

THE LAND COVER COMPONENT OF THE
ESA CLIMATE CHANGE INITIATIVE



EXTENDING THE SERIES OF GLOBAL LAND COVER MAPS TO
2015 WITH PROBA-V: CURRENT ACHIEVEMENTS

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Why do climate modelers care about land surface ?

- Significant impact of terrestrial part to the climate system for:
 - fundamental climate understanding (fluxes of water, C and energy)
 - used in impact and mitigation assessments at various scales

(2010 GCOS Implementation Plan)

→ Requirements for a consistent long term time series of land cover

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5 Terrestrial ECVs in the CCI

land cover fire ice sheets glaciers soil moisture



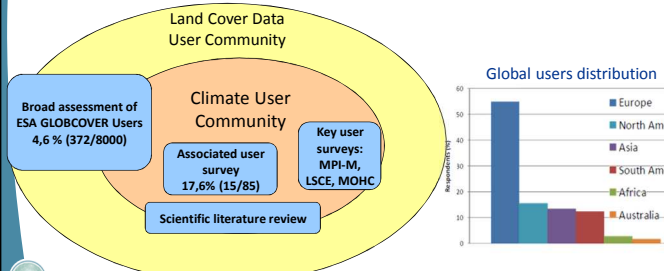
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Land Cover for Climate Modeling

- 6 months dedicated to users consultations
 - Need for stable LC maps over time
 - Need for a dynamic component reflecting change, vegetation phenology



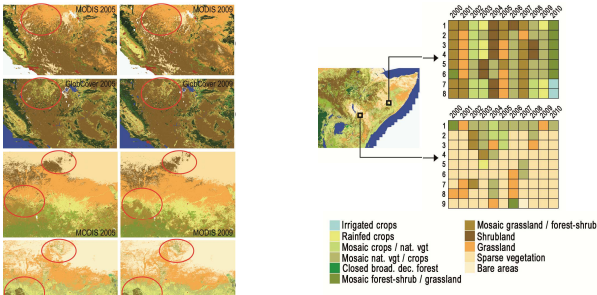
Global users distribution

Region	Number of Users
Europe	~55
North America	~15
Asia	~10
South America	~5
Africa	~2
Australia	~1

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Annual or limited time series → inconsistency between LC maps

Very challenging for all global land cover products showing annual variations not related to 'land cover change'

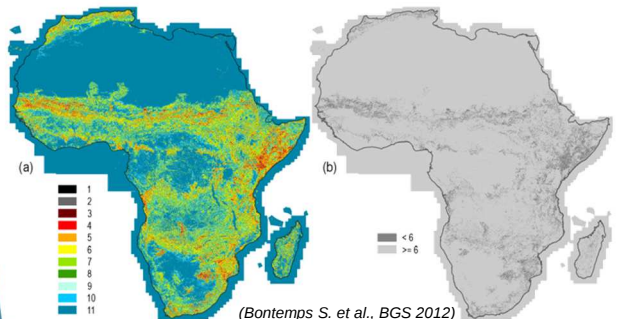


Bontemps et al., BGS 2012

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Annual or limited time series : transition zone prone to LC inconsistency

Nbr of occurrences of the same LC class Stable versus less stable region
from annual land cover maps land cover mapping

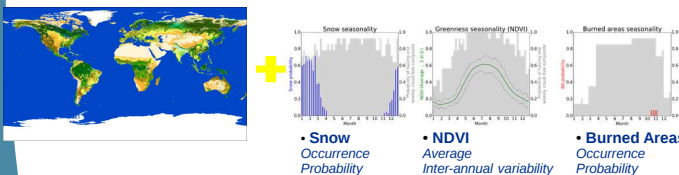


(Bontemps S. et al., BGS 2012)

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Revisited land cover concept: land cover + land surface seasonality

Land cover can not be the (observed) physical and biological cover on the terrestrial surface (LCCS 2005; GTOS ECV 2009) ...
and remains stable and consistent over time (as requested by climate modelers)
→ Mapping **land cover** & **land surface seasonality**



Defourny et al., 2013

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Land cover maps for 3 epochs 2010 (2008-2012), 2005 (2003-2007), 2000 (1998-2002)

- Input EO time series:
 - Envisat MERIS Full Resolution (near-global every 3-9 days 300 m reflectance in 15 bands (blue to NIR), 2003-2012)
 - Envisat MERIS Reduced Resolution (global every 3 days 1.2 km reflectance in 15 bands (blue to NIR), 2003-2012)
 - SPOT Vegetation 1 & 2 (global daily 1-km surface reflectance in 4 bands (blue to SWIR), 1999-2012)
 - Envisat ASAR WS, IMM & GM from 2005 to 2012

Satellite	Instrument	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ESA	Envisat																									
	Envisat																									
	PROBA-V																									
	Sentinel-3																									
Europe	SPOT-4																									
	SPOT-5																									
	METOP																									

→ 3rd global full archive reprocessing of MERIS (160 TB) + VGT (10TB)

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