

# CopLAC-Chile A Regional Copernicus Center for LAC

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Mathematical  
Modeling





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# Data access evolution

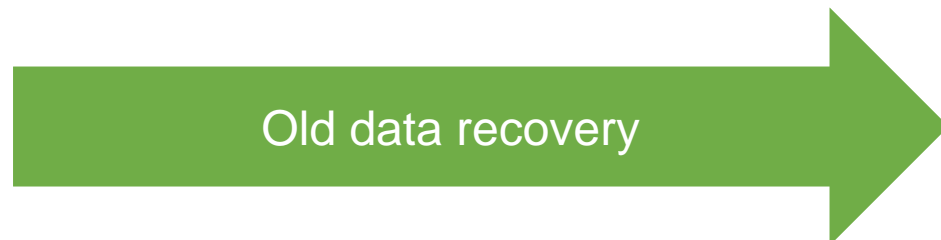


6 months

12 months

Full archiving facility  
(2014-)

No current archiving  
facility



Old data recovery



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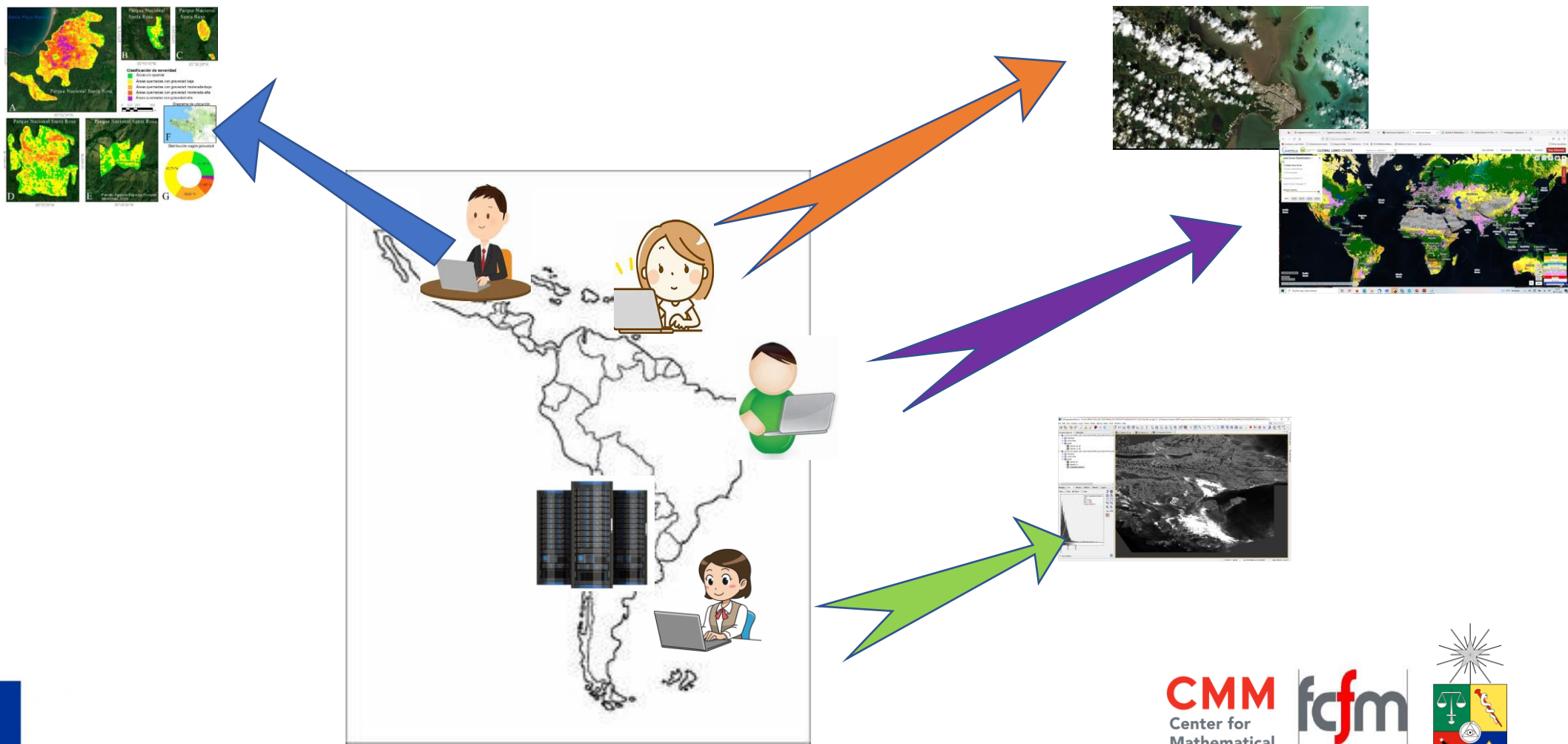
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# A private cloud for Satellite Imagery



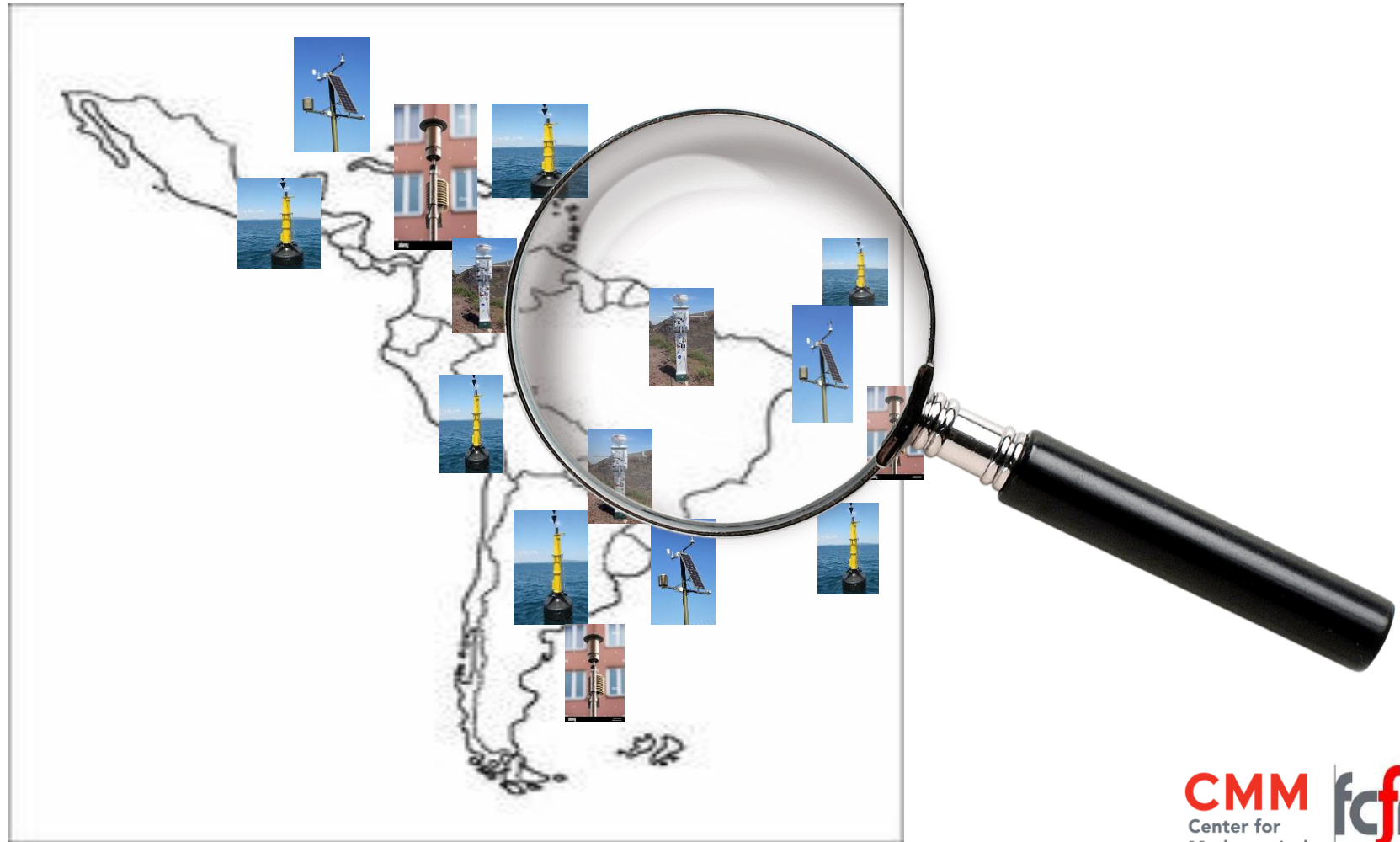
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# A Federation of "In Situ" Data and Search Engine

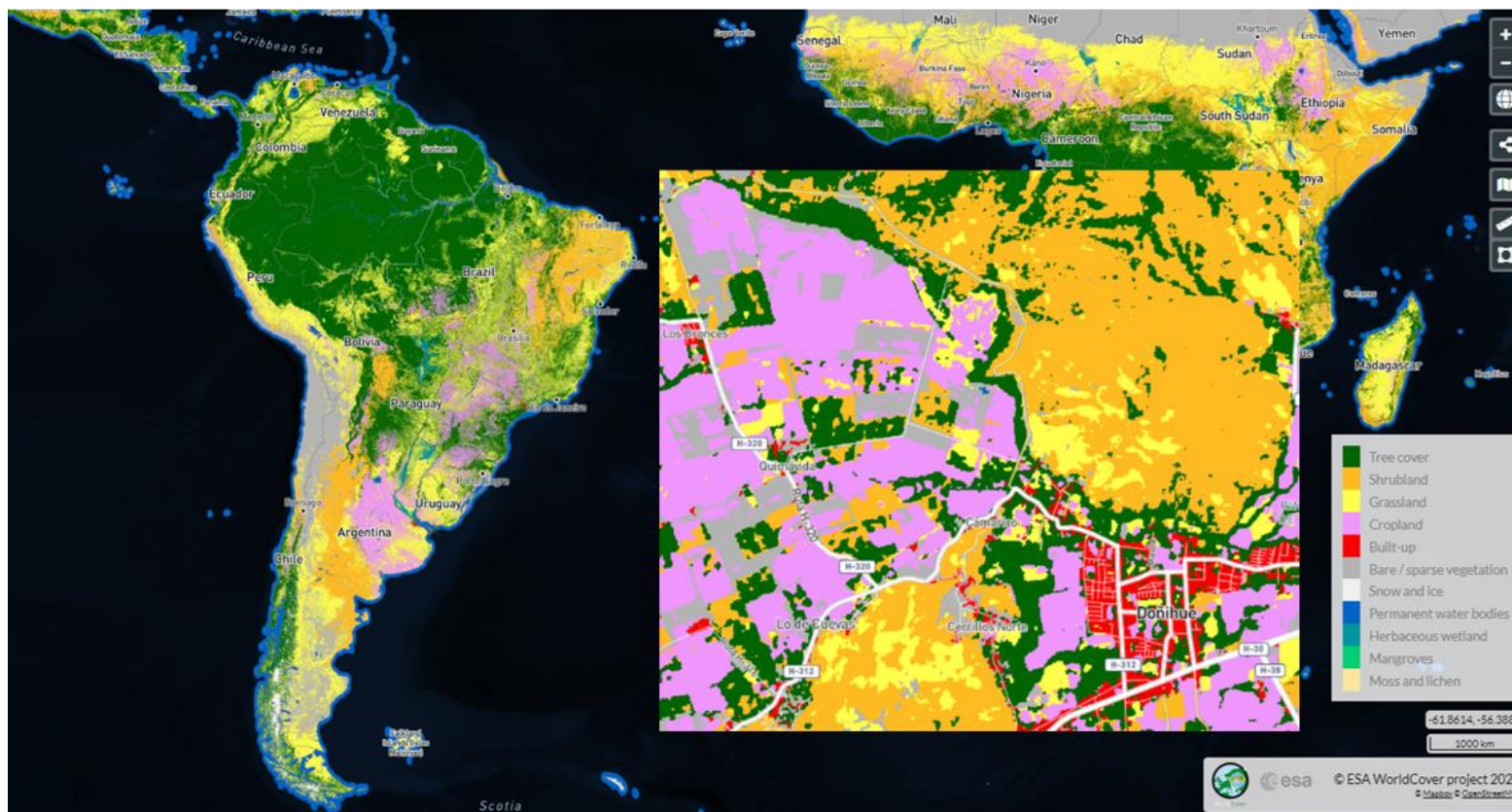


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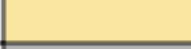
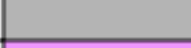


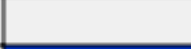


# Public Value Added Services: Localized Land Cover/Land Use for LAC



There are several classifications, depends on the users.







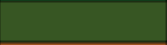














## COPERNICUS GLOBAL LAND SERVICE LAND COVER LEVEL 1

| CGLS-LC-100  |   |
|--|---|
| Forest   |  |
| Shrubs   |  |
| Herbaceous vegetation                                    |  |
| Herbaceous wetland                                       |  |
| Moss and lichen  |  |
| Bare / sparse vegetation                                 |  |
| Cultivated and managed vegetation/agriculture (cropland) |  |
| Urban / built up   |  |
| Snow and Ice   |  |
| Permanent water bodies                                   |  |
| Open sea   |  |

- Global maps of annual land cover between the years 2015-2019 with 80% precision and reference year 2015 with a resolution of 100 m.
- Training set: 168,000 points at 10m and coverage fraction layers for 2015



# MODIS ANUAL GLOBAL LAND COVER (MCD12Q1) LEVEL 1












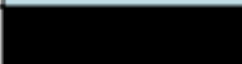
| MCD12Q1                                     |   |
|---|---|
| Barren                                      |    |
| Permanent Snow and Ice                      |    |
| Water Bodies                                |    |
| Evergreen Needleleaf Forests                |    |
| Evergreen Broadleaf Forests                 |    |
| Deciduous Needleleaf Forests                |    |
| Deciduous Broadleaf Forests                 |    |
| Mixed Broadleaf/Needleleaf Forests          |    |
| Mixed Broadleaf Evergreen/Deciduous Forests |    |
| Open Forests                                |    |
| Sparse Forests                              |    |
| Dense Herbaceous                            |    |
| Sparse Herbaceous                           |    |
| Dense Shrublands                            |    |
| Shrubland/Grassland Mosaics                 |    |
| Sparse Shrublands                           |    |
| Urban and Built-up Lands                    |    |
| Forest/Cropland Mosaics                     |   |
| Natural Herbaceous/Croplands Mosaics        |  |

- The maps are prepared from the supervised reflectance classification obtained from the MODIS Nadir BRDF-Adjusted Reflectance (NBAR) bands averaged every 8 days.
- Prepares annual land surface coverage and use classifications from 2001 to the present at a resolution of 500m





# FAO GLOBAL LAND COVER SHARE (GLC-SHARE) LEVEL 1

| GLC-SHARE   |  |
|---|--|
| Tree Covered Areas                                  |    |
| Shrubs Covered Areas                                |    |
| Herbaceous vegetation, aquatic or regularly flooded |    |
| Grassland   |    |
| Mangroves   |    |
| Sparse vegetation                                   |    |
| Bare soil   |    |
| Cropland  |    |
| Artificial Surfaces                                 |    |
| Snow and glaciers                                   |    |
| Water bodies  |   |
| Unclassified  |  |

- Available biannually since 2014.
- Spatial resolution of 30 arc-seconds (~1km).
- Prepared from the UN-FAO LCCS classification system.
- Land cover data from various sources are combined and integrated at the level (from sub-national to global) to create a coherent global product.

\*Clases de cobertura nivel 1



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| ESA CCI  |              |
|--|--------------|
| Cropland, rainfed  | Yellow       |
| Cropland, irrigated or post-flooding   | Cyan         |
| Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%) | Light Green  |
| Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%) | Medium Green |
| Tree cover, broadleaved, evergreen, closed to open (>15%)                          | Dark Green   |
| Tree cover, broadleaved, deciduous, closed to open (>15%)                          | Green        |
| Tree cover, needleleaved, evergreen, closed to open (>15%)                         | Dark Green   |
| Tree cover, needleleaved, deciduous, closed to open (>15%)                         | Dark Green   |
| Tree cover, mixed leaf type (broadleaved and needleleaved)                         | Dark Green   |
| Mosaic tree and shrub (>50%) / herbaceous cover (<50%)                             | Dark Green   |
| Mosaic herbaceous cover (>50%) / tree and shrub (<50%)                             | Brown        |
| Shrubland  | Dark Brown   |
| Grassland  | Orange       |
| Lichens and mosses   | Pink         |
| Sparse vegetation (tree, shrub, herbaceous cover) (<15%)                           | Yellow       |
| Tree cover, flooded, fresh or brackish water                                       | Dark Teal    |
| Tree cover, flooded, saline water  | Green        |
| Shrub or herbaceous cover, flooded, fresh/saline/brackish water                    | Bright Green |
| Urban areas  | Red          |
| Bare areas   | Yellow       |
| Water bodies   | Blue         |
| Permanent snow and ice   | White        |
| No Data  | Yellow       |
| Unclassified   | Black        |



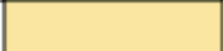





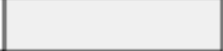
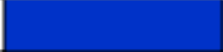

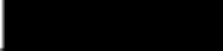
- Available annually from 1992 to 2020.
- Spatial resolution of 300 meters.
- Its development process is divided into two periods: Version 1 from 1999 to 2015 and version 2 from 2016-2020. Prepared from the UN-FAO LCCS classification system





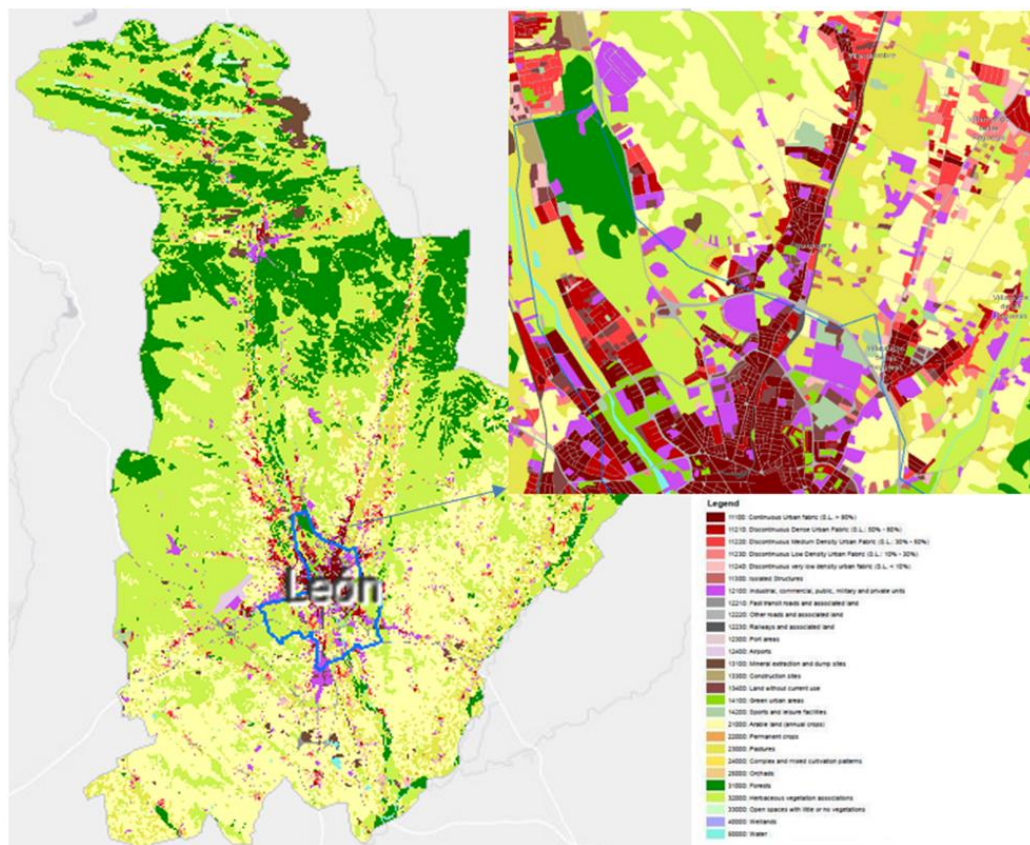
# Our Proposal: LAC-LC

## Preliminary conclusions and ideas

| LAC-LC                   |  |
|--------------------------|--|
| Natural Forest           |    |
| Artificial Forest        |    |
| Desert                   |    |
| Shrubs                   |    |
| Herbaceous vegetation    |    |
| Bare / sparse vegetation |    |
| Agriculture (cropland)   |    |
| Urban / built up         |    |
| Snow and Ice             |    |
| Permanent water bodies   |    |
| Open sea                 |   |
| Unclassified             |  |

- LULC global products are developed based on general ideas or criteria for landscape description. We need to construct a new classification adapted to our reality.
  - We suggest including Desert and distinguishing between natural forest and forestry cultivation**, e.g.: Sterile soils vs deserts; tree plantations vs jungle or native forests.
- There are some classification levels that could include continuous variables for their definition, e.g. % of class coverage or density.
- We recommend incorporating measurements of surface using active sensors to improve classification performance.
  - Different classes of tree cover
  - Higher resolutions and differences in urban areas
- If we do a "cross-examination" of the suggested products and classes, we can have an idea into which Level 2 classes need to be discussed.

# Public Value Added Services: Urban Monitoring/Development Scenarios



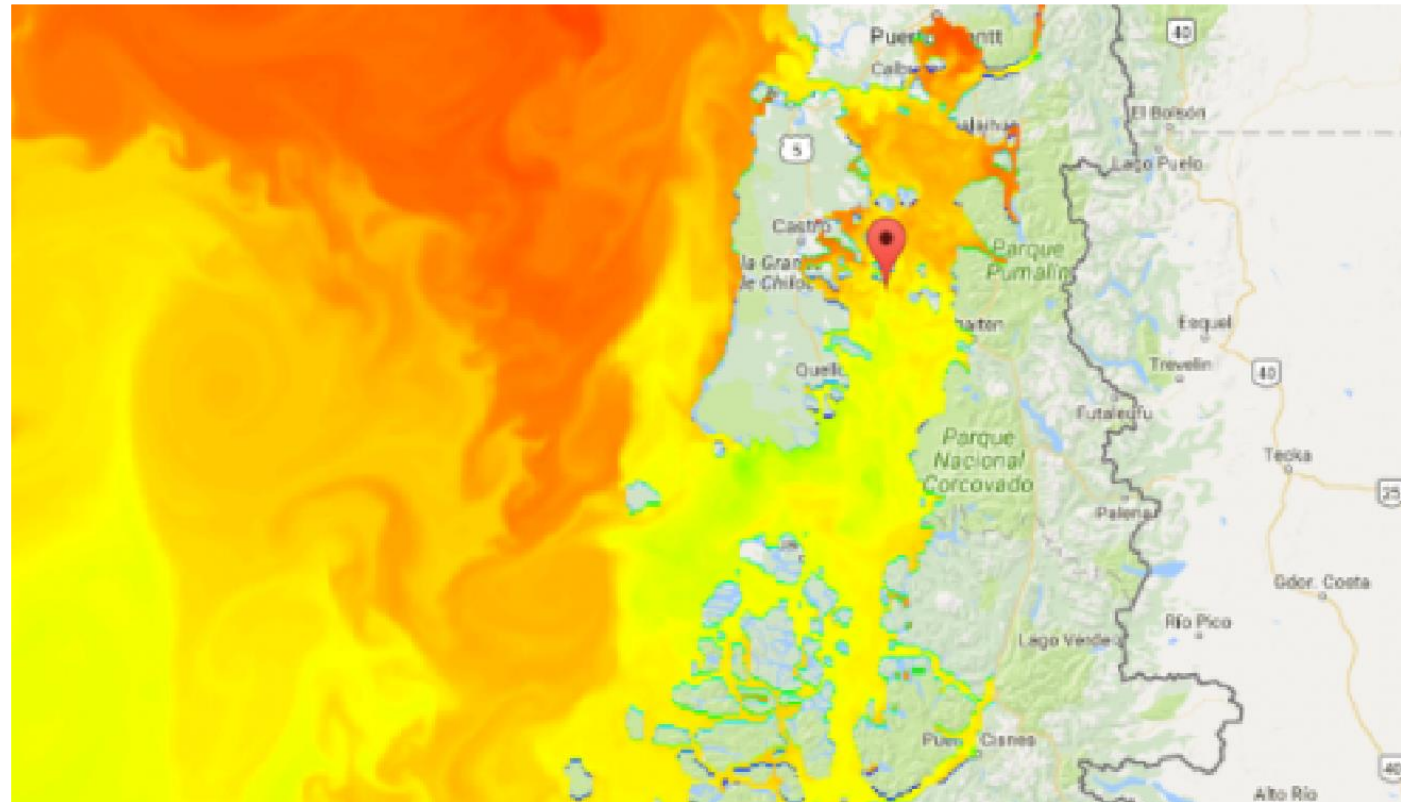


# What information do we hope to produce?

- Urban Atlas Coverage and land use (17 classes)
- Urban street tree layer: Corridors or contiguous patches of trees covering at least 500 m<sup>2</sup> and a minimum mapping width of 10 m on artificial surfaces
- Urban building height (10 m raster)
- Waterproofing (10 m raster)
- We need to select the cities in LAC with our partners

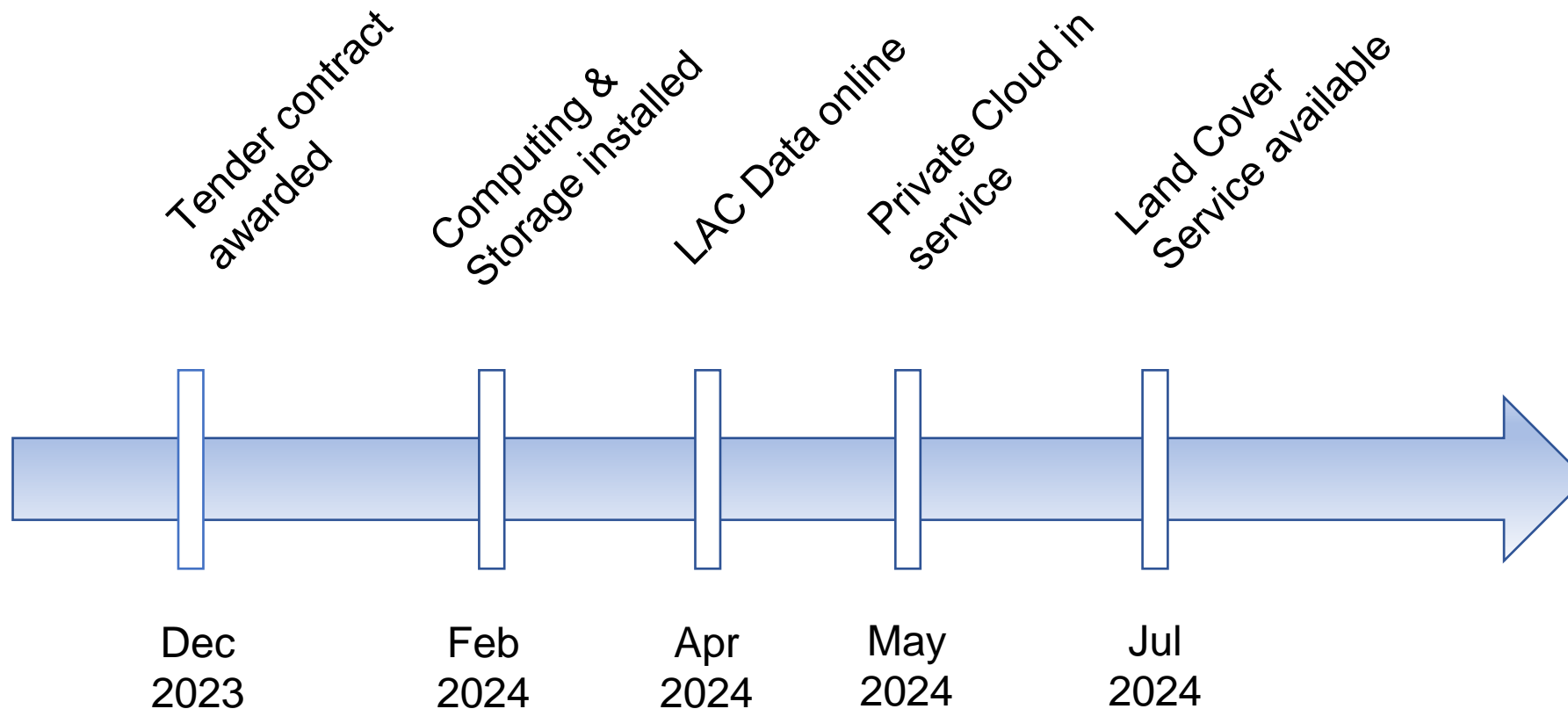


# Public Value Added Services: Localized Ocean Monitoring





# Project Calendar



# Thank you