover / Land-Use Change  
Program



Global Observation of Forest  
and Land Cover Dynamics



# SCERIN Goals and Geographic Domain

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## Goals:

- Provide a platform for collaboration among remote sensing experts in SCE, *through collaborative activities*
- Facilitate progress and consistent implementation of remote sensing and LCLUC methodology, *in the region*
- Foster regional collaboration for monitoring the dynamics, stability, and vulnerability of the major ecosystems
- Promote effective sustainable management and preservation, *on the local, regional and pan-European level*

## Geographic Domain:

Central & South Eastern Europe, the Danube Watershed & Western Black Sea coast



# Regional Background

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- Diversity of land forms and environmental conditions has produced a unique richness of species - highly sensitive and vulnerable to climate change.
- SCEE has undergone extensive land-use, which have rendered many of the natural processes of adaptation un-sustainable.
  - Rich archive of long-term LULC data
  - Archive of methodology for field observations
  - LUCC research established
    - ✓ *tradition of 15-25 years in Central EU*
    - ✓ *Tradition of 10-15 years in SE EU*
  - Availability of regional data
    - from individual institutions or projects
    - not always uniformly organized and consistent

# SCERIN Focus and Structure

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## Focus Groups (FG) – *DYNAMIC, current LEADS*

**FG1:** Forest changes: disturbances, biomass production, forest LCLUC, driving forces [Leads: F. Zemek/ J. Albrechtová]

**FG2:** Land Cover Changes: climate change, agricultural land abandonment, urban expansion [Leads: G. Taff/ L. Kupková/ P. Stych/ L. Genc]

**FG3:** Validation/verification of products, for support of current and future satellite missions (e.g. NASA's LDCM, ESA's Sentinel 1, 2, and 3) [Leads: A. Halabuk/ L. Filchev/ P. Campbell]

**FG4:** LCLUC water management and ENVIRONMENT (watersheds, catchments, dams) [Leads: V. Starodubtsev/ I. Pilas / V. Lugatov]

# SCERIN COORDINATORS

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## **Network Coordinator U.S.:**

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Joint Center for Earth Systems Technology (JCET)

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## **Network Coordinator E.U.:**

**Jana Albrechtova** [albrecht@natur.cuni.cz](mailto:albrecht@natur.cuni.cz)

Department of Experimental Plant Biology, Faculty of Science

Charles University, Prague, Czech Republic



## **Regional Coordinator, Czech Republic**

**Lucie Kupkova** [lucie.kupkova@gmail.com](mailto:lucie.kupkova@gmail.com)

Charles University, Prague, Czech Republic

# Partnerships

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- EnviroGRIDS
- IGU LCLUC
- EARSeL LCLUC
- Trans-Atlantic Training Initiative (ESA-NASA)

*Additional inputs from CEOS/WGCV/LPV*



# SCERIN Critical Regional Issues

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- ✓ Changes in forest composition, age, structure and function
- ✓ Changes in ecosystem diversity
- ✓ Increasing urbanization
- ✓ Inbalanced water regime (floods/droughts)
- ✓ Extreme Events increase (floods, droughts and fires)

*Pre-cursors of LCC: natural & anthropogenic (e.g. technological advancements, political & population changes)*

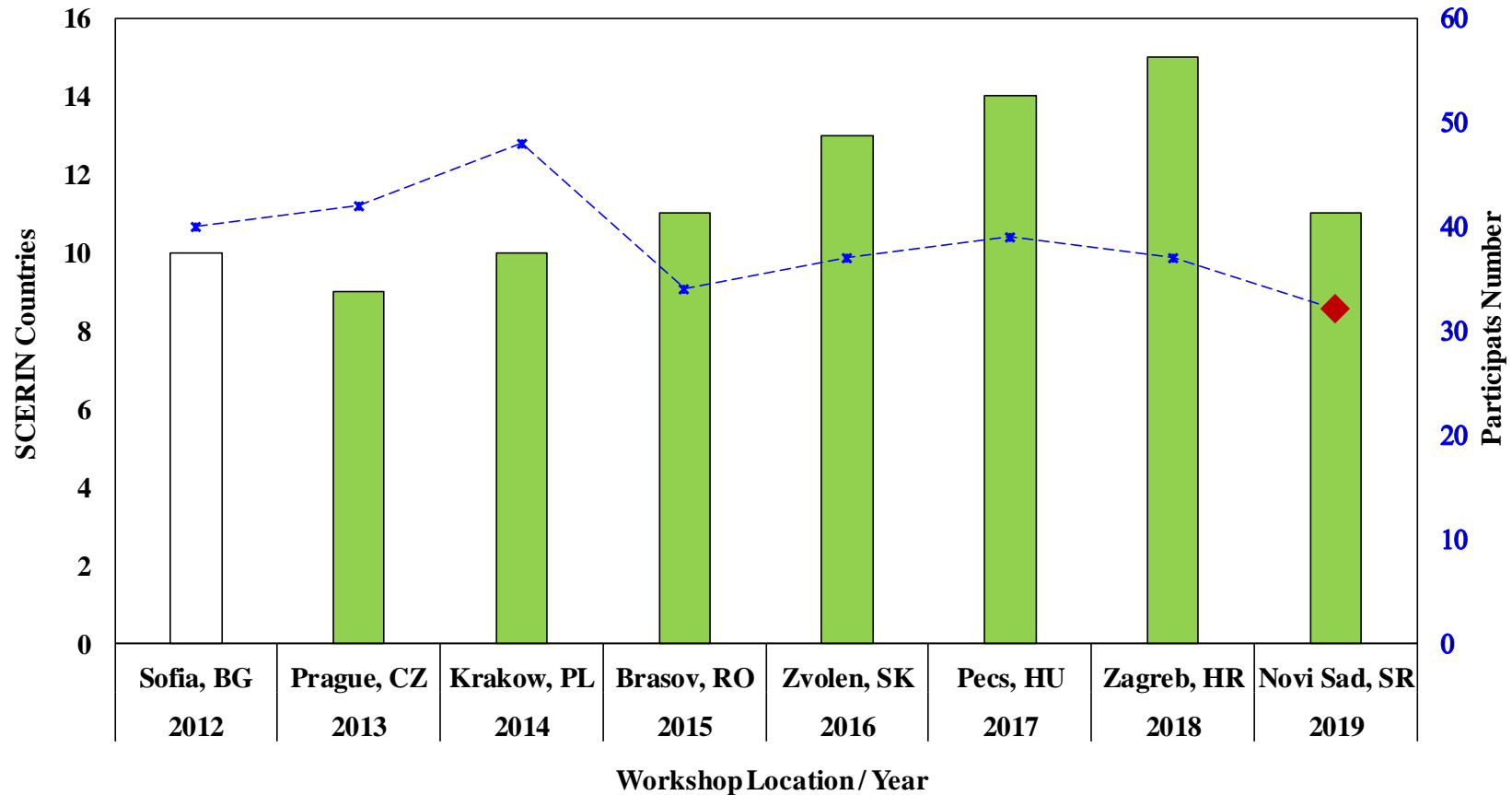
# Benefit of having SCERIN

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- joint projects and publications
- networking for knowledge and technology exchange (tools)
- using both Landsat-8 and Sentinel-2 data, and knowledge of the processing methodology in land use change monitoring
- capacity building through exchange of data and methods for satellite products evaluation
- facilitate teaching BS classes (tools and curriculum)
- student and faculty mobility – short and long term visits



# SCERIN Growth



- Permanent: BGR, CZE, POL, ROU, SVK, TUR, HUN, UKR, GRC, HRV, SRB, SVN
  - New/Returning: Bosnia and Herzegovina (BIH), FYROM, Moldova
  - To reach: Albania (AL), Montenegro (ME), Belarus(BY)

2019

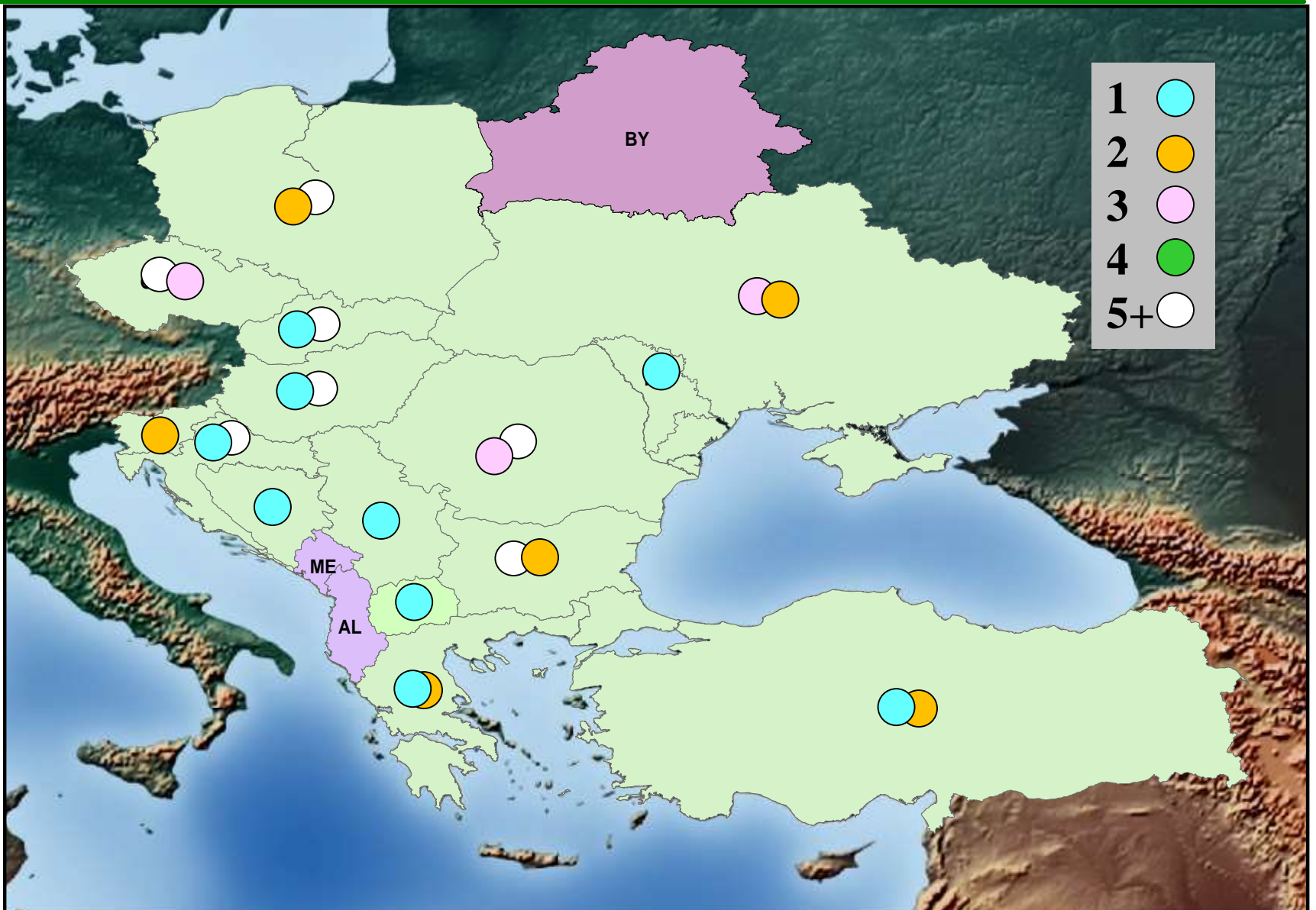
# SCERIN-7, Novi Sad, SRB



# Observers (2019): Armenia, Georgia, Latvia, Kazakhstan, Russia, Norway, Netherland, U.S.



# SCERIN Institutions/Country



# SCERIN Achievements

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Established and growing RIN

Active network collaborations, including:

- Joint 5 research projects in progress (WS)
- Joint manuscripts, published and in preparation
- Joint presentations, proposals and ongoing collaborative efforts

SCERIN web resources

- ✓ <http://www.fao.org/gtos/gofc-gold/net-SEERIN.html>
- ✓ [www.csebr.cz/scerin](http://www.csebr.cz/scerin)

# SCERIN Achievements - Papers

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- Manakos, I.; Tomaszewska, M.; Gkinis, I.; Brovkina, O.; Filchev, L.; Genc, L.; Gitas, I.; Halabuk, A.; Inalpulat, M.; Irimescu, A.; Jelev, G.; Karantzalos, K.; Katagis, T.; Kupkova, L.; Lavreniuk, M.; Mesaros, M.; Mihailescu, D.; Nita, M.; Rusnak, T.; Stych, P.; Zemek, F.; Albrechtova, A.; Campbell, P.K.E. (2018). **Comparison of Global and Continental Land Cover Products for Selected Study Areas in South Central and Eastern European Region**. Remote Sens. 2018, Special Issue Remote Sensing for Land Cover/Land Use Mapping at Local and Regional Scales, 10(12), 1967.
- Mišurec J, Kopačková V, Lhotáková Z, Hanuš J, Weyermann J, Entcheva-Campbell P and Albrechtová J 2012. **Utilization of hyperspectral image optical indices to assess the Norway spruce forest health status** J. App. Remote Sens. [063545](#)
- Mišurec J, Kopačková V, Lhotáková Z, Campbell P and Albrechtová J 2016. Detection of spatio-temporal changes of Norway spruce forest stands in Ore Mountains using Landsat timeseries and airborne hyperspectral imagery Remote Sens. <https://doi.org/10.3390/rs8020092>

# SCERIN Achievements - Book

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**Book in Czech with English summary and captions for figures and tables.**

Czech title: Metody hodnocení fyziologického stavu smrkových porostů : případové studie sledování vývoje stavu smrkových porostů v Krušných horách v letech 1998-2013 .

Albrechtová, J., P.K.E. Campbell, Z. Lhotáková and B.N.Rock (2017). Monitoring of physiological condition of Norway spruce forests. In: Case studies for monitoring of the physiological condition of Norway spruce forests in Krušné hory Mountains 1998 – 2013. Editors: J. Albrechtová, P. Campbell and L. Kupkova; Publishing House of the Czech Geographical Society, edition Geographica, Prague, 2017.

Publisher: Praha : Česká geografická společnost, 2017;. Series: Geographica. ISBN: 978-80-905642-9-9

# SCERIN – Conference Presentations 1

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- **AGU, Washington, DC**

**GC51D-0810 The South Central and Eastern European Regional Information Network (SCERIN) update and Prospects for Satellite Monitoring of Canopy Chlorophyll Content.** Petya K. E. Campbell<sup>1</sup>, Jana Albrechtova<sup>2</sup>, Elizabeth Middleton<sup>3</sup>, Karl F Huemmrich<sup>3</sup> and Christopher S R Neigh<sup>4</sup>, (1)University of Maryland Baltimore County, JCET, Baltimore, MD, United States, (2)Charles University, Faculty of Science, Department of Experimental Plant Biology, Prague, Czech Republic, (3)NASA Goddard Space Flight Cen., Greenbelt, MD, United States, (4)NASA Goddard Space Flight Center, Greenbelt, MD, United States  
Friday, 14 December 2018 08:00 - 12:20 Walter E Washington Convention Center - Hall A-C (Poster Hall)

- **ERSEL, Brno, Czech Republic, 6-8 February, 2019, <http://is.earsel.org/workshop/11-IS-Brno2019/>**

**1) Canopy traits for assessment of vegetation function in different agro-ecosystems in SCERIN**

Petya Campbell<sup>1,2</sup>, Petr Lukes<sup>2</sup>, Zuzana Lhotakova<sup>2</sup>, Lucie Kupkova<sup>2</sup> and Jana Albrechtova<sup>2\*</sup>

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**2) Autonomous Spectral Systems for Monitoring Eco-physiological Dynamics at leaf and canopy**

**scales.** Petya Campbell<sup>1,2</sup>, Elizabeth, Middleton<sup>2</sup>, K. Fred Huemmrich<sup>1,2</sup>, Tomaso Julitta<sup>3</sup>, James MacKinnon<sup>2</sup>, Dan Mandl<sup>2</sup>, Phil Townsend<sup>4</sup> and Craig Daughtry<sup>5</sup> <sup>1</sup>UMBC, Baltimore, MD, USA; <sup>2</sup>NASA/GSFC, Greenbelt, MD, USA; <sup>3</sup> JB Hyperspectral Devices, Germany; <sup>4</sup> University of Wisconsin, Madison, USA; <sup>5</sup> USDA/ARC, Greenbelt, MD, USA



# SCERIN – Conference Presentations 2

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## Conference Presentations

- GLP, Bern: 24-26- April, 2019 <https://glp.earth/osm-2019>

### **Satellite monitoring of canopy chlorophyll content within the South Central and East European region (SCERIN) – Czech Republic**

Jana Albrechtova 1\*, Petr Lukes2, Zuzana Lhotakova1, Lucie Kupkova1 , Eva Neuwirthová1, Lucie Cervena1, Ružena Janoutová2, Lucie Homolová2, Marketa Potuckova1, Petya Campbell3,4

\*Corresponding author: [jana.albrechtova@natur.cuni.cz](mailto:jana.albrechtova@natur.cuni.cz)

1 Charles University, Faculty of Science, 2 Global Change Research Institute, Czech Academy of Sciences, Brno, 3 Joint Center for Earth Systems Technology, University of Maryland Baltimore County, 4 NASA Goddard Space Flight Center

- NASA Science Biology and Geology Workshop, June 12-14, 2019, Holiday In Capitol, Washington, DC.

### **Prototyping Canopy Chlorophyll for Assessment of Vegetation Function**

P. Campbell<sup>1</sup>, K. F. Huemrich<sup>1</sup>, E. Middleton<sup>2</sup>, C. Neigh<sup>2</sup>, J. Albrechtova<sup>3</sup> and M. Abdulahi<sup>1</sup>

<sup>1</sup>UMBC, MD, USA; <sup>2</sup>NASA/GSFC, MD, USA; <sup>3</sup>Charles University, Prague, Czech Republic

# SCERIN Challenges and Lessons Learned

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## Ongoing or work in progress

- evolving network structure and partnerships within the region
- maintain/update a network participants database – in progress
  - Participants, contacts, publications, involved institutions, etc.
- develop a regional collaborative database
  - Regional networks of relevance to SCERIN – leverage network activities
  - Regional sponsors offering potential for support
  - Relevant active projects, lead person, duration - collaborations
  - List of links to available data for collaborative projects

## Challenges

- Active participation not only from agencies but also from big private companies
- Need more links to and involvement with funding agencies
- Need to involve stakeholders, political scientists, decision makers (invited lectures)
- Social media presence
  - Facebook <https://m.facebook.com/groups/1598067267142275>
  - LinkedIn <https://www.linkedin.com/groups/8349564>
  - Other ?

# SCERIN Long Term Vision

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- Include and actively involve all SCERIN countries
- Balanced participation from research and applications
- Transitioning from detection of LCC to monitoring and analysis of trends or LCD
  - collaborate with local, regional and global and EU research monitoring networks – long term data records across disciplines
- Collaboration with the other GOFCC-GOLD RNs

# The 3 Years Plan - Research

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## SCERIN's 3 most important research topics

1. Changes in vegetation cover, function (yield/assimilation) and ecosystem diversity with transition to free market, agricultural land abandonment and urban expansion
2. Regional LCLUC validation/verification of methods and products
3. Inbalance in the water regime of the SCEE, especially the Danube watershed (floods/droughts and fires) - **NEW**

# The 3 Years Plan – Capacity Building

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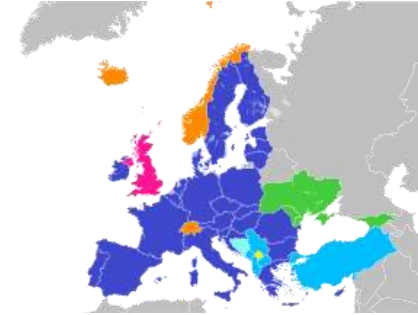
- SCERIN database: active projects, data collections and publications
- Methods and tools for combined use of diverse datasets, for obtaining information across scales and at **relevant time step**
  - Change detection: Landsat + Sentinel + MODIS + Radar
  - Calibration: VHR + Spectroscopy
  - Canopy height and structure: photogrammetry and lidar

# Potential Future Support

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SCERIN proposals for joint research projects and networking

- Joint Project Proposals in 2017 and 2018 (3)
- Joint Project Proposal EU COST Action as a platform for GOFC-GOLD + SCERIN activities (to consider)



Smaller proposals and collaborative work by collaborating groups within SCERIN

- Visiting Scholars (Fulbright, other)
- Graduate studies
- Research grants

***NEW!* Opportunity for leveraging/collaboration among the GOFC-GOLD networks for exchange of tools for product validation; flood, fire and snow prediction and mapping in SCERIN.**

# Current SCERIN Support

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- Main Sponsorship by GOFC-GOLD/START and NASA/LCLUC
- Support of participants from their organizations
- Host and regional partnerships offering partial sponsorship

*Thank You*

# Activities in Progress / SCERIN-7 Agenda

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- **Plenary session – set priorities** (day 1)
- **Research highlights – updates** (day 1)
- **Working sessions** (WSs, day 2)
  - Automated LC classification using S2GLC classification approach - results; and Database of land cover reference points (WS1, Lewinski and Gromny)
  - Progress on three studies/papers, next steps and alternatives (WS2, Manakos)
  - The impact of urban greenery on local climate (WS3, Zemek)
  - Agricultural Land Use/Land Cover changes in East and Central Europe - main trends and driving forces (WS4, Taff)
- **SCERIN & Observers Programs/Country Panel** (day 2, lead Jana, priorities, active projects)
- **New collaborative activities, projects, collaborations and venues** (day 2)
  - Examples, proposals
  - FG priorities goals, and milestones - discussions
- **SCERIN Future Venue(s)** - proposal(s) for 2020
  - TBD Joint Workshop with MEDRIN – the Mediterranean Regional Information Network  
MEDRIN background - <https://gofcgold.org/regional-networks/mediterranean-regional-network-medrin>  
Report - <https://drive.google.com/file/d/11bOp1yXgTh7EutMmPCOadlnZPJbCUPF/view?usp=sharing>