GCOS High Resolution Land Cover ECV

Detailed Land Cover and Climate

Land cover and its changes

- modify the goods and services provided to human society

- force climate by altering water and energy exchanges with the atmosphere

- change greenhouse gas and aerosol sources and sinks.

Land-cover distribution is partly determined by regional climate, so changes in land cover may indicate climate change.

- To understand the role of land cover, land-cover classification systems and legends need to adhere to internationally-agreed standards.

- Change analysis annually of the spatial distribution of land-cover characteristics is applicable to climate modelling, mitigation and adaptation activities, and ecosystem models. To achieve these in particular mitigation and adaptation requires 10-30m-scale land-cover maps.

- Class-by-class thematic/spatial accuracy to meet the transparency needs required to ensure a proper and informed use of lannd cover datasets.

Map products are needed for forest monitoring and reporting activities as part of the REDD+ mechanism.

- There is a need to understand how the Land Cover ECV products relate to these map products. This requires high resolution land cover.

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HR Land Cover: GCOS ECV Requirements

GCOS Requirements

	Freq.	Resolution	Uncertainty	Stability/ decade
Maps of high resolution land cover	Every 5 years	10 - 30m	5% (omission and commission in classes). Location accuracy better than 1/3 IFOV	5 % (as uncertainty)
Maps of key IPCC land use and related changes	1-10 years (incl. historical data)	10-1000 m (depending on time period)	20% (maximum error of omission and commission in classes), Location accuracy better than 1/3 IFOV	20% (as uncertainty)

Land Cover: International Context

A large of number of initiatives/users of these products exist, including:

GOFC-GOLD – assesses needs and deficiencies for monitoring of land cover

NASA LCLUC Programme - where, when, how much and why are land-cover and land-use changes

Global Forest Observation Initiative (GFOI) - supports REDD+ countries
to develop their national forest monitoring systems

Land-Use and Climate, IDentification of robust impacts (LUCID) - robustness of possible impacts of land cover changes (LCC) at a local and remote level for CMIP.

International Land Model Benchmarking (ILAMB) - model-data intercomparison and performance assessment

GEO Carbon and GHG Initiative (GEO-C) - carbon budgets from local to global scale

EC Copernicus Land Service – Global, Pan_European, Local Data on Land Cover

EC Copernicus Climate Change Service - Past, current and future states of the climate

HR Land Cover: Satellite Instruments

Taking account of the LandCover_cci (MERIS, VGT, AVHRR, PROBA) heritage, the satellite focus of HR Land Cover is:

- **Optical High Resolution:** Landsat TM, ETM, OLI, SPOT HRV, HRVIR, HRG, S-2 MSI …

- **Optical Very High Resolution:** IKONOS, QUICKBIRD-2, GEOEYE, WORLDVIEW, JSS 56, RAPIDEYE, PLANET …

- **Microwave High Resolution:** ERS, Envisat, Sentinel 1, Radarsat, JERS-1, ALOS, ALOS-2, TerraSAR, Cosmo SkyMed, ….
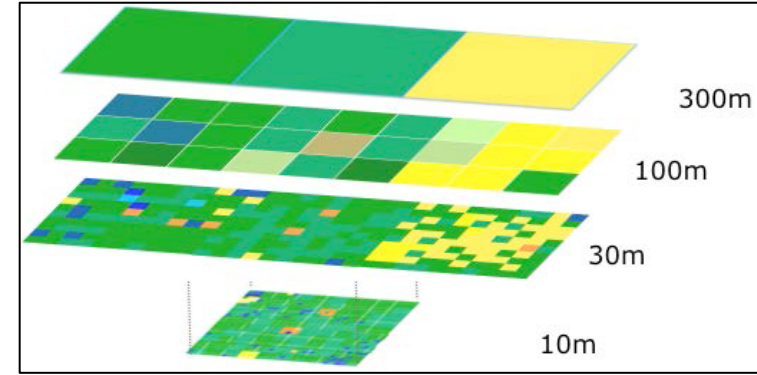
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The objectives of HRLC_cci are restricted in area with a focus on:

- understanding regional change in vegetation manifest either in terms of land cover or in terms of vegetation state as it affects classification over time, as driven by climate.

- understanding classification variability across spatio-temporal scales from the moderate resolution previously tackled in LandCover _cci.

- understanding how the Land Cover ECV products at moderate resolution relate to the map products needed for mitigation and adaptation at local scales including forest monitoring and reporting activities as part of the REDD+ mechanism.

HR Land Cover: Key Issues for CCI+ (2)

Given these objectives the HRLC_cci will aim to generate global land cover at high resolution with a focus on two aspects:

- Investigation of the role of spatial-temporal resolution on the consistency of land cover classification

- To understand and assess climate impacts on observed land cover change and potentially vice-versa by examining regions on the globe that have been exposed to either extremes of climate or climate is purported to have changed significantly over the period of satellite observations.

These two axes will be tackled over the period consistent with LandCover_cci i.e. 1992-2015 with updates to the present as the project develops.

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