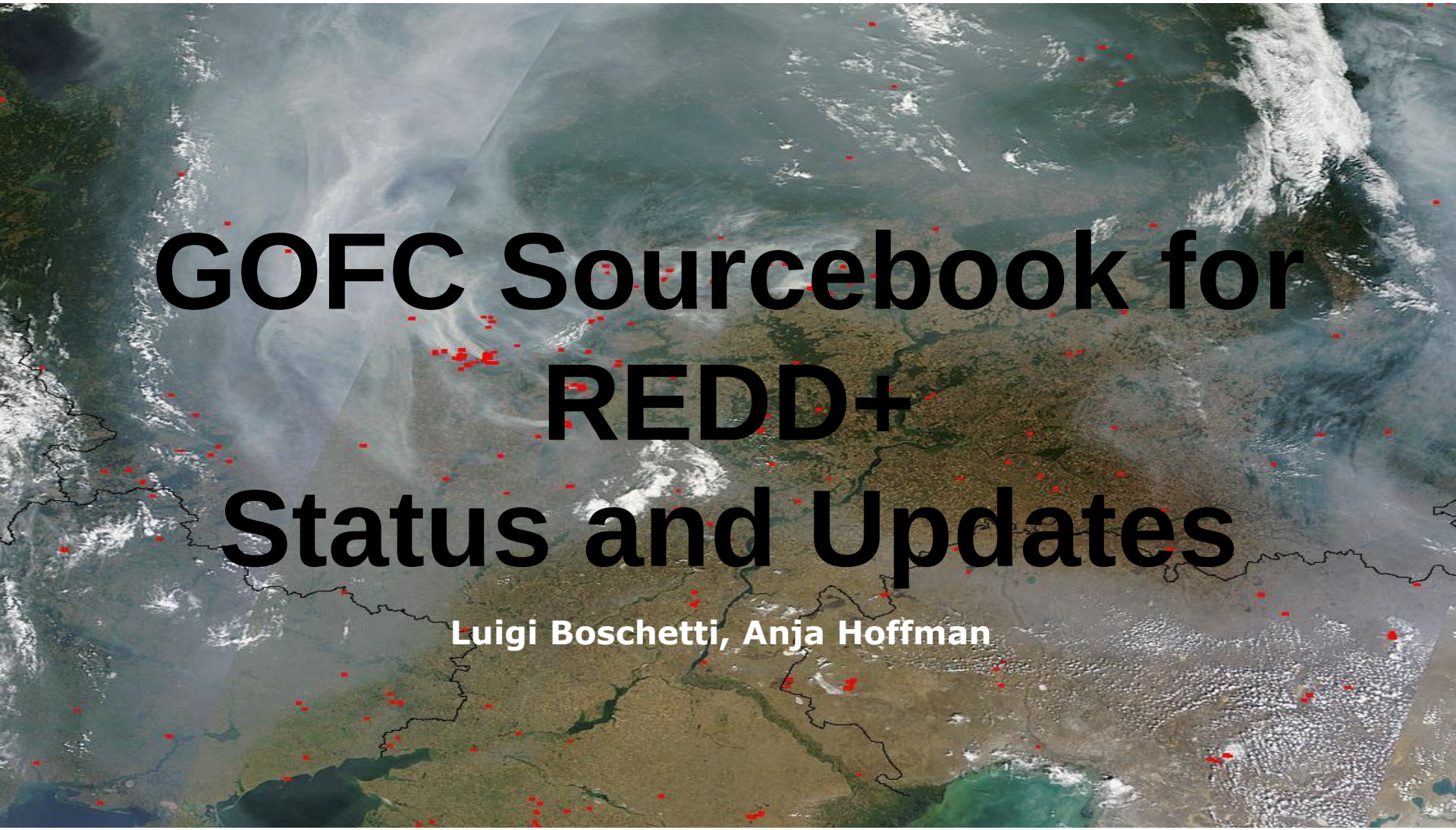


GOFC Sourcebook for REDD+ Status and Updates

Luigi Boschetti, Anja Hoffman

SOURCEBOOK

COP 16 version 1

A sourcebook of methods and procedures for monitoring and reporting anthropogenic greenhouse gas emissions and removals caused by deforestation, gains and losses of carbon stocks in forests remaining forests, and forestation

GOFC-GOLD

Global Observation of Forest and Land Cover Dynamics

Background – History of Sourcebook

- Consistent with IPCC guidelines
- Provides additional explanation, clarification and methodologies to support REDD+ actions
- The sourcebook has been regularly updated from 2005 (current version presented at COP 18, Doha 2012)
- Ad hoc working group within GOFC

Target audience

Target user group when the activity started:

- Policy makers and negotiators

Additional users as the project continued

- Technical bodies at national level, in countries with little background in generating country level satellite products

Focus on the use of existing, readily accessible data and products

Remote sensing and REDD+

The role of remote sensing in national monitoring systems is recognised in decision 4 of COP15

- **Article 1 (d):**
  To establish, according to national circumstances and capabilities, robust and transparent national forest monitoring systems and, if appropriate, sub-national systems as part of national monitoring systems that:

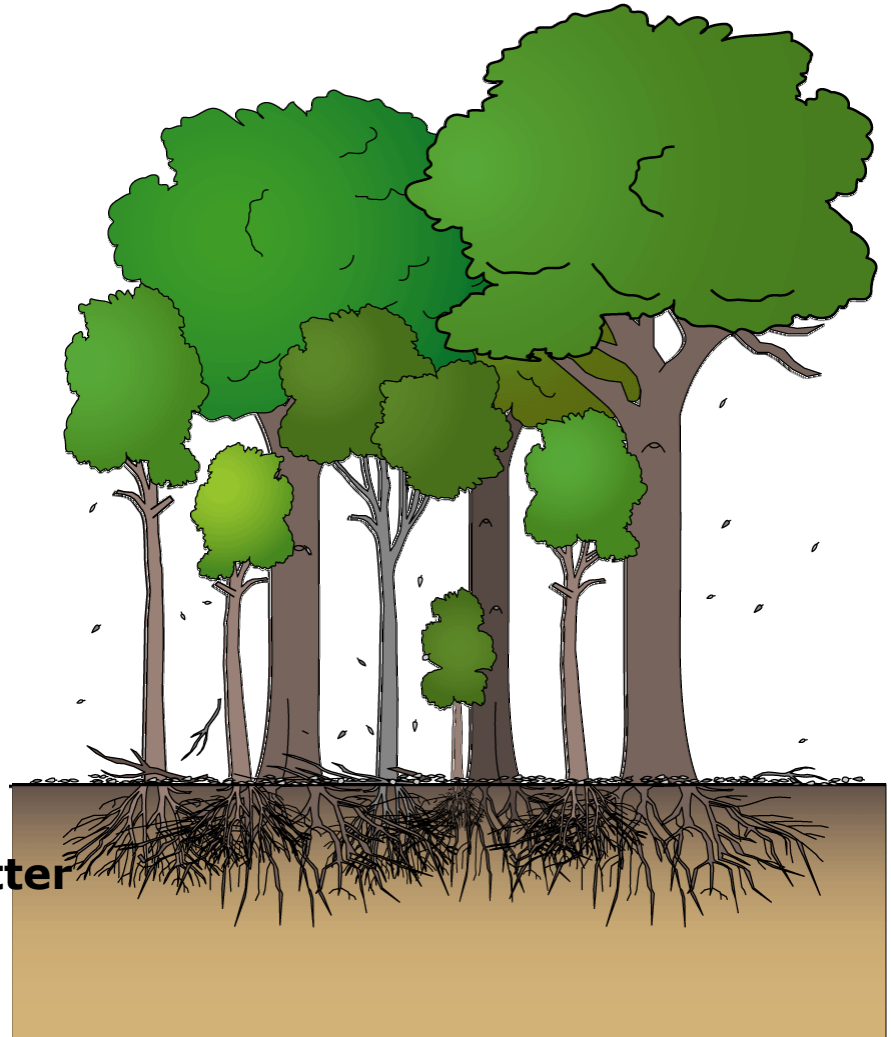
(i) **Use a combination of remote sensing and ground-based forest carbon inventory approaches** for estimating, as appropriate, anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes;

(ii) Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities;

(iii) Are transparent and their results are available and suitable for review as agreed by the Conference of the Parties;

Emission factors

IPCC has identified five carbon pools



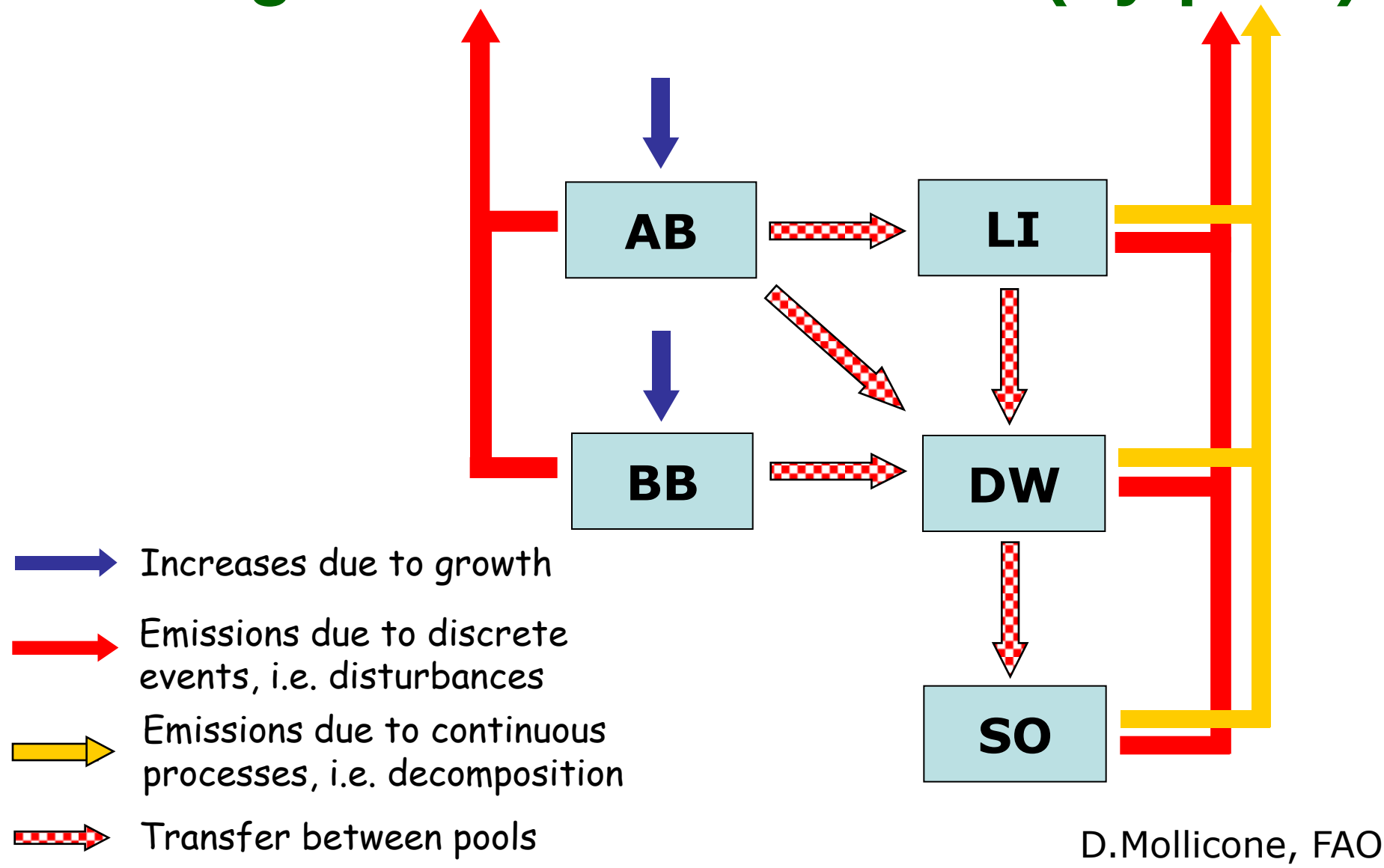
Above-ground biomass

Litter, dead wood and soil organic matter

Below-ground biomass

D.Mollicone, FAO

Changes = Gains – Losses (by pool)



D.Mollicone, FAO

Fire chapter

2.5 METHODS FOR ESTIMATING GHG'S EMISSIONS FROM BIOMASS BURNING

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2.5.1 Scope of chapter

Chapter 2.5 is focused on fires in forest environments and how to calculate greenhouse gas emissions due to vegetation fires, using available satellite-based fire monitoring products, biomass estimates and coefficients.

Section 2.5.2 introduces emissions due to fire in forest environments and approaches to estimates emissions from fires.

Section 2.5.3 focuses on the IPCC guidelines for estimating fire-related emission.

Section 2.5.4 focuses on Systems for observing and mapping fire.

Section 2.5.5 describes the potential use of existing fire and burned area products.

2.5.2 Introduction

2.5.2.1 REDD and emissions due to fire in forest environments

Fire is a complex biophysical process with multiple direct and indirect effects on the atmosphere, the biosphere and the hydrosphere. Moreover, it is now widely recognized

Fire observations and their usefulness for national REDD implementation

Approach	Information	REDD objective	Suitability
Pre-fire	Early warning system	Protect forest areas at risk and address leakage and permanence	Most suitable for countries with significant amount of wildland fires and known fire regimes
Active fire	Hot spot satellite data	Fire relief and active emissions reduction Support of in-situ actions	Most suitable for countries with large number of small-scale deforestation fires
Post-fire	Burned area estimates	Support estimation of areas of deforestation and degradation	All countries with forest loss due to fire

IPCC methodology for REDD+

REDD+ potential activities		**Forest sector (AFOLU / IPCC)**
Deforestation	=	Forest land converted to other land
Degradation SMF Conservation Enhancement F C S	=	Forest land remaining forest land
Enhancement F C S	=	Other land converted to forest land

REDD and fire emissions

- Fire as
  - Ecological change agent
  - A disturbance
  - Process associated with land cover conversion
  - A land management tool
- For now, limited to above ground biomass

REDD+ and fire emissions

What fire activities can be relevant to REDD+?

- Mapping and monitoring fire as a disturbance for carbon accounting (forest loss and forest degradation) as well as permanence and leakage monitoring
- Fire management in fire-prone savannah ecosystems

Crucial question for country level actions

- The Marrakech accords mandate that ecosystems with 10% to 30% tree cover might be considered as forest or not
- This would include most of the fire-prone savannah ecosystems.
- Emission reduction through fire management could be part of REDD+ actions (example of Australia).

Implications for emissions

- If fire is a disturbance in forest ecosystems, computation of the emissions from deforestation and forest degradation (CO_2 and other gases)
- In savannah and grassland, the IPCC guidelines assume that there is full regrowth within the year, so CO_2 emissions are balanced by carbon absorption (but CH_4 and N_2O are not!)

Emission computation

- “ Bottom up”: for IPCC,

$$Lfire = A \times Mb \times Cf \times Gef$$

L emission for each gas

A area burned

Mb fuel load

Cf combustion factor

Gef amount of gas released per unit of biomass consumed by the fire

(alternative approach: estimation of fire radiative power from satellite now allows for “top down” direct estimation of the biomass burned; limitations due to sampling)

Emission Estimation

- We need spatially and temporally distributed
  - Burned areas (almost there)
  - Biomass (almost there – models and landcover maps)
  - Combustion completeness (very uncertain)
  - Emission factors (almost there, but not temporal variation)

Tier 2 and tier 3 assessments are possible, but cannot rely solely on available global products!

Satellite data

- The nature of fire as non-permanent land cover change poses requirements on temporal sampling more strict that for other disturbances
- Available sensors (tradeoff between spatial and temporal resolution):
  - Hyperspatial: 1-10 m pixel, available sporadically
  - Moderate / high: 10-30 m, available weekly/monthly
  - Coarse: over 100m, available daily

Satellite products

- Do we have those data with the accuracy needed e.g. 1 ha?
  - Plenty of systematic fire products, none at the moment with sufficient spatial resolution (not to mention the validation)
  - Some high resolution mapping systems (e.g. ESA supported Landsat scale mapping in Mediterranean, EFFIS, MTBS) but not systematic, and not in many countries that would need it

What's next?

- Fire section: level of detail inadequate for country level carbon accounting
- Beyond mapping burned areas, need to adequately estimate carbon transfers for each pool:
  - Pre fire biomass
  - Combustion completeness
  - Fire behaviour
  - Seasonality of emission coefficients

What's next?

- What's the future role of the sourcebook? Can it continue as unfunded activity?
- GOFC-Fire should have a role beyond the sourcebook, especially involving the regional networks
- Funding opportunity through NASA for workshop on Fire and REDD, with focus on the use of existing products, could be combined with next IT meeting (Idaho 2014?)