



Australian Government

Department of the Environment and Energy

Australia's GHG inventory for the AFOLU sector

**Partnership on Transparency – Asia-pacific regional workshop,
Bangkok 2018**

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Australia's GHG Inventory experience:

Australia's AFOLU GHG Emissions and trends

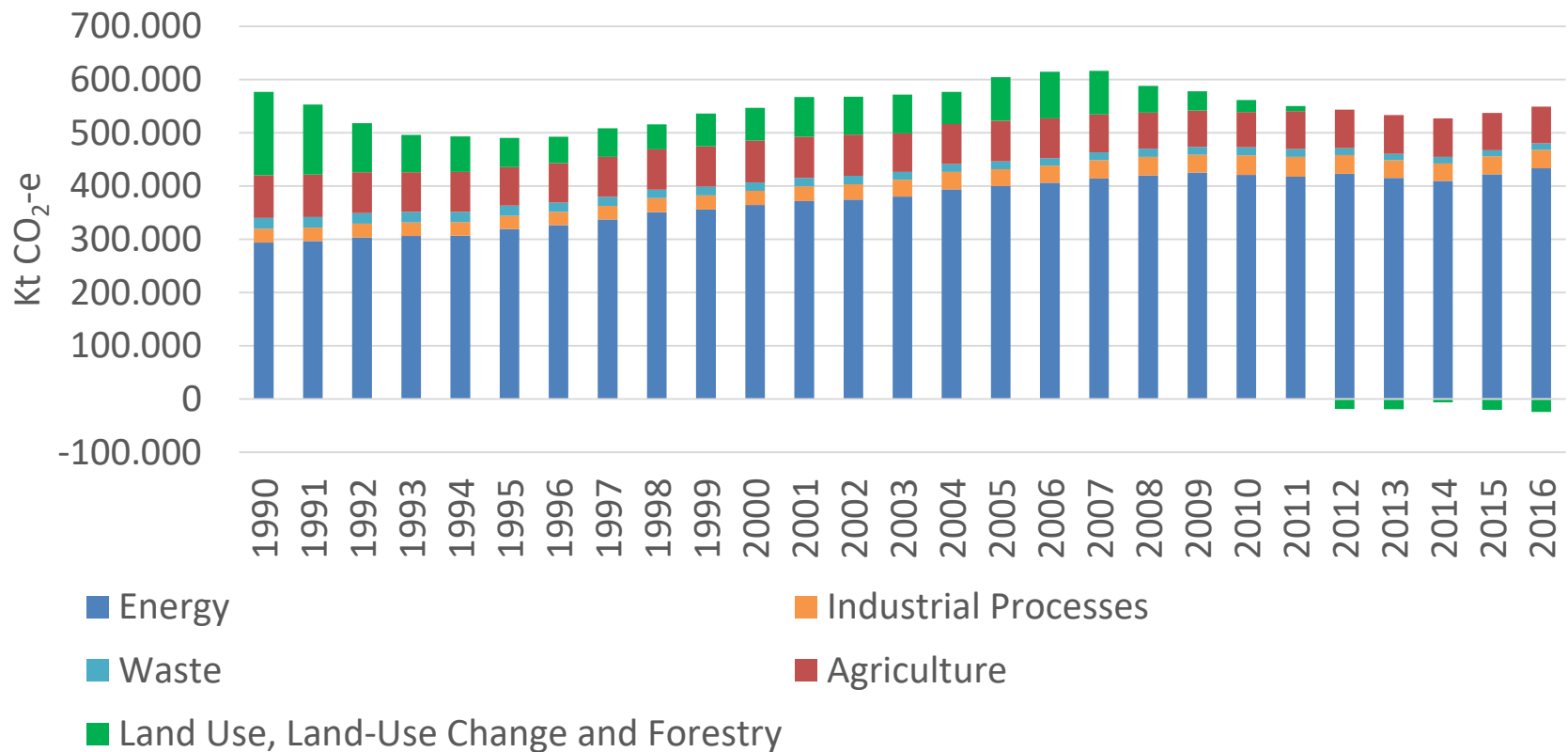
Role of the AFOLU sector in Australia's NDC

Development of institutional arrangements for data collection and reporting

Strengths and gaps in data collection and management

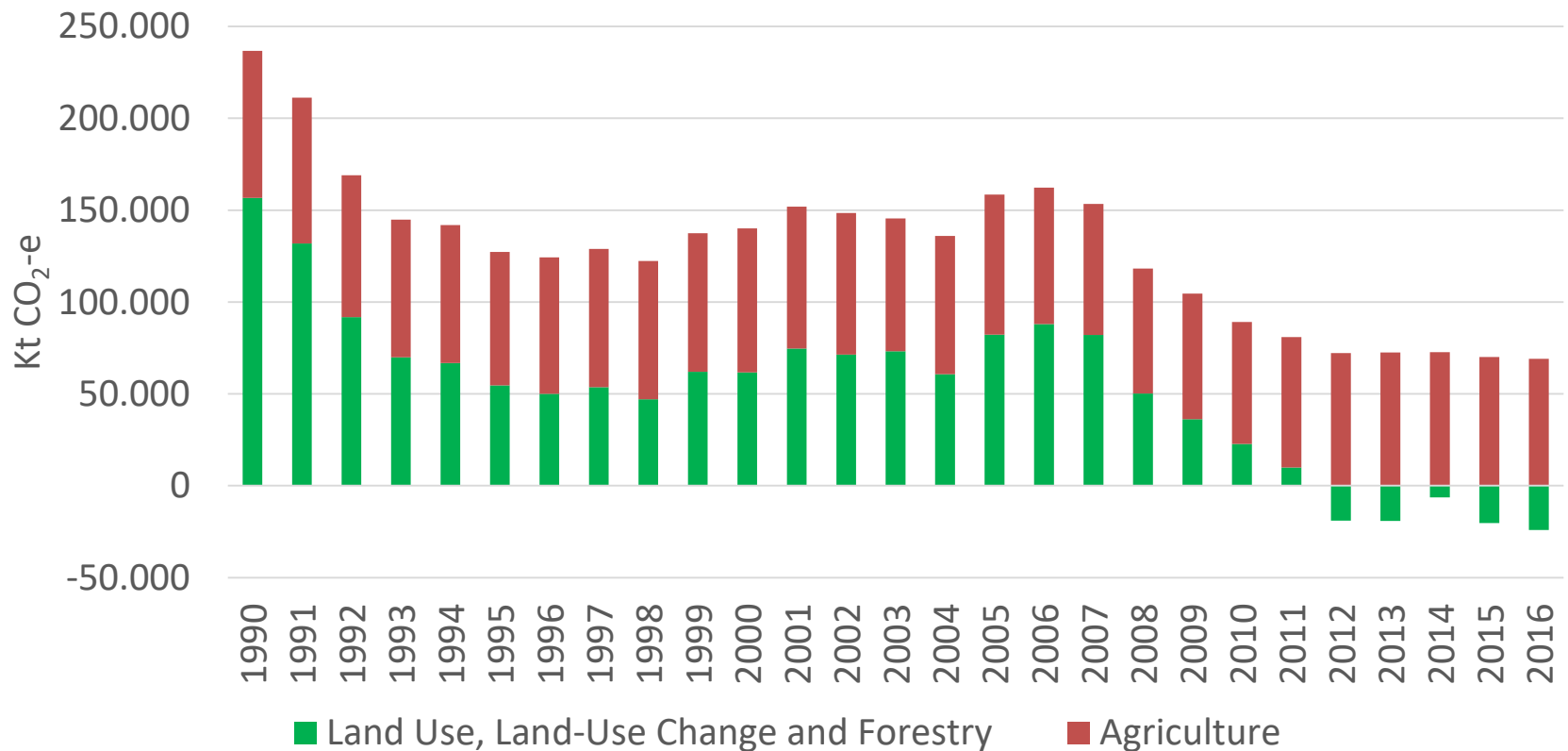
AFOLU Emissions and trends

AFOLU is a significant sector for Australia's total GHG emissions



AFOLU Emissions and trends

... & a major contributor to emissions reductions



Role of AFOLU in NDC

Comprehensive coverage

- 26-28% below 2005 levels by 2030
 - Economy-wide target – includes AFOLU
 - a. Net-net accounting
(compare net emissions in 2005 with net emissions in 2030)
 - b. AFOLU is treated the same as every other sector
 - All land is included → more mitigation opportunities
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History of Institutional Arrangements

Key objectives:

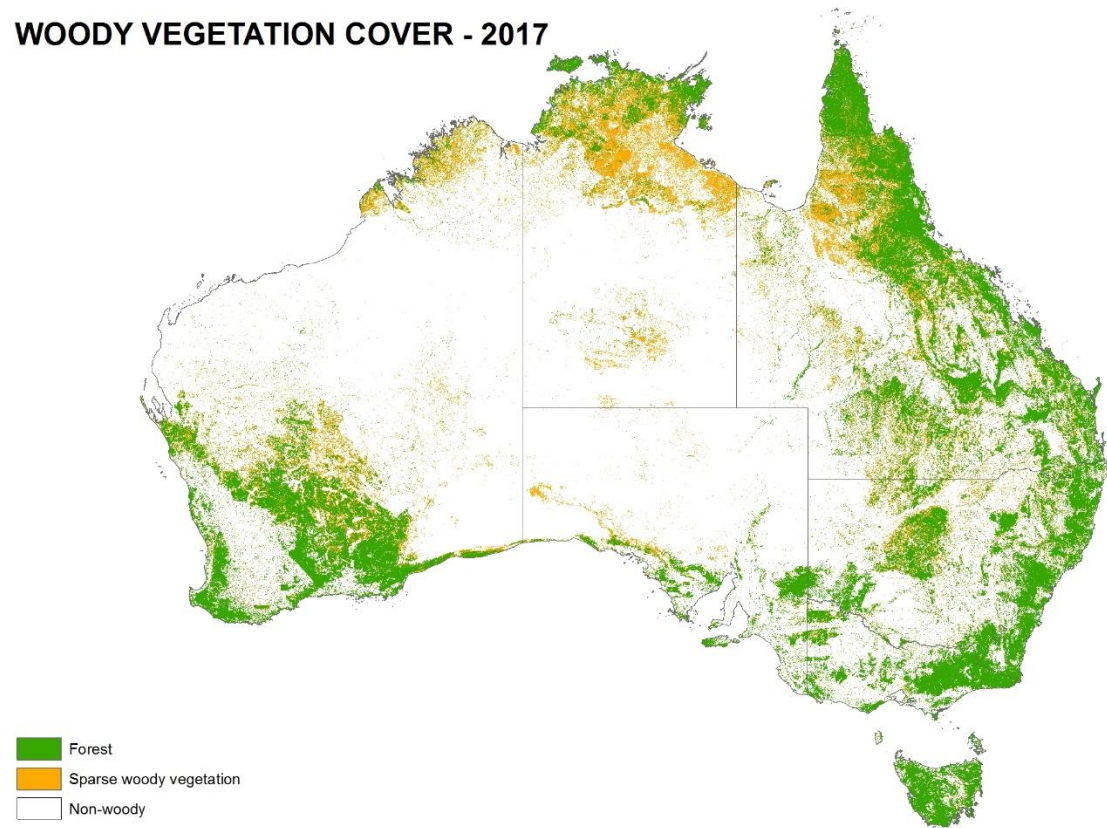
- System that meets KP-1 requirements
 - a. Started simple – forest clearing and plantations
 - Supports project-level abatement and trading of units within National Inventory framework
 - a. Need strong MRV framework to support payments for land sector abatement projects under the CFI Act 2011
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History of Institutional Arrangements

National Circumstances:

- Lacked existing forest-sampling program (like many European NFI programs)
- Federal system of government: many agencies with regulatory responsibility

WOODY VEGETATION COVER - 2017



Solution: developed a new centralised system using remote sensing and modelling

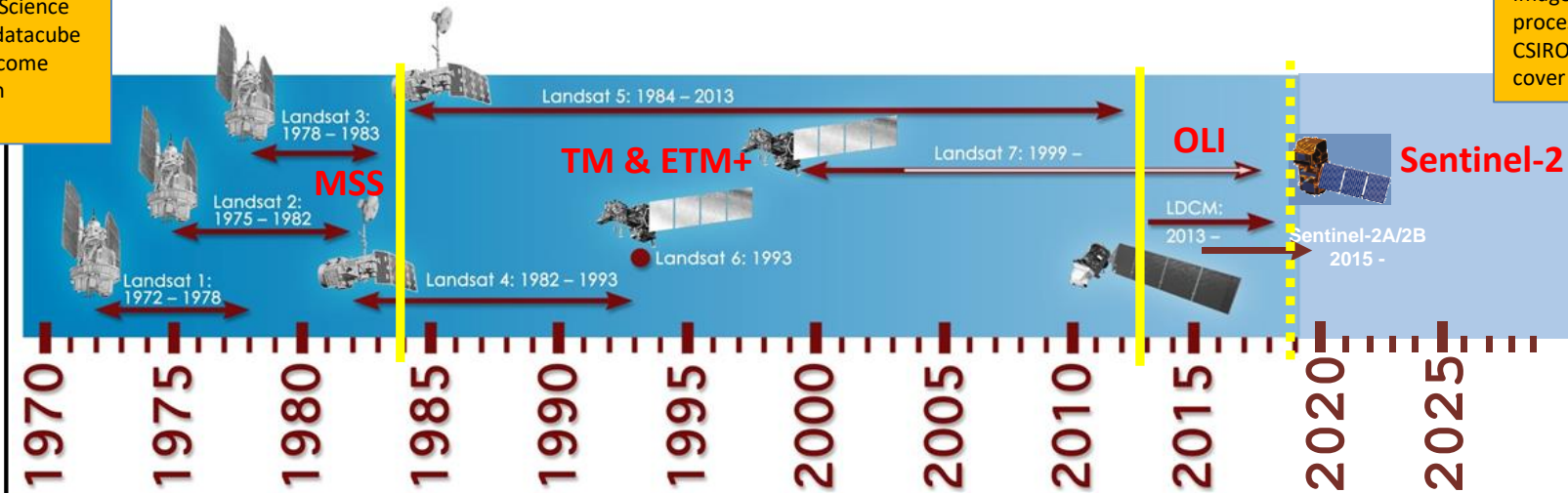
Remote sensing system for forest land

Riding on the back of Landsat

'Big Data'

DoEE is the biggest user of GeoScience Australia's datacube (soon to become Digital Earth Australia)

Images are processed using CSIRO Data61 land cover algorithms



8 Landsat satellites (NASA – USGS)

~ 43 years of land cover history

- 4 different sensors over the life of Landsat program

- 2 major sensor changes [MSS to TM & TM/ETM+ to OLI]

- 10m Sentinel-2 data would improve the quality of FullCAM inputs

Landsat images are verified using high-res images like google earth and digital globe

History of Institutional Arrangements

✓ Owned and operated by the Department of Environment and Energy – but involving many agencies

✓ Based on latest science

✓ Uses latest data management capabilities

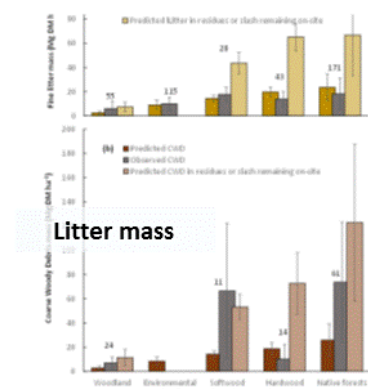
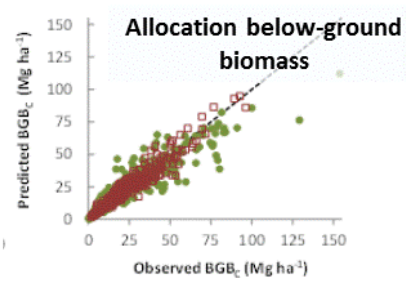
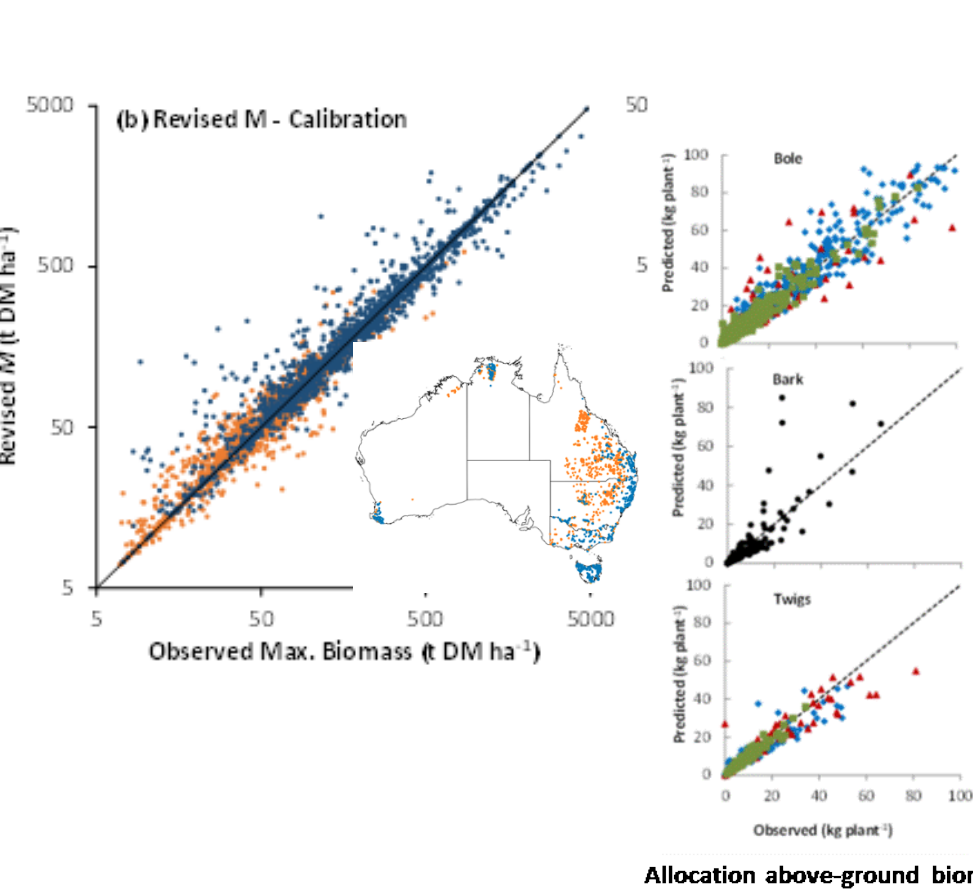
- **1998 Response to Kyoto Protocol**
 - : 40 NCAS technical science reports
 - : Inputs from broad science community
- **2005 Operational for deforestation, plantations**
 - : Imagery acquired through GA
 - : Detection analysed by DoEE using CSIRO algorithms
 - : Carbon estimation through FullCAM
- **2012 - ... Start of project-level activities**
 - : supported by National GHGI systems and framework
- **2015 Operational for broader landscape accounting**
 - : Forests, soil carbon
- **2015 – 2017 Massive Improvement Program**
 - Output data generated on x variables at a 25 x 25 pixel basis
 - Updated for latest data management techniques
 - : Principal user of the GA Datacube
 - Updated for latest science (Roxburgh, Paul)
- **2018 Ongoing Improvements**

Strengths and gaps in data collection and management

- Use of models - simple or complex (e.g. FullCAM) is scalable and verifiable
 - a. Supported by latest science
 - b. Model evaluation and verification
 - Outputs into database for analysis and archiving
 - a. Robust framework for both UNFCCC and to support financial instruments from project activities
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Strengths and gaps in data collection and management

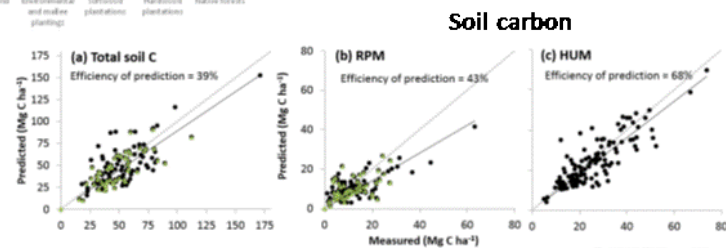
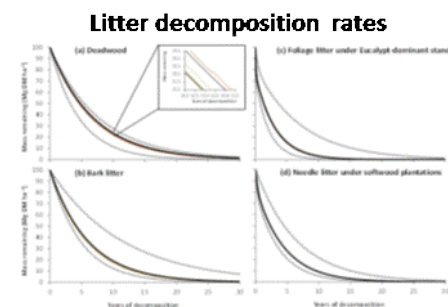
FullCAM model verification and continuous improvements



Litter fall rates

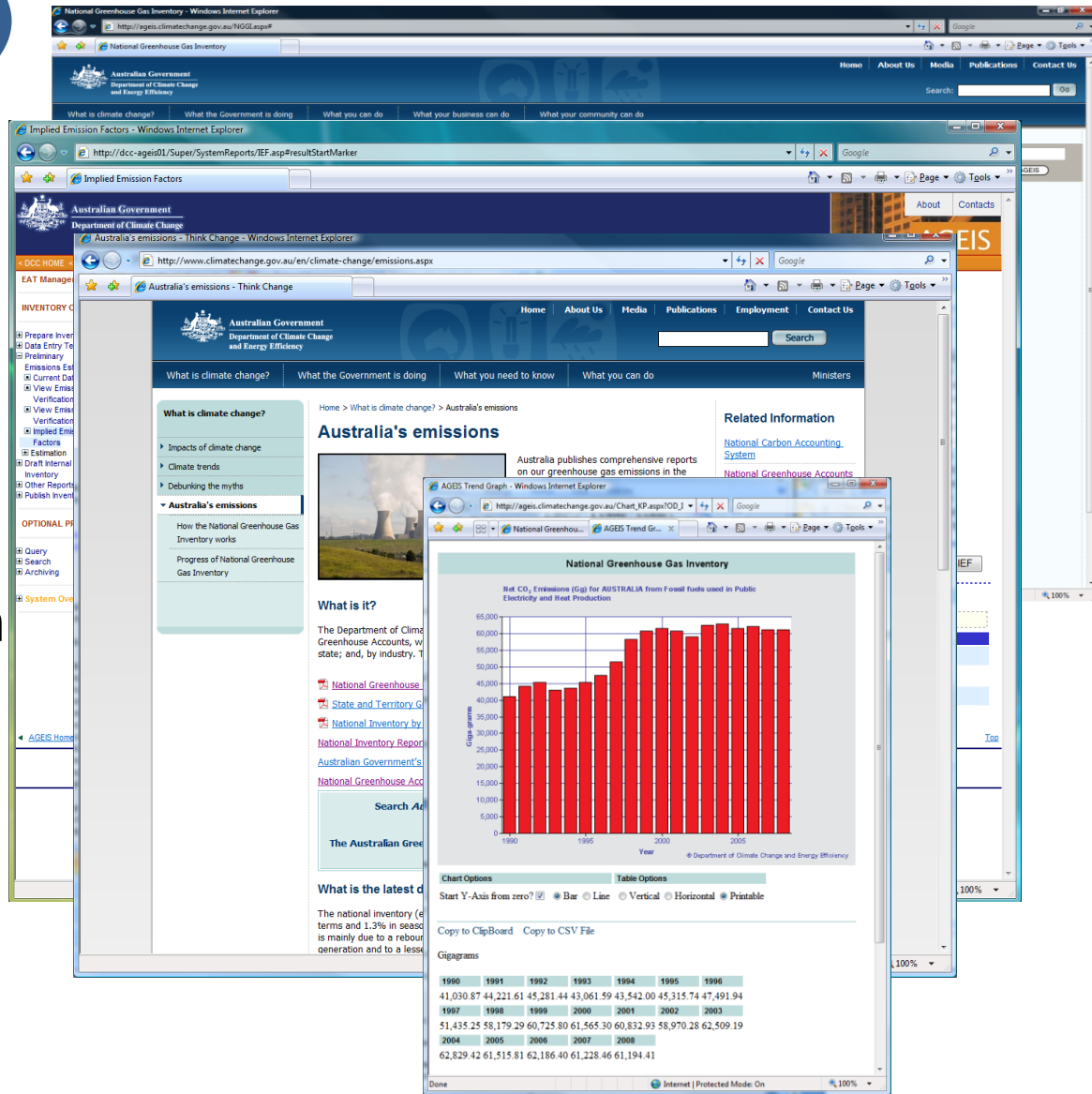
Table 1. Mean litter fall rates (Mg DM ha⁻¹ yr⁻¹) under the different forest types, regions, and species. The observed litter fall rates are shown in bold. The predicted litter fall rates are shown in regular font. The relative error is shown in the last column.

Forest type	Annual litterfall (Mg DM ha ⁻¹ yr ⁻¹)	Mean	SD	Min	Max	RE
Euc. plantings	Total	1.20	0.47	2.40	1.00	4
	MRUage	40	14	17	55	4
	NRUage	40	14	17	55	4
Native forests	Total	5.11	2.06	1.13	10.4	43
	MRUage	18	12	28	89	18
	NRUage	18	12	28	89	43
Woodland	Total	1.50	0.97	0.70	1.14	14
	MRUage	40	14	22	75	6
	NRUage	18	8	20	30	6
Hardwood plantation	Total	5.58	2.54	1.72	9.60	16
	MRUage	18	10	15	100	3
	NRUage	5	4	0	8	2
Softwood plantation	Total	2.80	1.05	1.30	4.00	29
	MRUage	18	15	13	100	8
	NRUage	14	7	0	21	7
NRUage	8	4	1	13	7	



Data management - Australian Greenhouse Emissions Information System (AGEIS)

- AGEIS Benefits
 - Data management
 - Emissions estimation
 - QC functions
 - Auditability
 - Report production
 - CRF Reporter Tool population
 - Data archiving
 - Publicly accessible



Conclusions

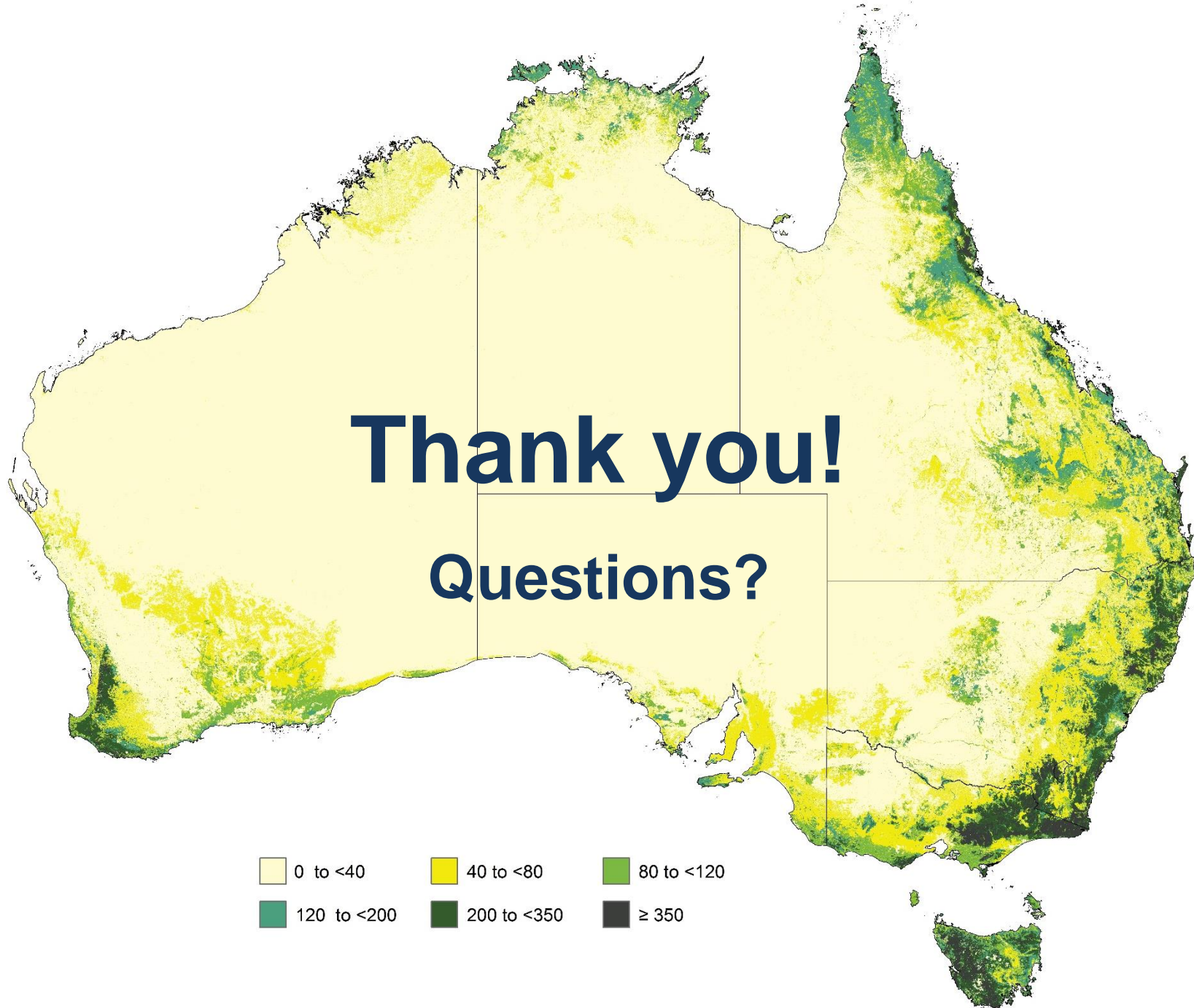
Australia's GHGI for the AFOLU sector

- AFOLU is important in Australia – both level, and trend
- Comprehensive inclusion in NDC, net-net accounting – maximum scope for mitigation
- Institutional arrangements –
 - a. Centralised, purpose built, lowest cost - remote sensing
 - b. Integrated MRV framework links National Inventory to project level activities
- Data management – use of data cube and modelling systems that output to database
 - a. Meets UNFCCC requirements for verification, archiving
 - b. Strong MRV framework supports creation of financial instruments that monetise abatement

Tools and support now available

... so it doesn't take 20 years to set up!

- Benefit from other Parties' experiences (like Australia)
 - Tools like GFOI
www.gfoi.org/reddcompass (similar institutional arrangements can support all UNFCCC processes)
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Continuous improvement

- Our data management practices have evolved over time
 - Spreadsheet based calculations
 - AGEIS
- Our estimates have evolved toward higher-tier methods
 - Outcomes of international and domestic reviews
 - Formalised in Improvement Plans
- Ongoing focus on QA/QC



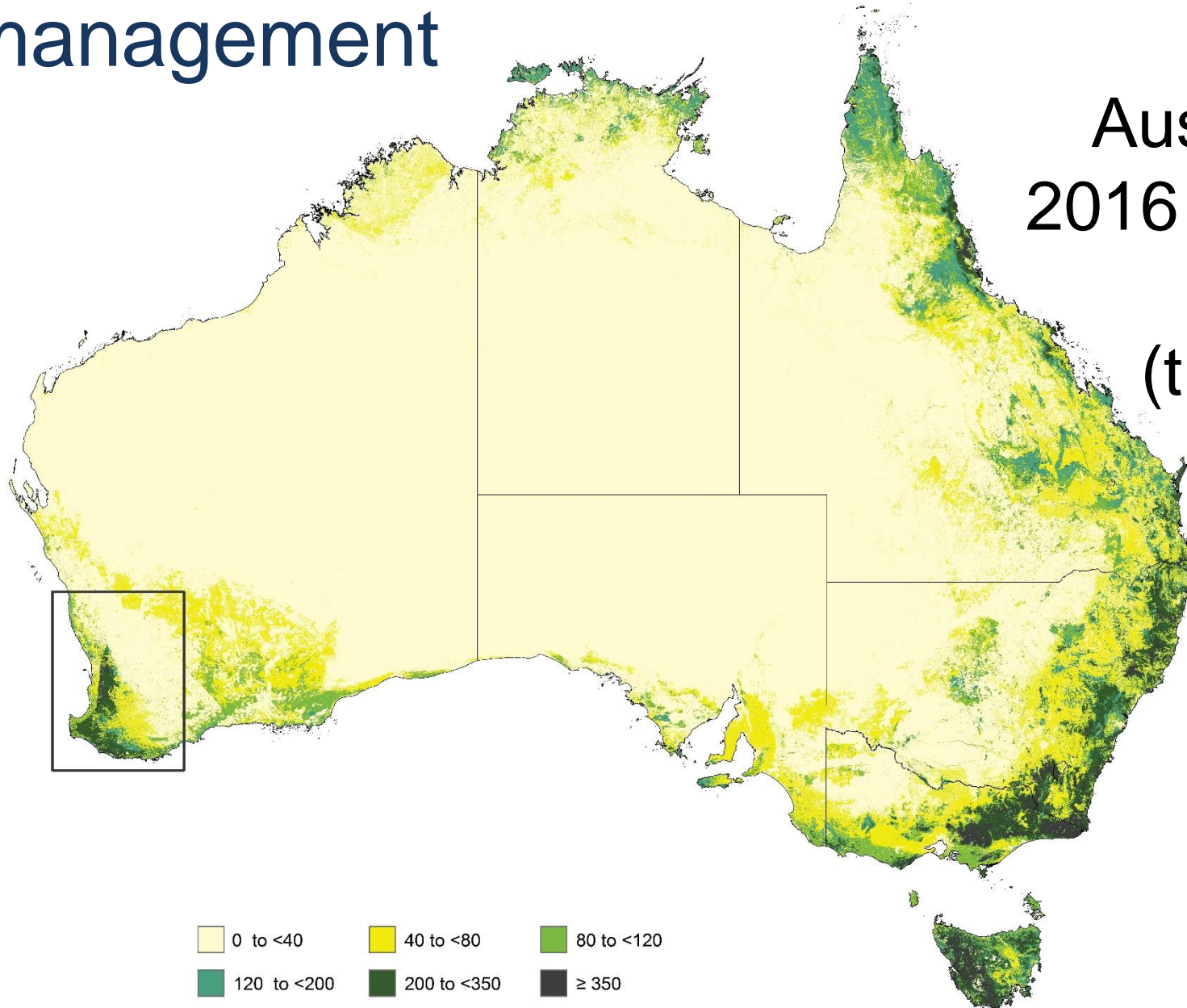
Continuous improvement:

Australia's participation in UNFCCC reviews

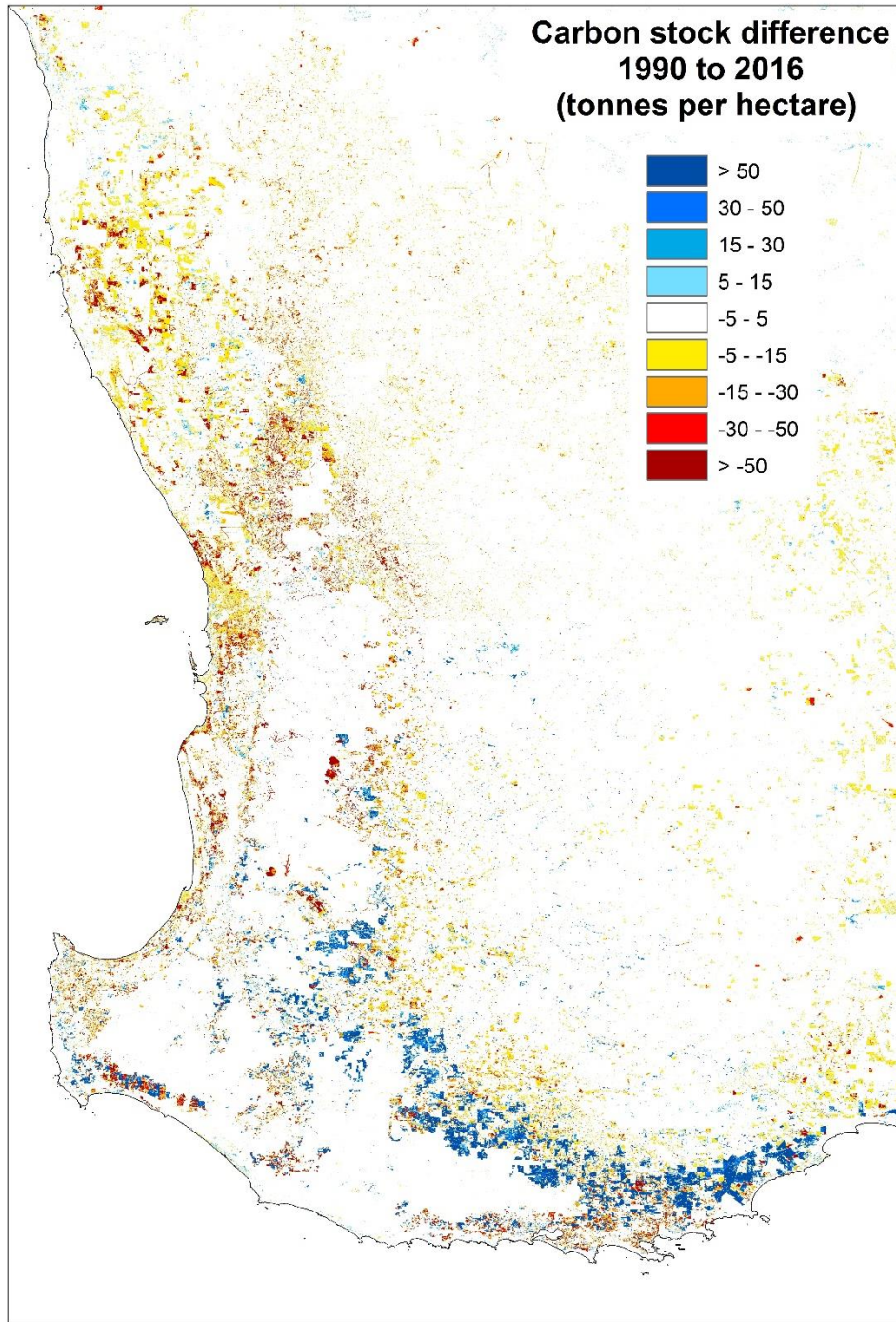
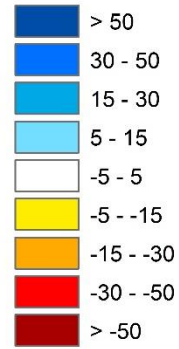
- Under UNFCCC:
 - Facilitative (and stimulates capacity-building)
 - Reviewed each year
 - Suggestions are helpful
 - ...doesn't change the aggregate picture
- Under Kyoto Protocol
 - Increased focus on compliance
 - Raises scrutiny/ pressure
 - ...not a bad thing

Case study – data collection and management

Australia's
2016 carbon
stocks
(t C / ha)



**Carbon stock difference
1990 to 2016
(tonnes per hectare)**



Case study – data collection and management

Australia's LULUCF carbon stocks (Gt C)

