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Developments in the UK's LULUCF inventory

JRC LULUCF workshop

26-27th April 2017

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Using EO data to track land use change

- Develop a more accurate way to track land use change in the GHG inventory
- Feasibility of methods of using EO to track UK land use and land use change (LULUC) over time
- Costed roadmap for operational system for tracking LULUC from 1990

- Coarse resolution optical (>250 m pixel resolution)
  - MODIS data and AVHRR pre-2002
- Medium resolution optical (10-80 m pixel resolution)
  - Landsat archive and Landsat 8 + Sentinel-2 from 2015
- Synthetic Aperture Radar (SAR) and SAR+optical data fusion
  - C-band SAR: Sentinel-1 and ENVISAT ASAR pre-2015

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Impact of Grassland management on soil carbon

- Operational method to report soil carbon stock changes from grassland management
- Higher-tier approach (i.e. IPCC Tier 2 or 3) using stock change factors and activity data for the UK's managed grasslands
- Literature search (31 publications): 223 soil C stocks from grasslands with age since last cultivation ranging 0-149 years
- Empirical model validation: at 10 grassland sites across UK
- LandscapeDNDC model to further test empirical findings
- Integrated Administration and Control System (IACS) data to improve understanding of crop rotation and grassland management

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Modelling Forest Land soil carbon stocks

- UK uses Forest Research's CARBINE model (Tier 3 approach) to estimate emissions/removals from Forest Land
- New CARBINE Soil Carbon Accounting sub-model (CARBINE-SCA)
- Based on simplified version of ECOSSE model, coupled with litter decomposition model derived from ForClim-D model
- Testing against published field observations

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Implementing the IPCC Wetlands Supplement

- Quantifying the total GHG emissions/removals from the UK's peatlands
- Effects of past management and future mitigation potential
- Tier 2 emission factors (EFs) for peatland types and management activities
- Consistent baseline activity map of peatland condition for all four UK countries
- Earth Observation (EO) methods to monitor activity changes on UK peatlands
- EFs for some peatland condition categories based on few field studies (e.g. cropland and grassland on thin peat, afforested peat)

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Model QA/QC: converting from Excel to R scripts

- Part of ongoing model QA/QC work to ensure compliance with international and national requirements
- Activity data, EFs, GWPs, unit conversions etc. will be stored in database tables
- R scripts will read from database, carry out calculations and QA/QC and write back to database
- Reduce possibility of transcription errors from linking between Excel sheets
- Ability to update EFs and GWPs en masse
- Embedded QA/QC (e.g. extreme value tests, comparison graphs)
- Reduce time required for annual inventory compilation and checking
- Increased documentation of models

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Thank you

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RICARDO

Forest Research

CEH Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

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