TerraLook: Simplified Access to Satellite Images

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Government sponsorship acknowledged.
CONDOR
Version 1.1

UNA HERRAMIENTA DE
ANÁLISIS REGIONAL PARA EL
Desarrollo Sostenible en
LA REGIÓN ANDINA
SURAPA -> RedParques (FAO, EU, CI)
Bienvenidos

Red de Información sobre Áreas Protegidas de los Andes Tropicales y la Cuenca Amazónica
Colaboraciones
NASA – JPL Gary Geller

- ASTER y LANDSAT
- Terra Look version 2 (Machu Picchu) en Ingles y Castellano disponible
Sensor Remoto: mide algo a distancia

- Formato Típico: fotografía (imagen) y algo más…

Son Conjuntos de Datos que incluyen

- Información Espacial (donde están localizados los objetos?)
- Información Espectral (color y longitud de onda)

Puede y debe ser manipulada para encontrar y resaltar características interesantes.
Parque Noel Kempff Mercado en Bolivia ejemplo de aplicaciones de SIG en combinación con imágenes satelitales.
Transformación de imágenes Landsat para mostrar la distribución de humedad en la zona de expansión de un parque natural.
Un transecto de 50 kilómetros alta resolución.
información acerca de la estructura de del dosel

Noel Kempff Mercado Parque Nacional; Bolivia
Deforestación

... evaluación del estado de conservación
Nuevas Alianzas: INPE Deforestación CBERS
Direct (in situ) biological monitoring
Remote sensing of ecosystems
Mapping of conservation actions

State
Pressure
Response

Inferred state of overall biodiversity

Coverage & representativeness of protected areas

Mapped / modelled patterns of biodiversity distribution

Structural & functional ecosystem attributes

Loss of particular habitat types

Land- or sea-use (ecosystem intactness)

Pressures from other domains (e.g. climate change)

Derived measures (indicators) of biodiversity change

Extinction - risk indices

Population trends of selected species

Other inputs

Inferred benefits (ecosystem services)

Benefits

Other inputs
How can satellite images be used for conservation?

What images and tools are available?

TerraLook—simple and free

- Sources of images
- Collections, images, and image footprints
- Constraints and limitations

Egmont NP, NZ
Background

- Satellite images of Earth have been available for 40 years
- Increasingly important to conservation users
  - Monitoring change (esp. land cover & land use)
  - Mapping
  - Planning
  - Communicating
What Can You See in Images?

Phu Kradung NP, Thailand
Using an Image
Using an Image
Using an Image
Using Images: Dong Houa Sao
Satellite Images for Conservation
2008

Satellite Images for Conservation
Comparison

Satellite Images for Conservation
Measure Area
Recommendation

Approximate excision boundary
Problem: Many image formats and systems are complicated
  • Hard to use
  • Require specialized software
  • Expensive

TerraLook addresses those issues
  • Simplified
  • User-friendly
  • Free
What is TerraLook?

TerraLook consists of two parts

1. Images
   • Free, global coverage
   • Use online tool to find and order images of interest

2. Software
   • To work with images
   • Optional—but “understands” TerraLook images
   • Image processing and GIS capabilities
   • Open Source
   • Free

http://terralook.cr.usgs.gov/
Images

- Currently come from two sources

1. Landsat
   - Operated continuously since 1972
   - TerraLook uses “Global Land Survey” layers
   - Global coverage, mostly cloud free

2. ASTER
   - Began operating in 2000
   - Full archive available to TerraLook
     - ~ 2 million scenes
   - Global coverage
Landsat

- Joint project between NASA and USGS
- Scene size 180 x 180 km
- 30m pixels (80m during the 1970s)
- Uses “path/row” grid

Satellite Images for Conservation
Advanced Spaceborne Thermal Emission and Reflection Radiometer

Joint project between US and Japan

Scene size: 60 x 60 km

15m pixels

Acquisitions not gridded

“Full” product: USD100

TerraLook jpegs are free
What Is a TerraLook “Collection”?

- Collection of one or many images
  - Images selected by the user

- Can be
  - Thematic (cities, protected areas, wetlands…)
  - Regional (e.g., national)

- Can contain any image from
  - ASTER archive (2000-present)
TerraLook Images

- JPEG format
- “Georeferenced”
  - Location of every pixel is known
- “Simulated natural color”
  - Live vegetation is green
  - Dead vegetation is brown or purplish
  - Water is blue
  - Urban areas, bare soil are whitish/bluish

Phu Kradung NP, Thailand
TerraLook Software

- Simple and intuitive
- Bilingual (English, Spanish)
- Open source
- Current version: 2.0 (“Machu Picchu”)

Satellite Images for Conservation

Iguazu Falls NP, 2012
With the TerraLook Software You Can:

- Display images
- Look at current and past images
- Look at change over time (e.g., Land Cover and Land Use)
- Display overlays
- Manage overlays
- Create new overlays
- More…
Frequency of Image Updates

- **Landsat**
  - TerraLook uses “Global Land Survey”
    - Updated at ~5 year intervals—could be a limitation
  - Full archive is actually available: Updated ~4x / year
    - *But:* TerraLook software needs to be updated to provide easy access

- **ASTER**
  - Full archive easily accessible
  - *But:* repeat frequency varies
  - *However:* Can request periodic ASTER acquisitions
    - Eg, annual acquisition of PAs of interest
    - Free, easy
Repeat interval

- 15-30 m pixels good for landscape level work
  - Eg, change in Land Cover or Land Use
  - But, selective logging, other issues may not be visible

Cannot always get everything you want

- Clouds can be an issue (esp in equatorial tropics)
- Gaps in acquisitions
- Instrument problems
- But...usually, can get most of what you need
Work in Progress

- Will soon start new web-based version of TerraLook
  - Based on Google “EarthEngine” from google.org

- Will provide access to all Landsat scenes in archive
  - Shorter repeat interval

- Also provide access to other image sources (but no ASTER access)

- Will provide some new capabilities: we welcome input from RedLAC
  - What should it do
  - How to make it easy to use

- Timeframe
  - Initial version first half of 2013
Summary

- TerraLook
  - Free
  - Simple and intuitive, easy to use
    - 1-3 h of training (perhaps self-training)
  - Good for LULC change, visual analysis, communication
  - Does have some limitations

- Coming next year
  - TerraLook-inspired online, web-based system using Google “EarthEngine”
  - Access to full Landsat archive, plus other sensors
  - Some new capabilities

http://terralook.cr.usgs.gov/