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NATURAL ENVIRONMENT RESEARCH COUNCIL

NCEO and Forest 2020 linkages to GFOI

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GFOI SDCG meeting
Ho Chi Minh City
(Vietnam) April 2017

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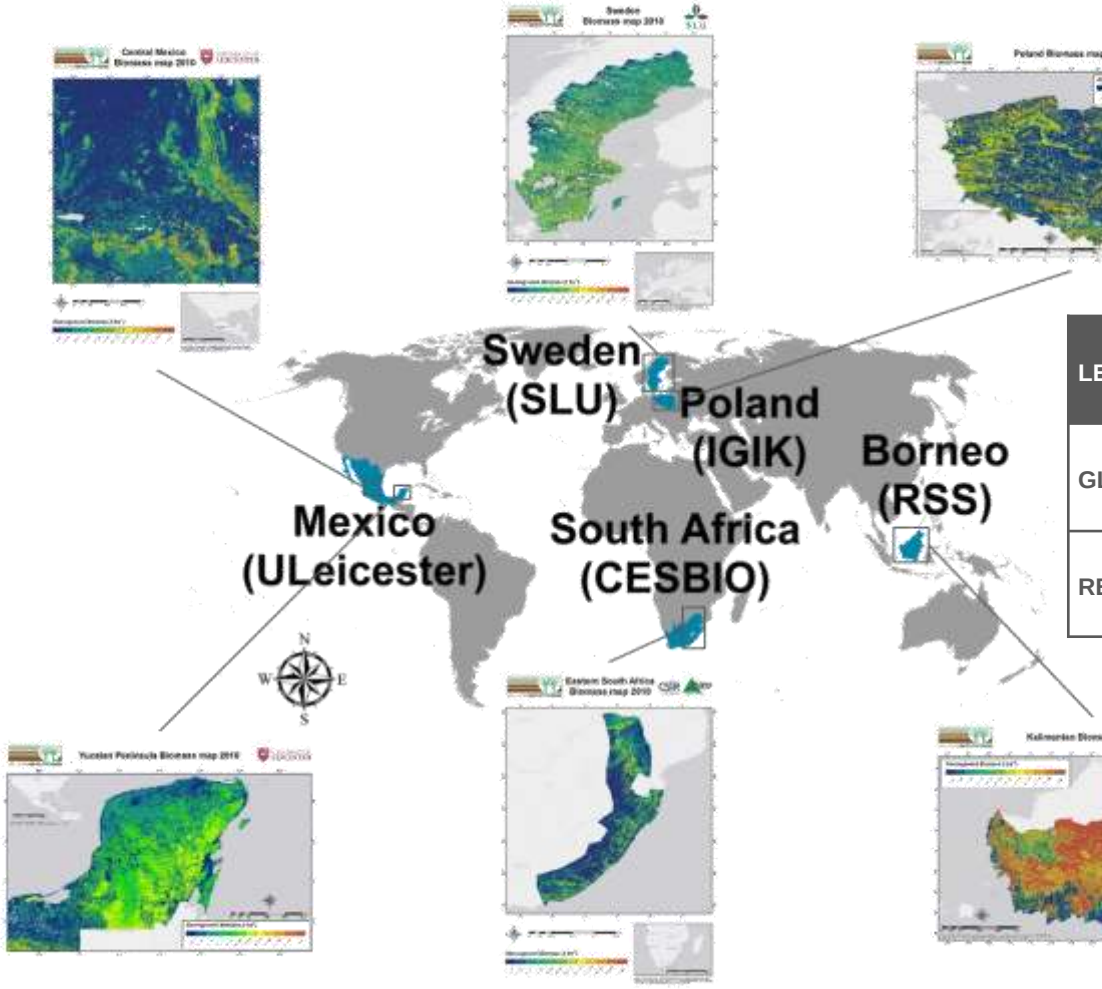
- The University of Leicester is leading the UK National Centre for Earth Observation
- NCEO provides the UK's Natural Environment Research Council with national capability in Earth observation science, and employs more than 80 scientist distributed across leading UK universities and research organisations
- NCEO Director: Prof. John Remedios
- ODA Programme Lead: Prof. Heiko Balzter
- NCEO hosts the UK Joint GEO/CEOS Office

https://www.nceo.ac.uk/

ESA DUE GlobBiomass



Lead by University of Jena
More info:
http://globbiomass.org/

LEVEL	PRODUCT	RESOLUTION	PERIOD
GLOBAL	AGB & Uncertainty maps	1 km - 50 m	2010 +/-1
REGIONAL	AGB, Uncertainty & AGB-change maps	25 - 50 m	2005, 2010, 2015

Poland: Temperate zone
Sweden: Boreal zone
Indonesia: Tropical zone
Mexico: Tropical-woodland transition
South Africa: Savanna woodlands

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REDD+ Monitoring Services with Satellite Earth Observation - Community Forest Monitoring Pilot

Satellite optical and radar data acquisition

Smartphone app deforestation alerts and forest information

Community / field based response to illegal logging and deforestation

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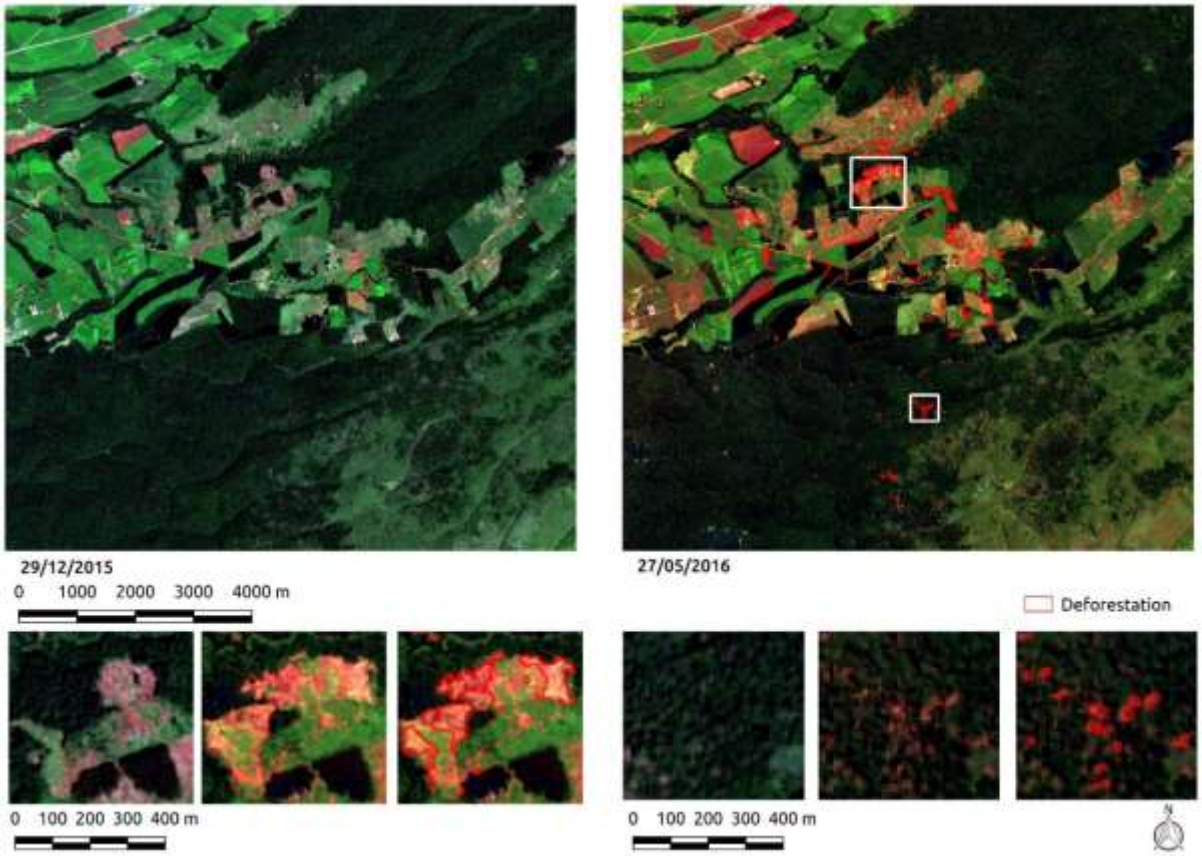
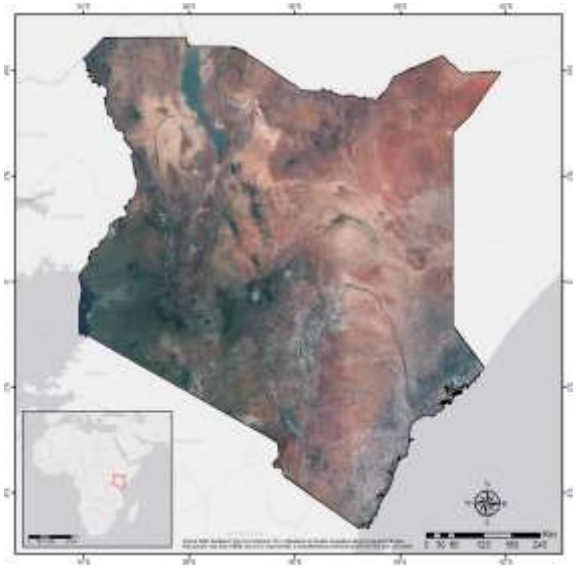
REDD+ Monitoring Services with Satellite Earth Observation - Community Forest Monitoring Pilot





Sentinel-2 image mosaic of Kenya

Forest cover change over 5 months in Mau Forest area in Kenya

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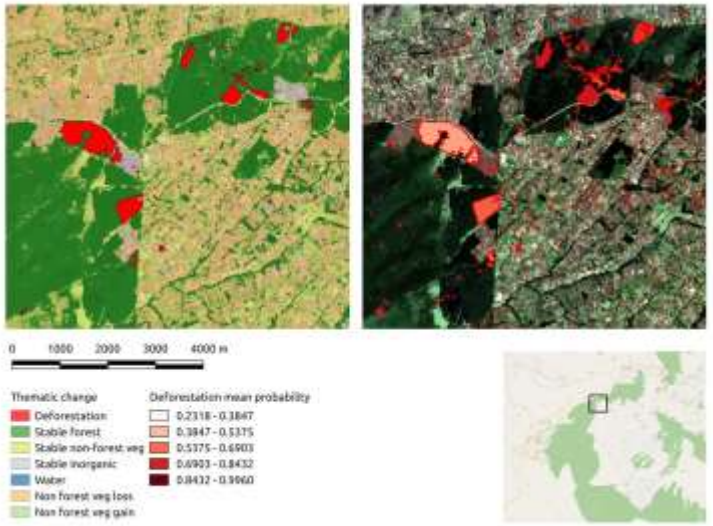
Forest Sentinel System



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NCEO - Official Development Assistance (ODA)

EO research for land-atmosphere services in DAC Countries, Foundation Award starting April 2017

- WP1 Soil moisture and drought in the Horn of Africa (Lead: Balzter), investigates data assimilation for soil moisture and vegetation.
- WP2 Forest carbon stocks and deforestation processes in East Africa (Lead: Balzter), analyses satellite data and models to assess forest carbon stocks and change in Kenya.
- WP3 Landscape burning and large-scale air quality in Asia (Lead: Wooster), estimates particulate matter fluxes from fires in near-real-time, and aerosol optical depth and trace gas data.
- WP4 Delivering UK EO knowledge at international agency level (NPG Lead: Remedios), provides technical assistance to AfriGEOSS (29 African GEO member states).

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NCEO ODA Foundation Award 2017: WP2 Forest carbon stocks and deforestation processes in East Africa

Research actions

- Investigate the suitability of new research using satellite data and models to assess both carbon pools and fluxes.
- Produce a baseline aboveground forest biomass map of Kenya from radar and multispectral imagery
- Assessment of dynamic change through deforestation (and, if feasible, degradation) monitoring methods will utilise Landsat and Sentinel-2 (Sentinel-1 for persistently cloudy areas).
- A terrestrial carbon assimilation framework (CARDAMOM) will assimilate these EO data and incorporate carbon pools (e.g. soil carbon) from non-EO data, producing estimates of carbon stocks with uncertainties.

Forest 2020

International Climate Fund

UK SPACE AGENCY

AIMS

https://ecometrica.com/forests2020

- Improve forest monitoring systems in >6 developing countries
- Improve effectiveness of UK ICF forest investments
- Improve global forest monitoring practices for REDD+, timber trade and forest livelihoods
- Strengthen UK collaborations in the application of science and technology to sustainability – **contribution to GFOI**

Forests 2020: a £30m (£15m from UK) investment to advance the application of earth observation to forests in developing countries

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National partners

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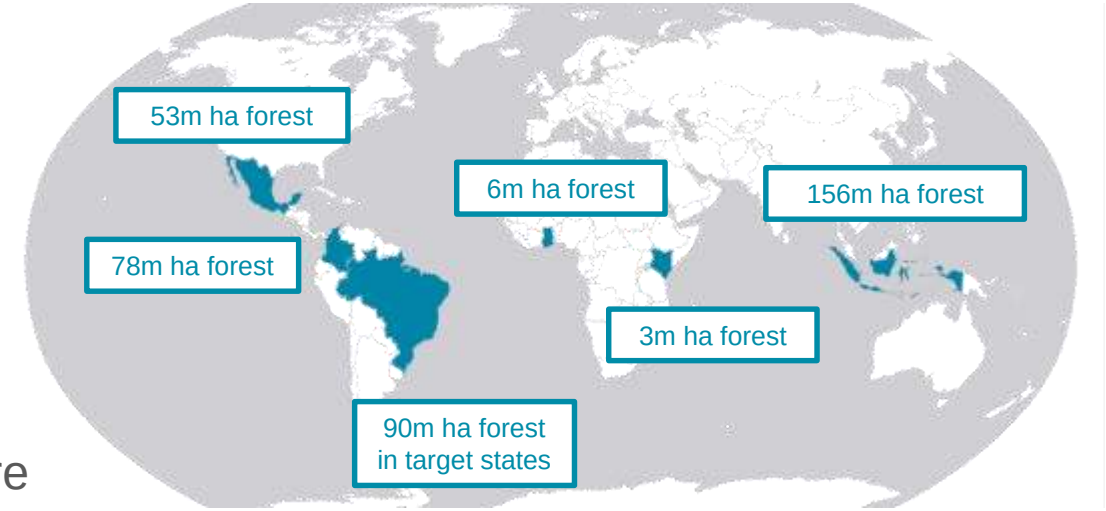
- **Brazil:** INPE, IPAM, Key Associados
- **Colombia:** University of Andes, IDEAM, The Nature Conservancy (TNC)
- **Ghana:** Kwame Nkrumah University of Science and Technology, Resource Management Support Centre of the Forestry Commission



- **Indonesia:** Ministry of Environment and Forests, Bogor Agricultural University (IPB), PT Hatfield Indonesia, WRI Indonesia, Daemeter
- **Kenya:** Kenya Forest Service (KFS), Jomo Kenyatta University of Agriculture and Technology (JKUAT)
- **Mexico:** CONAFOR, ECOSUR, FIPRODEFO

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APPROACH

- Build on successful UKSA-IPSP project to advance EO applications in forests with Brazil and Mexico + scoping work
- Support ICF Key Performance Indicator work (Indonesia, Brazil, Ghana, Colombia, Nepal)
- Build on country efforts and private sector R&D investment (match-funding model)
- Apply UK research excellence at NCEO
- International collaboration with NASA, ESA, GFOI, Germany, Norway, commercial EO data providers

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DESIGNED FOR IMPACT

- A major effort to improve monitoring systems covering over 300 million hectares of tropical forests
- Concerted work on shared challenges to produce common solutions:
  - Integration of Sentinel data to address clouds and small scale changes
  - Automation to speed up generation of maps
  - Information sharing tools to bridge gaps between national and local
  - Better localisation of fire risk by integrating EO into dynamic models
  - Better identification of restoration opportunities
- Potential impact: 4 to 6 million hectares avoided loss or improvement over a decade

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CROSS-CUTTING TECHNICAL CHALLENGES

- **T1**: Detection and measurement of difficult to measure **forest change**: degradation associated with small-scale agriculture, mining and illegal logging, changes under cloud cover
- **T2**: Mapping of **risks** and **priorities** to target and improve restoration (Bonn Challenge) and fire protection measures
- **T3**: **Digital infrastructure** to make resulting data assets and information available in a usable form to end users (local forest authorities, protection agencies, civil society, business, donors)

There are common technical issues across all countries but applications will be tailored according to existing capabilities, potential for improvement and forest context.

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EFFICIENCY FROM COLLABORATION & SCALE

Forests 2020 will build on existing research and data structures to ensure wider impact and efficient use of resources:

- NCEO (University of Leicester and University of Edinburgh) research links in the target countries
- NASA – GFOI work on data cubes for Landsat data, enhanced with Ecometrica mapping platform and Sentinel data
- NASA – GEDI project (Lidar on ISS) to provide detailed data in calibration – validation areas via University of Maryland – UK EO Lab
- Carbomap and Ecometrica to bring free commercial high resolution optical , radar and lidar data for calibration and validation purposes in test areas (Forest Data Facility)
- Common methods for calibration – validation and Sentinel integration applied across the portfolio (economies of scale)
- Results transmitted through GFOI to improve global practice

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NCEO-Forest 2020 Linkages to GFOI Objectives

- UK's contribution to GFOI in line with vision for "Global Britain" - ie best of UK science and technology addressing global challenges such as forest governance within a changing world
- UK's potential contribution on EO applications to forests includes but is broader than REDD+ MRV. It also covers aspects such as:
  - the role of forests and trees in rural livelihoods (note importance of gender and rights in livelihoods)
  - reducing illegal logging and establishment of good governance systems
  - the role of forests in climate change adaptation / also how to help forests adapt to climate change
  - the role of forests in the global carbon cycle
  - biodiversity and habitats
- NCEO ODA and Forests 2020 aim to help countries improve national forest monitoring systems which could include all of the above aspects

Forest 2020 specific activities involving or contributing to GFOI

- Data assets and results of a number of "Window" areas for testing, calibration and validation of different forest mapping and change detection techniques in different forest types will be shared with GFOI
- Methods and guidance developed through Forests 2020 will be shared through the GFOI and may contribute to the ongoing evolution of the MGD
- In countries, such as Colombia, where GFOI has specific project activities underway, we shall seek to complement and build upon those actions

Forests 2020 will also co-ordinate with UK's strategic investments in forests and climate through the International Climate Fund, the Global Challenges Research Fund and diplomatic efforts to ensure the UK continues to play an effective global role in the area of forests, land use and climate change.

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XIN CẢM ƠN!

Thank you!